# The Bison Producers' Handbook

**A COMPLETE GUIDE TO PRODUCTION AND MARKETING**

## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgments</td>
<td>5</td>
</tr>
<tr>
<td>Foreword</td>
<td>7</td>
</tr>
<tr>
<td>Bison Through History By Robert Pickering, Ph.D.</td>
<td>9</td>
</tr>
<tr>
<td>The Early Days: Ranchers' Role in Bison Restoration</td>
<td>21</td>
</tr>
<tr>
<td>Native Herds Pushed to the Fringes</td>
<td>35</td>
</tr>
<tr>
<td>The Bison Business Today</td>
<td>39</td>
</tr>
<tr>
<td>Characteristics and Behavior of the American Bison.</td>
<td>47</td>
</tr>
<tr>
<td>The Pasture Environment</td>
<td>57</td>
</tr>
<tr>
<td>Modern Bison Handling Systems</td>
<td>69</td>
</tr>
<tr>
<td>Selecting the Right Foundation Stock</td>
<td>77</td>
</tr>
<tr>
<td>Small Scale Management</td>
<td>85</td>
</tr>
<tr>
<td>Large Scale Bison Management</td>
<td>91</td>
</tr>
<tr>
<td>Low Stress Bison Handling</td>
<td>99</td>
</tr>
<tr>
<td>Bison Health.</td>
<td>117</td>
</tr>
<tr>
<td>Grass Finishing Bison</td>
<td>135</td>
</tr>
<tr>
<td>Finishing Bison with Grain</td>
<td>145</td>
</tr>
<tr>
<td>The Farmers' Market Option for Selling Bison Meat</td>
<td>155</td>
</tr>
<tr>
<td>Selling Directly to Restaurants and Retail</td>
<td>167</td>
</tr>
<tr>
<td>Commercial Marketing of Bison</td>
<td>173</td>
</tr>
<tr>
<td>Marketing your Bison Business on the Internet</td>
<td>177</td>
</tr>
<tr>
<td>Social Media, The New Marketing Tool</td>
<td>181</td>
</tr>
<tr>
<td>Utilizing Specialized Marketing Claims</td>
<td>185</td>
</tr>
<tr>
<td>Buffalo Field Harvest</td>
<td>191</td>
</tr>
<tr>
<td>Value Added Bison Products</td>
<td>195</td>
</tr>
<tr>
<td>Agritourism in the Bison Industry - A Growing Opportunity</td>
<td>199</td>
</tr>
<tr>
<td>Gate to Plate Bison Operation</td>
<td>205</td>
</tr>
</tbody>
</table>
The National Bison Association first and foremost thanks the dedicated individuals who shared their expertise and experience to contribute the material of this handbook. You exemplify the character of our business; the willingness to help others come along to be a part of this unique slice of American agriculture, and a growing part of the American culinary experience.

We also acknowledge the U.S. Department of Agriculture’s Risk Management Agency and SARE (Sustainable Agriculture Research Education) for providing the financial support for this handbook as part of two grants awarded to the NBA by the agencies to strengthen the capacity of bison producers to provide better strategies to mitigate risks.

There are numerous people not mentioned in the bylines, who fact-checked information. You may not be named, but thank you nonetheless. And, thanks to Sue Carter for proofreading these chapters, even as her computer was hacked, causing the need for double-proofing in some instances. We would also like to thank our intern, Alexandria White, for committing her time and talent to the development of this book.

Thank you to all who have helped bring the bison business to its point of vitality today. You may not be in the bylines of the chapters, but you have contributed to the base of knowledge in these pages.

Ultimately, all thanks go to the bison. Conventional agriculture today is based on producing commodities…generic items grown as quickly as possible, and processed as cheaply as feasible. We are not conventional. Anyone involved with buffalo can likely tell you the first time they looked into the eyes of one of these animals. Bison ranchers don’t produce a commodity; we raise an animal whose hoof print has shaped the ecosystem in which we live. That’s why this producers’ handbook begins with a chapter that describes the pictographs in the ancient caves of France.
Foreword

Three decades ago, the ranchers founding the American Buffalo Association—one of the two organizations that merged to create the National Bison Association in 1995—published the *Buffalo Breeders’ Handbook and Directory*.

A copy is on my office bookshelf. The other night, I sat down and read through that 56 page magazine-style handbook.

Much of the production and handling information in that initial edition could have been entitled “What we’ve learned from cattle.” After all, most of the ranchers getting into bison at the time were converting from cattle operations. Their knowledge, and their frame of reference, was based on cattle. So, the logical advice seemed to be on how to handle bison like beef animals. There were even segments on dehorning and hoof trimming.

In terms of marketing, the readers were treated to extensive information on selling breeding stock, buying and selling at auctions, and how to construct private treaty sales. Oh, and there was a paragraph on selling to diet and health food stores, four paragraphs on selling to restaurants, and a paragraph on selling to special events.

The producers involved in compiling that initial *Buffalo Breeders’ Handbook* were working with the best knowledge available at the time. The commercial bison business was in its infancy. These ranchers were true pioneers; willing to step outside their comfort zone—risking the snickers and criticism of their neighbors—to move into largely unchartered waters.

Through the years, these magnificent animals have taught us a lot.

The production-oriented focus in the 1980’s and 90’s gave way to a meat marketing emphasis after the market crash of 2000. By 2010, retail stores, chefs, and homemakers in growing numbers had embraced the great taste, nutritional attributes, and sustainable ranching story of bison.
Since then, our business has enjoyed an unprecedented period of strength and stability. We are striving to build upon that foundation by providing newcomers and seasoned ranchers alike with valuable, practical information that will allow us to continue to meet our customers’ evolving expectations.

This handbook reflects the growth—in scale, and in knowledge—of our business over the past three decades. More than 25 producers and marketers have contributed material for this edition. Their combined experience in the bison business represents hundreds of years of accumulated knowledge. The information they share in these pages is rooted in years of practical experience in raising healthy bison, and in developing a connection with customers in retail stores, restaurants, farmers’ markets and other venues.

If you are a newcomer, congratulations. Reading this handbook can serve as the best immersion into our young and exciting business. If you’ve been around for a few years, we hope you’ll pick up some new thoughts and tips from your fellow producers and marketers. And, we hope this book will remain on your bookshelf as a ready reference… at least until the next edition comes out with newer information.

There was one more thing that struck me as I leafed through the yellowing pages of that 1985 handbook. Several of the names—and the faces—in that publication are still active, contributing participants in the National Bison Association and the buffalo business. Buffalo people persevere.

I think that each of those veterans, along with those who helped author this book, will agree that written information is valuable, but our true knowledge comes from the animal.

Every day spent with bison will provide great insight and understanding.

Let the journey continue.

DAVE CARTER

Executive Director
National Bison Association
The Ice Age story of bison begins in a world very different from the one in which we live today.

The Pleistocene epoch, as it is called by scientists, lasted from about 1.8 million years ago to about 10,000 years ago. During the Ice Age, a high percentage of the Earth’s water was impounded in massive ice sheets, resulting in a significant drop in sea level around the world. Shallow coastal areas became dry land. The narrow watery channel, known as the Bering Straits, which exists today between North America and Siberia, would have been a wide, low, and wet plain where many generations of animals and early humans could have lived their entire lives or migrated into North America. During the Ice Age, not all of the northern portions of the globe were covered continuously by glaciers. There were alternating periods of cold and relative warmth. A rich environment of plants and animals adapted and flourished in this harsh climate.

Along with Steppe bison (the Ice Age ancestor of today’s bison), woolly mammoth, mastodons, woolly rhinoceros, musk ox, horses, and camels were large grazing animals that populated the Pleistocene or Ice Age landscape. Bison, like most of the other herbivores, ranged over major parts of northern Europe, Asia, and North America. Many of these species, except perhaps for the horse and the musk ox, were larger than similar animals today. Large body size has some adaptive advantages in cold climates.
A bigger, more compact body mass reduces heat loss. Longer, thicker body hair also provided some protection from the cold and would have been a noticeable physical difference compared to today’s animals.

The people who lived in Europe, especially in southern France and northern Spain, depicted dynamic and beautiful paintings of many of these animals on the walls of caves such as Lascaux, Altamira, and Chauvet. In fact, the Ice Age bison is the most commonly depicted animal on the cave walls. The frequency probably denotes the importance of the bison to early humans.

Whether there were behavioral or physiological differences in the animals of the Ice Age versus their modern descendants is a matter of debate among scientists. There is no evidence that Ice Age bison achieved the high population numbers that have been estimated for pre-European North America. If the populations were smaller or if they lived in smaller groups, their behavior also may have differed from modern bison. Without a great deal more research, describing ancient bison behavior is speculative.

Wherever there are grazing herd animals, there are likely to be meat-eating predators. Dire wolves, the American lion, saber-toothed cats, and giant short-faced bears were the Ice Age predators that filled the ecological niche of modern bears and wolves. Just as the grazers were larger than their current counterparts, so too, the predators also were larger. For example, the giant short-faced bear adults stood at least six feet tall at the shoulder. Their skulls were larger and broader than today’s grizzly bears.

During the Pleistocene, there was little difference between the Steppe bison of Siberia and the bison of North America. These animals are known as *Bison priscus* or *Bison latifrons* by scientists. Ice Age bison were huge. Males had horn spreads reaching more than two meters and were as much as 40 percent larger than today’s bison. The vertebral spines in the “hump” were much longer than in the more recent forms of bison.
Some of the best evidence concerning the form and habits of the Steppe bison of the Ice Age come from frozen mummies found in Alaska and Siberia. Whole and partial animals are preserved in the ice and permafrost of the Arctic. Portions of woolly mammoth, rhino, bison, ferret, pika, snowshoe hare, and ground squirrel have been found in a dried, frozen state. These discoveries provide tremendous information on the animals and the environments in which they lived. Scientists approach these sites with the same care and investigative skills that would be used in a human forensic case. Besides the characteristics of size and form, these mummified remains reveal patterns of hair distribution, color differences, diet, disease, and, sometimes, cause of death. In *Frozen Fauna of the Mammoth Steppe*, Dale Guthrie’s analysis of “Blue Babe,” a bison bull, reveals that Babe was killed by a small pride of American lions in the early winter, about 36,000 years ago. Guthrie named the specimen “Blue Babe” because of the mineral deposits that had developed on the skin over time. At least two other mummified, partial bison carcasses have been found in Alaska. These extraordinary discoveries revealed many details about the soft tissue of the bison such as characteristics of the hair, skin muscles, organs and other perishable tissues. Babe’s remains had a thick, long beard and thick hair on the legs and the belly, as well as on the hump. The autopsy of the bison revealed what Babe had been eating shortly before her death. Bits of plant fiber and phytoliths were recovered from the crevices in the teeth and identified.

Scientists who study bison and the Ice Age environment have noted that, as early as 50,000 years ago, a decline in body size and horn cores already was well underway. Bison were adapting to the changing environmental conditions at the end of the Ice Age and were beginning to look more like modern bison. The Ice Age ended with warming weather and retreating ice sheets. Changes in climate and moisture quickly
impacted the plant life and, subsequently, the grazers. Environmental changes created new challenges for all animals which involved adapting their habits to new conditions and plants. Some of the physical traits, such as large size and thick pelage, were advantageous in the Ice Age, but were no longer adaptive in the modern Holocene environment. Some animals, like the mammoth, mastodon, woolly rhinoceros, and horse, did not make the transition to the post-Ice Age environment in North America. Most of the carnivores also became extinct. Only one large, plant-eating species known as the bison successfully adapted to the modern environment. Smaller plant eaters that adapted to the new environment included moose, wapiti (elk), deer, and pronghorn. Understanding why bison were successful while the others were not is still an intriguing question worthy of more research.

For about 15,000 years, American bison have been totally separated from their Eurasian cousins due to the rise in sea level and the disappearance of the Bering land bridge. Estimates of the North American herd size at the time of European contact vary from 30,000,000 to 70,000,000 animals. The herds ranged from Alaska to at least the northern tier of Mexican states (Sonora, Chihuahua and Coahuila) and from New England to the West Coast. However, bison were not evenly distributed over the North American continent. They tended to concentrate and thrive west of the Mississippi where the prairie grasses extend to the horizon. Bison lived in the eastern woodlands probably as small isolated populations that could be sustained by small patchwork prairies or along rivers where grasses could thrive.

The first scientific description of bison was written by Linnaeus in 1758 (Systema naturae). He called living American bison, Bos bison, a species of cattle. He based his work on a 1651 description written by Francisco Hernandez, who coined the term Taurus mexicanus to describe the “wild cattle of moderate size with humped back, thick mane and a long dewlap.” Hernandez cited the reports of Coronado, who in 1541 was the first European to see bison in the Quivara region of northern Mexico. Today, this region is commonly known as central Kansas.

It was not until 1852 that scientists seriously tried to correlate the relationship between living and extinct bison. This was also the time when Charles Darwin and Alfred Russell were describing biological evolution by natural selection, and the quickening pace of exploration and discovery was rapidly increasing the numbers of living and extinct animals known to the European world. European and American scientists documented the differences between European plants and animals, and those found in the Americas. These differences proved to be fertile grounds for attempts to explain why the people, plants, and animals of the Americas were distinct. Scientists during this time could see that the European bison (wisent) were very different from the American bison. However, many questions arose. Were they a different species or a subspecies?
Were there any transitional forms between the two species? In the late nineteenth and early twentieth centuries, when a great deal of taxonomic studies were conducted, scientists working in different parts of the country often identified local forms of bison as different species or subspecies. In 1876, J.A. Allen defined two extinct species, *Bison latifrons* and *Bison antiquus*, and one living species, *Bison americanus* (Bison bison).

By 1947, the confusion reached its height when Skinner and Kansen defined one genus, five subgenera, ten species, and four subspecies of bison. In all, 27 species and subspecies of extinct and living bison in North America were named. In recent years, zoologists have taken a new view that sees primarily one form of bison that evolved through the millennia into minor, regional variant populations. While all of this taxonomic quibbling may be boring or, at best, irrelevant to today's bison rancher, it does represent an important point: over time, bison have changed. In fact, bison living at the same time probably differed slightly from place to place based on the geology and environmental conditions that sustained them.

**EARLY EVIDENCE OF BISON/HUMAN INTERACTION**

In 1908, an African-American cowboy by the name of George W. McJunkin discovered a site in New Mexico that revolutionized American archaeology. The Folsom site, as it came to be known, provided the first irrefutable evidence that human-made tools and Ice Age animals existed together. The site proved to be a bison kill, or bison jump, where Paleo Indians killed and butchered 23 bison nearly 10,000 years ago. The evidence included 19 fluted projectile points among the bison remains.

Jesse Figgins, the first professional director at the Denver Museum of Natural History (now, the Denver Museum of Nature and Science), excavated the Folsom site and returned to Denver with the artifacts and bison specimens. The Folsom evidence was controversial in that it placed people in the New World 5,000 years earlier than many scientists of the day believed. The prominent American physical anthropologist, Dr. Ales Hrdlicka of the Smithsonian Institution, refused to believe that people inhabited the Americas for more than a few thousand years. However, the quality of the excavation and the quantity of data from the Folsom site was undeniable.

The stone spear points used by hunters at this earliest time of bison and human interaction are distinct from more recent blades. They are lancelate in shape and have a distinctive flute or channel on one or both sides. The channel or flute extends from the concave base toward the point on both sides of the projectile. The flute was made by deftly removing a single long flake. The concave base and lower portions of the sides typically have their sharp edges ground smooth. Archaeologists interpreted this as a method used to keep the edges from cutting the bindings that attach the stone point to the shaft.
Aesthetically and technically, Paleo points are some of the finest stone tools ever produced in the Americas. They rival the quality of chipped stone tools found anywhere in the world. During the Paleo Indians period, these points were attached by fore shafts to spears. Although these spears could be used effectively for “jabbing” the bison, they were also used with an “atlatl” or spear thrower. Essentially, the spear thrower allowed the hunter to hurl the spear or dart with much greater force, but without a loss in accuracy.

The Folsom find encouraged others to look more intensively for Paleo sites. Through the Dust Bowl years, professional and amateur archaeologists hunted the “blow outs” caused by erosion, looking for projectile points and fossils. Scientific excavations began to uncover evidence of bison kill sites throughout a wide area of the west, from western Canada and the United States to Mexico and Central America. At least one Paleo kill has been excavated above 8,000 feet in the Rockies demonstrating that the climate at that time may have been milder, thus allowing animals to live, at least seasonally, at that altitude, to which human hunters were very capable of following them.

The number of kill sites is so great that the Paleo Indians are often described as a culture of big game hunters. Although they did hunt bison, the extent to which they depended on bison is not clear. It is very possible that, like many other cultures, the subsistence strategy of these people included gathering wild plants and hunting a wide range of animals, from cottontails to bison. However, a bison kill site usually leaves a thick layer of bison bones as evidence. If bison kill sites are over emphasized, it could be from the greater likelihood that these sites, with their large masses of dense bison bones, preserve better than a plant processing site, a fishing camp, or the refuse from hunting small game.

When the Spanish made landfall on the Caribbean coast of Mexico and began their conquest of the Aztec empire in 1519, they also reintroduced horses into the Americas. As the Spanish travelled into northern Mexico and what is now the American Southwest, they brought horses, cattle, and other domestic livestock with them. Various Indian tribes acquired horses for their own use and also traded them to other tribes farther north on the Great Plains of western North America. Within 150 years, many of the cultures on and near the Plains were transformed into horse-centered hunting.
cultures that focused almost exclusively on bison hunting for subsistence. Before the introduction of the horse, hunting by stealth with spear, and later, the bow and arrow was supplemented by using bison jumps or bison corralling techniques.

Organizing a successful hunt using a bison jump or corral was no small feat. Lots of planning and labor from the entire tribe was required. First, a suitable jump site had to be found. Very likely it would be near the traditional migration corridor of the bison. Two long drive lines of stone cairns (rock piles) were laid out in the form of a “V” with the point of the “V” at the edge of the appropriate cliff. Even today, some of these drive lines can still be seen; some of them are hundreds of yards in length. Of course, all of the work to prepare the drive lines had to be completed long before the bison arrived. Once a herd came near the drivelines, holy people, sometimes called shamans or medicine people, prepared for the hunt by praying and performing the necessary rituals.

A “buffalo caller” was a special person who performed rituals to attract bison toward the drivelines. Among many Plains tribes, there were individuals who were said to have the power to “call” bison. Frequently, a “buffalo stone” or iniskim, which resembles a bison shape, was central to the ritual. Iniskim are segments of ammonite fossils. In the 1950s, archaeologist Tom Kehoe interviewed an elder buffalo caller of the Blackfeet tribe. According to Blackfeet legend, the first iniskim revealed itself by singing of its power to a young woman. It asked her to take it to camp and the woman and her husband prepared the first bison calling ritual, which was done according to the instructions from the buffalo stone itself. Since that first ritual, the people could call the bison whenever their tribe was in need. Most of the Plains tribes have stories, myths, and rituals that center on bison and its crucial connection to the people.

Sometimes wearing the cape of an antelope or a baby bison, the buffalo caller danced and sang to attract the herd into the trap. Meanwhile the villagers, young and old, would be hidden behind the rock cairns waiting to do their part. As the bison entered the wide end of the “V,” people would rise up and come in behind the herd, causing them to move...
faster and faster down the ever-narrowing drivelines. The farther they ran into the “V,” the more people stood up, shouted or sang, and waved blankets to keep the bison within the drivelines and running toward the edge of the cliff. By the time the lead animals of the herd came to the edge of the cliff, it was too late to stop. They would topple over the edge, either killed by the fall or by other animals falling on top of them. For at least 10,000 years, this was a common and successful method of hunting bison.

Whether bringing down the animal by stealth or stampeding a herd over a cliff, hunting was risky and depended on the herd coming near the people. The introduction of the horse allowed hunters to range much farther afield to find the bison. Very quickly, Indian riders learned to use horses to help stampede bison or to attack them from horseback using spears, bows and arrows, or European long guns. Horses made hunting bison more efficient.

In fact, it appears from the archaeological record that well-known jump sites were used repeatedly, resulting in the build-up of large masses of bones and tools used for killing and processing the carcasses. Many of these kill sites reveal the butchering practices used by different groups. Archaeologists can estimate the number of people in the group based on the number of animals killed, and can further estimate the amount of meat resulting from these slaughters. The age of animals also can be determined, as can environmental factors. All of this data is used to reconstruct the season of the kill event and the kinds of activity that occurred at the site. Head-Smashed-In Bison Kill World Heritage Site near Ft. Macleod, Alberta, is an excellent example and interpretation of a kill site.

Curiously, there is very little archaeological evidence of bison east of the Mississippi before 1700. Prehistoric sites yield the bones of wapiti (elk), bear, deer, and a wide range of animals, fish, mollusks, amphibians, and reptiles but few remains of bison. The usual explanation is that the densely forested expanses east of the Mississippi were not good habitat for bison. That explanation is a good one, but, of course, not all of the lands east of the Mississippi were heavily forested all the time. Some small herds did exist in the east, perhaps as far north as New England and as far south as the northern Florida Keys, but their numbers were never great.
When bison bones are found on eastern woodland archaeological sites, they are usually found as finished artifacts. Very likely, these tools or the bones from which they were made, were traded from tribes farther west. Almost no depictions of bison have been found on any artifacts east of the Mississippi from prehistoric times. One very notable exception is a striking etching of a bison bull on a smoking pipe found at a site dating to about 1000 AD in the Chicago area.

Archaeologically, there is evidence that the bison range extended at least as far south as the Mexican state of Chihuahua and that they were being actively hunted. At the site of Paquime or Casas Grandes, artifacts with bison images have been found. More importantly, butchered bison remains were recovered at the site. Charles DiPeso, principle archaeologist of the excavations, said that during the Viejo Period of habitation (700-1060 AD), bison account for 93.7 percent of the meat produced. Since Casas Grandes was an extremely important trade center on the north-south route between Arizona/New Mexico and the Valley of Mexico (present day Mexico City), it could be speculated that bison may well have been known in the complex civilizations of Mexico. The Mexican historian, Solis, recounts a story that live bison were seen by the Spanish conquistadors in Tenochtitlán at the zoo of the Aztec emperor, Moctezuma. Although this particular story is unsubstantiated, it is certainly possible.

Bison have represented the best and the worst of the West. Once, the mighty herds stretched from horizon to horizon. To the American Indians, these animals provided an unending supply of food and raw material for tools, clothing, and other products. Perhaps even more important, bison sustained the spiritual as well as physical life. Indeed, Indian people lived in a spiritual universe in which everything had mystical properties. The people, bison, and all other living things were interrelated.

To the early European explorers, the bison represented the potential for easy wealth, personal profit, and freedom. However, many of those seekers found hardship and death rather than success. Bison running was a business venture with the goal of making the most money in the least amount of time. Conservation to sustain a species did not yet exist as an idea. Within a few years, even the runners recognized that the herds were rapidly diminishing. They moved from region to region to find new herds. Finally, in the 1880s, the bison runners had nearly completed their deadly endeavor, almost exterminating the bison and their own livelihood as well. Their success changed the West, its environment and cultures, forever, but not necessarily in ways they could predict or understand.

The most devastating period of hide hunting, known as the Great Slaughter, came at the end of the Civil War. Former soldiers, from the North and South, travelled west looking for new bison lives. Coinciding in time with the end of the war was the
burgeoning Industrial Revolution that swept across Europe and the Americas. Steam powered the engines and leather belts connected the engines to individual pieces of equipment in factories. Millions of bison leather belts were needed to keep the factories running. Trains connected the local economies of the West to the world economy of the Industrial Revolution. The need for strong, but cheap leather belts, more than fancy coats and lap robes, led to the near demise of the American bison.

Herds were not endless as the Indians and buffalo runners believed. The wealth of numbers were quickly squandered and the bison nearly disappeared, reduced to masses of rotting carcasses. Through this incredible shortsighted policy, the bison came very close to extinction. The size of the herds before 1800 is difficult to estimate. Regardless of how many bison existed in North America before Europeans arrived, there is no disagreement that at the end of the Great Slaughter, the number of animals remaining was no more than 1,500, probably as few as 1,000.

Using 30 million as a conservative estimate, the American bison herd was reduced to 1/2000th of its pre-European size. In genetic terms, this massive and rapid reduction is sometimes called a “bottleneck effect.” The biological question is how much of the genetic diversity of the pre-slaughter herd is present in the surviving herd. In other words, are today’s bison similar to or significantly different from earlier times? Perhaps the easiest answer is that the bison of today are the same as earlier ones. But as a population, they probably do not carry the genetic diversity that was present in the earlier American herd. For example, are bison now as large as their ancestors of 400 or 500 years ago? The slaughter selectively killed off the largest animals and the most robust bulls, thus eliminating the genetic components that contribute to large size.

William Hornaday stated the situation very succinctly in his 1887 article for the Annual Report of the Smithsonian Institution (published in 1889).

“It is hoped that the following historical account of the discovery, partial utilization and almost complete extermination of the great American bison may serve to cause the public
to fully realize the folly of allowing all our most valuable and interesting American mammals to be wantonly destroyed in the same manner. The wild bison is practically gone forever and in a few more years, when the whitened bones of the last bleaching skeleton shall have been picked up and shipped east for commercial uses, nothing will remain of him save his old, well-worn trails along the watercourses, a few museum specimens and regret of his fate. If his untimely end fails even to appoint a moral that shall benefit the surviving species of mammals which are now being slaughtered in like manner, it will be sad indeed."

Hornaday’s dire prediction of bison extinction almost came true. All the signs were pointing in that direction. The United States government recognized that the fates of the bison and the Native Americans of the plains were closely linked. In fact, the government encouraged the slaughter of the bison as a means of controlling, if not eradicating the Indians. General Phil Sheridan publicly advocated this policy and he was widely supported. He believed that every bullet freely provided by the government to hunt bison hastened the demise of the Indians.

However, about the same time that Hornaday’s report appeared, there was a large and growing movement in this country that would change the course of American history. A growing segment of the American public opposed eradicating whole species and the remaining Native Americans, whether out of their own religious sentiments, budding environmental concerns, or through social conscience. By the late 1880s, some of the same people who participated in the Great Slaughter actively tried to save some of the remnant herds. Men like Michel Pablo, C.J. “Buffalo” Jones, Charles Goodnight, and Scotty Philip, decided they could make as good a living by raising and selling live animals as they had by selling hides.

During this same period, organizations were founded to save selected species for the future benefit of hunters. Ducks Unlimited, the Boone & Crockett Club, and the American Bison Society were established to preserve and protect selected species. Some of these early environmentalists understood that saving species required setting aside sufficient protected rangeland – a novel idea at the time when other individuals were using Yellowstone National Park as their own hunting preserve. In 1905, the American Bison Society was formed by a small group of influential and wealthy individuals; most were Easterners and virtually all were men. They gave their time and their money to purchase bison and land. The National Bison Range was one of the early successes. Many other efforts, public and private, attempted to save the bison. Canada also established preserves so that these animals, especially the wood bison, could thrive. Some European countries developed conservation programs for the few remaining wisent – the bison’s European cousin. Not all were successful, but the extermination of the bison was thwarted.

With the change in public sentiment and the efforts of many well-meaning people, saving the bison could be considered America’s first environmental success story.
Since those early efforts, many schemes and experiments for saving the bison have come and gone. The hard work by members of the National Bison Association and the Canadian Bison Association demonstrate the importance and success of a private enterprise perspective for managing bison.

While bison have been saved from extinction, new controversies have developed within the ranks of those interested in bison. A simplified view is that one trend within the bison ranching industry is to treat bison like a breed of cattle that can be genetically manipulated to fit the needs of the rancher and the meat market. Another trend is to allow bison to exist in conditions that are as natural as possible and then to harvest them for meat and other products. A third view, as represented by the Park Service, is that bison should be allowed to live with as little human intervention as possible and to adapt to natural environmental conditions and pressures. In addition, many tribes, either through the Inter-Tribal Bison Cooperative or independently, are raising bison for their own purposes. These differences of opinion sometimes lead to disagreement and rancor. However, the common ground for most, if not all, of these perspectives centers on the importance of the bison. Today, there are multiple perspectives on how to save the bison. Bison ranchers, park managers, environmentalists and tribes may have similar goals, but propose very different means. Perhaps these diverse opinions and practices truly benefit the bison by providing a variety of management models.

We can learn from the mistakes and successes of the past. Historic buffalo runners showed that wanton slaughter for quick gain is wasteful and ultimately a disaster. Some individuals and organizations of the nineteenth century demonstrated that bison and other species must have protected habitat in order to thrive, not just survive. Indian peoples believe that bison have an on-going spiritual connection to humans that must be lived and honored. Certainly, today’s bison supporters have more information about environmental, health, and genetic concerns than those who came before. The questions to ask ourselves are: How will this information be used? Will our generation of ranchers, scientists, and bison supporters truly insure the survival and genetic diversity of the magnificent bison? Will bison survive as iconic oddities or thrive as a species? Do we care about the genetic diversity and integrity of bison? These questions will be answered by future generations, but the answer depends on what we do now.

Bob Pickering has served in a variety of museum education, research, and administrative positions for more than 30 years. For two decades, he has studied various aspects of bison/human relationships in ancient and modern times. Currently, he also serves as a professor of anthropology at the University of Tulsa.
The Early Days: Ranchers’ Role in Bison Restoration

BY DAVE CARTER

The ranchers and farmers who are reconnecting the public with the great taste and nutritional benefits of bison are heirs to a colorful legacy of bison restoration at the hands of private landowners.

Much has been written through the years about the role that conservationists played in pulling bison back from the brink of extinction. Less known is the role that a handful of individual ranchers played as the 1800’s came to a close. Even lesser known is the interplay of private and public herds through the first half of the 20th century.

If you are looking for advice on building fence or improving the genetic selection of your herd, feel free to skip this chapter. This is about roots; and perhaps learning a little about your herd’s family tree. It’s also the story about how some of the characters involved in pushing bison to the brink of extinction played a leading role in pulling them back, and how the noble actions of the men were prompted by the insistence of their wives.

In the Eastern United States, conservationists like William Hornaday, George Bird Grinnell and Teddy Roosevelt grew alarmed at the impending demise of bison in the 1880s.

Hornaday was a taxidermist by trade and a naturalist by passion. A native of Indiana, he first plied his trade in taxidermy in Rochester, New York. In 1882, he was appointed chief taxidermist for the Smithsonian Institution in Washington, D.C. Like many museums, a central part of the Smithsonian’s philosophy was to preserve endangered wildlife. At the time, the concept “preserve” often involved a trace of formaldehyde.

In the late 1800’s, bison were not alone in facing extinction. Species throughout the
world were being hunted to extinction. The Smithsonian and other museums accepted extinction as a virtual inevitability, and dispatched hunters and taxidermists to kill, stuff and place these endangered animals into exhibitions so that future generations could enjoy a glimpse of history.

In September 1886, Hornaday travelled to Montana to hunt enough bison to put into a collection at the Smithsonian. It took him more than two months to kill 22 bison.\(^1\) Three years later, he compiled the first census of bison, estimating that 830 were left in North America.

Hornaday later began to realize that perhaps animals headed toward extinction should be saved before it was too late. He was a leading voice in the creation of zoological societies in the United States. He led the effort to establish the Washington, D.C. Zoo, and, in 1896 became the first director of the Bronx Zoo. There, he created a bison exhibit with a breeding pair of bison and two calves shipped from the Black Hills of South Dakota.

In 1905, Ernest Harold Baynes, manager of a private bison herd in New Hampshire, convinced Hornaday that a more concerted effort was needed to protect bison. That led to the creation of the American Bison Society (ABS), with President Teddy Roosevelt agreeing to serve as honorary president. The ABS sparked the establishment of some of the initial public herds in the West, including the Wichita Mountain Preserve in Oklahoma, the National Bison Range in Montana, Wind Cave National Park in South Dakota, and the Niobrara Wildlife Preserve in Nebraska. The first bison to stock those preserves came when 15 bison from the Bronx Zoo were loaded onto rail cars in 1907 and shipped to the Wichita Mountain Preserve.

In the West, meanwhile, bison restoration had already been underway for about 30 years, albeit in a dispersed, disorganized manner. Those efforts established the five foundation herds from which virtually all of today’s bison descended.

\(^1\) Bechtel, Stefan (2012) Mr. Hornaday’s War, How a Peculiar Victorian Zookeeper Waged a Lonely Crusade for Wildlife that Changed the World, Beacon Press, Boston, MA
Like Hornaday, the founders of these five herds had helped hunt bison to near extinction. And like Hornaday, they turned into conservationists by default. Some had made that conversion before Hornaday’s first hunting expedition to Montana for the Smithsonian.

One of the first was a Pend d’Oreille Indian from the Jocko Reservation in Montana. In English, his name meant Walking Coyote, so he went by the name Samuel Walking Coyote. Walking Coyote had gone hunting in 1877 with his wife, Mary Sabine, in the plains of northwest Montana. He met and fell in love with a young woman from the Blackfeet nation along the way, and made arrangements with the young woman’s family to be married. Polygamy was not uncommon in the Pend d’Oreille culture, but the arrangement didn’t set well with Mary. Walking Coyote knew the marriage would be even less welcome by the Jesuit priests who had established a Catholic mission on the Jocko Reservation.

A friend, Charles Aubrey, convinced Walking Coyote that the priests’ anger could be assuaged if he brought them a peace offering of bison calves. Walking Coyote managed to capture four calves, which he brought back to the reservation. The peace offering didn’t save Walking Coyote from a flogging, but he kept the calves and grazed them for years near his home south of the St. Ignatius Mission.

Sometime around 1884, Walking Coyote sold his herd—which had grown to a dozen bison—to Michel Pablo and his partner, Charles Allard. Those bison spawned of one of the great original founding herds.

Pablo, the son of a Mexican cattle rancher and Piegan Blackfeet woman, was born near Fort Benton, Montana around 1844, and in 1864 married Agate (Agathe) Finley, a Pend d’Oreille woman at St. Ignatius Mission. Pablo’s neighbor, Charles Allard, was born in Salem, Oregon in 1853, also of mixed blood. He had drifted to the Flathead Reservation and had married a member of the Jocko Reservation.

Because of their Indian blood, they had grazing rights on the Flathead Reservation. The Pablo Allard herd thrived and increased steadily through the years. Pablo and Allard also added some animals from the herd of Charles Buffalo Jones of Kansas.

---

2 Reffalt, William. Origins of Founding Bison at the National Bison Range, MT, Blue Goose Alliance, Albuquerque, NM

![FIGURE 2.2](image)

Buffalo cows and calves during the Pablo-Allard round-up, Montana, between 1906-1908. (Photo courtesy of the Glenbow Archives)
As the 19th Century neared an end, the Pablo Allard herd exceeded 300 animals, and the challenge shifted from preservation to disposal. Allard died in 1896, at about the same time that the U.S. government decided to open up native reserve land in the area for white settlement.

In 1901, Allard’s family began to sell off their portion of the herd. Forty six of the animals went to Charles and Alicia Conrad of Kalispell, Montana. Eight years later, 34 bison from the Conrad herd would provide the beginning stock for the newly-formed National Bison Range in Montana.

Pablo decided that the time had come to dispose of his herd as well. In 1905, he sent a formal request to the U.S. government to purchase his remaining herd of 300 bison for $250 apiece. The government sent a representative to inspect the herd, and offered a ridiculously low price of $25 apiece. After serious negotiations, the agent only increased the offer to $75 apiece.

Insulted by the low offer, and pressured by the U.S. government’s move to open his grazing lands to homesteaders, Pablo began discussions with the Canadian government. A year later, the Canadian government agreed to purchase Pablo’s entire herd for $200 apiece, plus $45 per head for shipping. Pablo originally proposed herding the animals to Canada, but rail shipment was deemed a better alternative. The extensive preparations needed to gather, sort, load and ship the animals took years. In 1907 the first of several rail shipments left southwest Montana for the 1,200 mile journey to Wood Buffalo National Park and other preserves in Alberta. Eventually, 709 animals would be shipped north, comprising the seed stock for most of Canada’s buffalo herds throughout the 20th century.

Canada had home-grown saviors of the bison as well.

James McKay, a 340 lb. bear of a man, was fluent in French, English, Cree and several Indian languages. Like Pablo and Allard, he was of mixed blood, the son of a Scottish Highlands father and a Métis mother. McKay had connected with Charles and William Alloway in developing a successful freighting business before the railroads reached Winnipeg in the 1870’s. Charles Alloway often accompanied McKay on hunting expeditions, including the annual Red River buffalo hunts involving thousands of Métis. Each year, though, the hunting parties had to venture further west to find the diminishing herds of bison.

By 1872, McKay became seriously concerned about the future of the bison. Charles Alloway later said, “We talked it over, and through that winter concluded that the buffalo could not last much longer.”

1 Coder, George (1975) The National Movement to Preserve the American Buffalo in the United States and Canada Between 1880 and 1920, Dissertation Presented in Partial Fulfillment for the Degree of Doctor of Philosophy, the Ohio State University, Chapter 1
McKay captured two heifer calves and one bull calf from the Battleford area on the Bull River in Saskatchewan. The following year, while on another hunting expedition with the Métis, McKay captured two more heifer calves and a bull calf, but the bull calf died. McKay died five years later, his little herd having grown to include 13 pure-bred bison.

Samuel Bedson, the warden of the penitentiary at Stoney Mountain in Manitoba, had purchased four young bulls and a heifer from McKay in 1877. Upon McKay’s death, he purchased another eight bison. But Bedson left the bison business in 1888, selling 58 pure-bred bison and 28 cross-bred catalo to Charles “Buffalo” Jones in Kansas. A few of McKay’s animals stayed in Canada, ending up in Rocky Mountain Park at Banff.

Buffalo Jones was one of two ranchers playing a central role in preserving bison on the Southern Plains. Often described as “colorful” and sometimes even as “con artist,” he came to Kansas in 1866, first settling in the northeastern corner of the state, and marrying Martha Walton, a descendent of the naturalist Izaak Walton, in 1869. The couple soon moved to Osborn County in north Central Kansas, and Jones began to earn his living hunting bison and capturing wild horses. In addition to hunting buffalo, he tamed buffalo calves and sold them at county fairs, thus earning him his nickname.

Jones claimed that he first conceived his idea to rescue buffalo in 1872, but he still continued to hunt the animals. He wrote in later years, “Often while hunting these animals as a business, I fully realized the cruelty of slaying these poor creatures. Many times did I ’swear off,’ and fully determined I should break my gun over a wagon-wheel when I arrived at camp; yet always hesitated to do so after several hours had elapsed. The next morning I would hear the guns of other hunters booming in all directions, and

---

4 Zontek, Ken (1995) Hunt, Capture, Raise Increase. The People who Save the Bison. Center for Great Plains Studies, University of Nebraska, Lincoln, NE
would make up my mind that even if I did not kill more, the buffalo would be slain just the same. Again, I would shoulder my rifle, to repeat the previous day’s experience.”

The $80/day to be earned hunting buffalo likely influenced his decision.⁷

He later moved south, establishing the town of Garden City, KS, and convincing the railroad to build a station. There, he became a wealthy businessman.

His serious efforts at saving bison began after being trapped on the prairie during a severe blizzard in 1886, one of the worst winters ever recorded in the American Great Plains. According to Jones, that also spawned one of the most misguided experiments ever attempted in the history of bison.

“I commended to ponder upon the contrast between the quality of the white man’s domestic cattle. I thought to myself, why not domesticate this wonderful beast which can endure such a blizzard, defying a storm so destructive to our domesticate species. Why not infuse their hardy blood into our native cattle, and have a perfect animal.”⁸

In 1886, Jones set off on his first mission to the Texas Panhandle, where he roped and hobbled 14 calves, but only 10 survived. By 1889, his three additional forays into the Texas Panhandle resulted in about 50 additional calves.⁹ After purchasing Bedson’s animals, Buffalo Jones’ herd of 150 was the largest in the United States.

Jones’ tendency to engage in wild schemes and risky ventures caught up with him during the financial panic of the early 1890’s. In 1893, he sold 26 pure-bred buffalo and 18 hybrids to Michel Pablo and Charles Allard, who immediately moved the pure-bred bison into their herd, and sequestered the hybrids on Horse Island in Flathead Lake. That sale wasn’t enough, and a year later, Buffalo Jones sold everything, including his herd of buffalo.

Using his political connections, Jones prevailed on President Roosevelt in 1902 to appoint him as the game warden at Yellowstone National Park. During Jones’ brief tenure, he brought in 18 bison cows from the Pablo Allard herd, and three bulls from the herd of Charles Goodnight in Texas. In part because of his caustic personality, the position of game warden was eliminated in 1905, and Jones was out of a job.

His last fingerprints on the bison business came in 1906, when he began to actively crossbreed bison with Galloway cattle on a government-owned ranch along the North Rim of the Grand Canyon.

---

⁶ Inman, Calomel Henry (1899) Buffalo Jones Forty Years’ of Adventure, Crane and Co., Topeka, KS pp. 21-23
⁷ Coder, Chapter 1
⁸ Ibid
⁹ Zontek, Ken (1995) Hunt, Capture, Raise Increase. The People who Save the Bison
The other major savior of bison in the southern herd is a name well-known in western livestock history. Charles Goodnight was a pioneer in nearly every sense of the word. The Goodnights got caught up in the “Texas Fever” of the 1840’s, and Charles moved with his family from Illinois to Texas in 1845 at the age of 11. He became a highly successful cattle rancher, and, along with Oliver Loving, blazed the Goodnight Loving Trail over which hundreds of thousands of cattle were driven from the Southern Plains to the railroads in Cheyenne in the years following the Civil War.

Like nearly every other hero in bison restoration, Goodnight had hunted more than his share of bison in the area surrounding his ranch, and along the Goodnight Loving Trail. He once argued that the advance of civilization required buffalo to be slaughtered, and that buffalo hunters were “a fearless body of men…who by killing out the buffalo stopped forever the terror of the settlers, the depredatory tribes of the Plains Indians.”

In 1866, during the initial cattle drive to Cheyenne, Goodnight discovered that it was possible to separate a buffalo calf from its mother by chasing the herd at a steady clip until a calf fell behind, and then using his horse to keep the calf away from its mother until the calf followed the horse. One time, though, the mother cow charged Goodnight’s horse, “and attacked me so viciously that I had to kill her to save my horse.” Sixty two years later, he acknowledged, “I felt badly over it then and the older I get, the worse I feel about killing that cow.”

---

11 Coder, Chapter 1
12 University of Texas Archives, Austin, TX. Van Dale Collection, notes made by J. Evetts Haley while interviewing Goodnight
In 1876, Goodnight settled in the Palo Duro Canyon, where the water and grass could support thousands of cattle. It was there that Goodnight’s wife, Mary Ann, prodded him into changing his views on buffalo. He noted, “The herd was started at the suggestion of Mrs. Goodnight who noted the slaughter of the animals on the plains and desired to perpetuate the race. The slaughter had been so great in the preceding three years that the animal was already nearly extinct, being only a few scattering ones left.”

He began to capture buffalo calves while on cattle roundups in 1878, and secured two others from a neighboring rancher. His herd numbered 14 bison. The Goodnight herd grew to 250 bison by the time of Charles’ death in 1933, but he struggled to find any economic value in the animals.

In South Dakota, where the U.S. Army’s drive during the Indian Wars to starve out the Native Americas by eliminating their food supply was harshly carried out, Frederick Dupree watched the disappearance of the buffalo herds and decided that action was needed to prevent the species from disappearing entirely. The son of a distinguished French-Canadian family in Quebec, Dupree arrived in South Dakota in 1838 and prospered through a variety of ventures including fur trading and cattle ranching. He married a Minneconjou Sioux, Mary Good Elk Woman, and became one of the state’s leading pioneers.

Dupree and his sons had participated in buffalo hunts, killing as many as 2,000 in one outing. By 1882, he became alarmed by the disappearance of buffalo. There are two accounts of how Dupree began to rescue bison. In one version, Dupree set out with one of his sons and an experienced trapper to travel into the Yellowstone River region of Montana to capture buffalo calves. They came home with nine calves, although two or three may have died shortly after reaching the Dupree ranch. In another version, Dupree’s sons captured five calves while the family was participating in the last great winter buffalo hunt of the Dakotas in 1884.

Whichever version is true, the herd totaled five cows, four bulls and seven hybrids.
The herd—both pure-bred and hybrid, continued to grow to 83 animals by the time of Dupree’s death in 1898.

Although Dupree pioneered the saving of buffalo in South Dakota, James “Scotty” Philip earned the title of Buffalo King in the ensuing years. Philip was born in Scotland in 1858 and traveled throughout the American West panning gold, working as a scout, and ranching in Wyoming, before marrying Sarah Larribee, a Lakota Sioux, in 1879. They settled down near Fort Pierre in South Dakota in 1882, prospering in the cattle business.

Many historians believe that—like Mary Ann Goodnight—Good Elk Woman and Sarah Larribee were instrumental in convincing their husbands to save the buffalo.

Scotty Philip had attempted to capture bison calves in the 1890’s, but had not succeeded. When Fred Dupree died in 1898, and his son, Pete, followed in death two years later, the Dupree herd became available. Philip seized the opportunity. He fortified the fencing around 15,000 acres of his ranch north of Fort Pierre. His ranch hands, along with some of the wranglers from Dupree’s ranch, drove 57 buffalo 100 miles to their new home. The following summer, 29 stragglers were rounded up, making a herd of 85, including some hybrids, which Philip described as “not worth a damn.”

Unlike Goodnight and Jones, Philip opposed breeding bison with cattle, and eliminated the hybrid animals from his herd. He believed that buffalo were unique, and deserved to be preserved in their natural form.

The ultimate irony set in for Goodnight, Philip, Pablo and other stewards of the bison herds in the earliest years of the 20th century. The ranchers had saved bison from extinction. Now, they struggled to economically sustain their efforts. As the movie business began to capture America’s attention, Charles Goodnight spent $7,000 filming an elaborate Indian buffalo hunt, but couldn’t market the footage. Pablo had offered to sell his herd to the U.S. government for $250/head, and had been shunned. Philip

13 Coder, Chap 1
leased 3,500 acres of unclaimed government land along the banks of the Missouri for $50 annually to be used as a tourist attraction, but the herd outgrew the pasture.

Goodnight and Jones, along with Bedson, actively experimented in crossing bison with cattle to create a hardy hybrid that they felt would have economic value. Those experiments failed because the crossbreds were less hardy and experienced significant sterility and calving problems. The practice soon diminished for everyone except Jones.

Pablo and Allard, and Philip, ended up acquiring some of the crossbred animals, which they kept segregated from their pure-bred bison. Philip ultimately slaughtered the cross-bred animals on his ranch. These brief experiments form the basis for the controversy surrounding cattle genetic introgression in bison today. A study conducted for her doctoral dissertation by Lauren Dobson of Texas A&M University concluded that bison descended from those herds have the equivalent of 1 percent cattle genetic introgression within their genome.14

By the time Philip died in 1911, his herd approximated 285 animals and was growing rapidly. By 1920, the Philip herd numbered 825. They were exceeding the carrying capacity of the land.

The state of South Dakota and the U.S. federal government got involved in 1913, and created Custer State Game Preserve and—at the urging of the American Bison Society—Wind Cave Game Preserve.

As described by historian David Neisheim of the University of Nebraska, the story of buffalo in the early 1900’s illustrates the tension between conservationists and preservationists. That tension was illustrated in the personalities of Gifford Pinchot and John Muir. Pinchot was the first chief of the U.S. National Forest Service under President Teddy Roosevelt, and was the founder of the wise use philosophy of public resources. Muir, founder of the Sierra Club and also a close confidant of Roosevelt’s, was an ardent advocate of preserving America’s wilderness from economic encroachment.

Nesheim wrote, “Both valued ‘wilderness in and for itself,’ but feuded over how best to preserve it for future generations. Muir and his followers argued that public lands should be preserved without economic development for the edification of humans and the continued existence of wildlife.

“Gifford Pinchot stressed professional management with extensive economic development,

and employed the concept of ‘wise-use’ to generate the greatest good for the most people. James Philip and Custer State Park envisioned a time when buffalo would be profitable and advocated for their economic development, similar to the beliefs of Pinchot.\(^{15}\)

In the first half of the 20th Century, though, there was little perceived economic value in bison. The new preserves fostered by the American Bison Society, the State of South Dakota and the federal government, provided the only significant outlet for the excess animals in the private herds. Animals from the herds of Pablo Allard, Goodnight and Jones were acquired by Yellowstone National Park in 1902 to restock the herd that had nearly been decimated by poaching that had continued until the mid-1890s. Thirty-four bison in the herd that Conrad had acquired from Pablo Allard were purchased by the American Bison Society in 1909 to serve as the nucleus of the National Bison Range in Montana.\(^{16}\) Philip’s heirs sold 36 bison to the state of South Dakota in 1914 to serve as seed stock for the Custer State Game Preserve herd.

Philip’s heirs struggled unsuccessfully to find private buyers for the remainder of the Buffalo King’s herd. With options exhausted, the family began to liquidate the approximately 700 bison in 1924. A hunt that winter included a pow-wow attended by members of the Lower Brule and Cheyenne River Reservations. The Lakota participated in the hunt, using their traditional weapons of bows and arrows. The events were recorded on motion picture cameras, although no known footage is in existence. There was even a rodeo, with bronc riding, roping, and bulldogging. The number of animals killed totaled 200, with another 100 shipped live to parks in eastern cities. Another hunt the following year killed 250 animals, and meat was shipped to 21 states.\(^{17}\)

Within a few years, though, managers of the public parks and preserves were wrestling with the similar problem of managing herds that had multiplied beyond the carrying capacity of their land. For decades, bison in Yellowstone National Park were intensively managed due to belief that they, along with elk and pronghorn, were over-grazing the park.\(^{18}\) In 1925, the U.S. Department of Interior began offering heads and robes for sale. Heads varied from $35 to $60, and a robe could be had for $40 to $80. Live creatures were available for the bargain rate of $115.\(^{19}\) By 1968, intensive manipulative management (including herd reductions) of bison ceased and natural ecological processes began.\(^{20}\) Today, Yellowstone’s efforts to manage their

\(^{16}\) Coder, Chapter 5
\(^{17}\) M.G. Ripke to the Commissioner of Indian Affairs, 5 August 1944, Record Group 75, Series 929, Box 718, FF Buffalo 1944–43, NARACR; Graham D. Taylor, The New Deal and American Tribalism: The Administration of the Indian Reorganization Act, 1934–1945 (Lincoln: University of Nebraska Press, 1980), 90. Per Nesheim
\(^{18}\) National Park Service (2014)
\(^{19}\) Nesheim (2004)
\(^{20}\) U.S. National Park Service (2014)
bison herd through ecological processes has formed the basis for intense conflict with surrounding landowners.

In 1928, the Alaska Game Commission obtained 23 buffalo from the Montana National Bison Range and shipped them to Central Alaska, although this was not their native habitat. Nineteen were turned loose, and, by 1963, had multiplied to more than 500 animals.\(^{21}\)

The efforts to balance preservation with conservation was perhaps best demonstrated at Custer State Park. The South Dakota Legislature first established Custer as a State Game Reserve in 1914, stocked with 36 bison purchased from the Philip herd. The legislature intended Custer to be a self-supporting enterprise.

Custer was renamed a state park in 1919, and soon began to attempt to manage its growing bison population by conducting annual field harvests in the park’s buffalo pasture. The meat was likely distributed in the community for the Christmas season. In 1922, 125 bulls were hunted in the park. Other animals were shipped from Custer to other parks in the East and the West. In the 1930’s, a slaughterhouse was constructed for bison to help dispose of surplus animals.

Still, the herd had grown to 2,500 animals by the early 1940’s.

World War II provided a market boost for bison meat from Custer State Park and the adjoining Wind Cave National Park. Prior to the attack on Pearl Harbor, President Roosevelt had established the Office of Price Administration, which began to impose severe rationing of several types of food-stocks, including beef. Meat packers in 1942 were restricted to 70 percent of their previous year’s sales.

“Wild Game,” including bison meat, was exempt from the rationing. Demand surged. In the winter of 1942, Custer State Park’s slaughter plant failed to meet its orders, and work began on a new processing plant in the park. Meat from Custer State Park was marketed across the country, including in some of New York City’s finer restaurants. Sales of buffalo meat from the park continued to increase after the war. By 1953, meat sales generated nearly seventy-five thousand dollars for the Park.\(^{22}\) For a decade, beginning in 1952, many of the bison slaughtered at the Custer State Park processing plant were brought into the park from neighboring Wind Cave National Park.

However, small sales of live bison from Custer State Park, Yellowstone National


Park, and elsewhere in the 20th century provided the foundation for many of today’s commercial bison herds. Ted Marquiss, a Wyoming rancher, purchased two cows and a bull from Custer State Park in 1922 “just for fun,” and proceeded to build a herd of nearly 500 animals by the 1950’s. Roy Houck, co-founder of the original National Buffalo Association, purchased his first bison from Custer State Park in 1959, and had developed the largest herd in the United States by the late 1960’s. The Flocchini family of California expanded from meat marketing into buffalo production in early 1965, when they acquired a Northern Wyoming ranch populated with surplus bison from the Yellowstone herd. Armando Flocchini was also instrumental in establishing the National Buffalo Association.

Today, the slaughterhouse at Custer State Park is long gone, but the annual auction held there, along with other auctions at Antelope Island State Park, Fort Niobrara Wildlife Refuge, and elsewhere provide a balance of preservation and conservation.

No doubt, wanton slaughter of bison—along with diseases introduced by European livestock—nearly decimated bison 125 years ago. At the turn of the last century, efforts by public herd managers and private ranchers focused on preserving bison as a link to our American heritage. Through the years, however, conservation—and restoration—of the species has involved an interwoven relationship among public, private—and now tribal—herds across North America.
Native Herds
Pushed to the Fringes

BY DAVE CARTER AND JIM STONE

Sadly, few of the bison restored on public lands in the first half of the 20th century were on tribal lands. After the active military campaigns to eliminate the Native Americans’ access to bison during the Indian Wars, little effort was made to bring them back to the reservations. Federal land management regulations aimed at stopping communal living and prioritizing individual ownership of land decreased the ability of tribes and tribal members to establish the necessary ranges to maintain herds. At the turn of the century there were a handful of tribes that made efforts to maintain herds of buffalo.

John Collier, President Franklin Roosevelt’s Commissioner of Indian Affairs, worked to successfully transfer 44 bulls and 32 cows from Wind Cave National Park to the Pine Ridge Reservation in South Dakota. Because of the severe restrictions that the Bureau of Indian Affairs placed on the tribe’s access to the animals, frustration among tribal leaders quickly grew. Even the spiritual ceremonies linking bison to the native peoples were forbidden, which further attempted to erode the long standing cultural ties between the buffalo and tribal peoples.

By the 1940’s tribal leaders were working to dispose of their herds. A resolution adopted by the Oglala Sioux Tribal Council in 1944 read, in part, “Whereas it is believed that the operations of the buffalo herd does not contribute materially to the best economic development of the tribe, …the tribal council hereby authorizes and instructs the Superintendent of the Pine Ridge Indian Agency to take such steps as necessary to terminate the activities of the buffalo herd.” Without the freedom to interact naturally with their bison, Indian tribes gravitated into cattle production.

---

25 Akim D. Reinhardt, “A Government Not of Their Choosing: Pine Ridge Politics from the Indian Reorganization Act to the Siege of Wounded Knee” (PhD Dissertation, University of Nebraska, 2000), 111; W. O. Roberts to Commissioner of Indian Affairs, 6 January 1943, Record Group 75, Box 718, Series 929, FF Buffalo 1944-43, National Archives and Records Administration- Kansas City, MO [Hereafter NARACR], Per Nesheim
The battle to eliminate diseases from livestock and wildlife in the US also played a role in the elimination of most tribal herds during this timeframe.

Through the years, buffalo began to trickle back to tribal lands.

The Standing Rock Reservation received one bull and four cows from Theodore Roosevelt National Park in 1968 to begin restoring its herd. Other tribes began to acquire similar, small herds.

The Inter Tribal Bison Cooperative (later renamed the Inter Tribal Buffalo Council) was organized in February 1992 in South Dakota. According to the ITBC website, “Although some tribes and tribal members have been engaged in the production of buffalo for sale and/or for subsistence and cultural use, these activities have been conducted by each individual tribe, with little or no collaboration between tribes.

“To reestablish healthy buffalo populations on tribal lands is to reestablish hope for Indian people. Members of Inter Tribal Buffalo Cooperative (ITBC) understood that reintroduction of the buffalo to tribal lands will help heal the spirit of both the Indian people and the buffalo.”

Today, the ITBC and the National Bison Association have established a Memorandum of Agreement specifying a commitment to work together to restore herds and tribal and private lands.

Dave Carter is the Executive Director of the National Bison Association. Jim Stone is Executive Director of the Inter Tribal Buffalo Council.

Getting Started
Much has been written about the restoration of bison from near extinction over the past century. When stories are told about the saving of the bison, it’s logical to glance back 125 years ago to conservationists like William Hornaday, and ranchers like Charles Goodnight and Scotty Philip. Those stories are important. Two chapters in this book cover that history.

But, many of the true pioneers and heroes of bison restoration are today’s producers and marketers; innovators actively involved in bringing bison back to the rangelands, pastures, and meal tables across North America.

Over the past five decades, hardy individuals in scattered pockets across the United States and Canada began to embrace the notion of raising bison on a commercial scale. Some were cattle ranchers frustrated with the industrialization and commoditization of the beef industry. Others had large tracts of land and were looking for an enterprise that could be both economically and ecologically sustainable. Still others had never set foot before on a farm or ranch, but were enamored by this magnificent animal.

All have played an important role.

Whether operating a chain of bison-centered restaurants or selling packets of frozen bison at farmers’ markets, producers large and small have steadily built this business, and have brought the bison back to the North American landscape.

The road hasn’t always been smooth. In the 1990’s producers focused on building herds, competing strongly to acquire good breeding stock. The missing element in this equation was the customer. The market crash of 2000 served as a wake-up call for
producers, and for the associations that represented them. New emphasis was placed on outreach, consumer education, and promotion. Fortunately, those efforts began just as a growing slice of North American and European shoppers began to tune in to attributes inherent in bison meat: good nutrition, ecological stewardship and great tasting food.

The bison business slowly began to climb out of that economic morass after the crash. It wasn’t easy. Those who persevered were bound by the knowledge that the animal, and the meat it produces, would ultimately prevail.

Market prices for bison meat began to slowly, steadily climb. The hot hanging weight of a young bull carcass—the benchmark price in the bison meat business—broke $3.90/lb. in the United States and Canada in the latter half of 2011. It has trended above that price steadily since then.

The growth from 2000 – 2010 was good. The strength and stability since 2011 has been even better.

Several factors contribute to this strength and stability.

It begins with customer demand.

Shoppers in retail stores and restaurants hold the keys to driving bison restoration forward. Over the past four years, growth in that demand has outstripped the ability of our business to keep pace. Twice each year, the National Bison Association conducts a survey of the major marketers in North America to assess the supply/demand situation. In May 2015, 50 percent of the marketers reported that orders for products were exceeding their ability to fill orders by as much as 20 percent. Meanwhile, 80
percent of the marketers surveyed reported that consumer demand was continuing to grow, with nearly 25 percent of the marketers reporting demand growth over more than 10 percent in the past year.

According to the National Bison Association, total sales of bison meat at the retail and foodservice level totaled $336 million in 2014, which was 46 percent higher than five years previously.

This growing affinity for bison meat comes, despite the fact that retail prices are roughly double the levels of a decade ago.

In fact, the bison business is a case study in the willingness of many shoppers to pay a premium price for products that have added value. And that’s the difference between bison and mainstream commodity agriculture.

Despite the growth in sales, bison remains a niche within the retail and foodservice marketplace, and within production agriculture. In 2014, 51,700 bison were processed under U.S. Department of Agriculture inspection in the United States, with another 8,600 harvested under qualified state-inspected programs deemed to be at least equal to federal inspection. By comparison, the U.S. beef industry slaughters more than 120,000 cattle each day. Thus, if the bison business grew ten-fold, we would reach one-week’s total production for the beef industry.
In Canada in 2014, just over 12,000 bison were harvested at plants under federal inspection and another 2,500 bison harvested at facilities under provincial inspection. The strong US demand and economic advantages of finishing and harvesting bison in the US resulted in just over 19,000 finished and feeder bison being exported from Canada into the United States. In addition to the North American market, bison meat products are exported to Europe and the United States. These charts reflect the strong link between the Canadian and US bison industries.

The growing popularity of bison meat is based in large part on the fact that our business is not a commodity industry. Instead, bison producers aim to continue restoring bison herds across the North American continent by connecting with consumers who value the natural qualities of this hardy native species that has evolved to thrive in the diverse North American ecosystem. In particular:

- Bison is a natural component of a healthy diet. Bison is low in fat, high in protein and iron, and has a great cholesterol profile.
- Bison is a natural, sustainable meat. Bison are an essential part of the North American ecosystem, so bison ranching is beneficial to the environment.
- Bison tastes great. Chefs and everyday cooks across the country have discovered the great taste and versatility of bison meat.

The growth of the bison business will be driven largely by three factors.
First, the biology of the animal we manage determines much of the pace of growth. In today’s industrial poultry industry, a spike in customer demand can result in the hatching of more chicks within weeks. But bison grow on nature’s clock. And, federal law and the National Bison Code of Ethics prohibit growth hormones, sub-therapeutic antibiotics, and genetic tinkering to push the animal to grow beyond the pace that nature intends.

Weather is the second factor determining the ability of bison producers to grow their herds to meet demand. Even as strong market prices provided an incentive for expansion in 2011, a devastating drought settled in along the heart of the U.S. bison producing country. As hay prices neared $300/ton, many producers were forced to reduce numbers rather than build herds.

The third factor critical to the growth of the bison business is you.

Bison production and marketing is one of the brightest spots in the landscape of North American agriculture today.

Yes, any agricultural enterprise today requires a significant investment of capital and labor. Yet, bison is one of the more relatively reasonable avenues of entry. Unlike row crop farming, bison production doesn’t require massive outlays for tractors, equipment and tillable land. The cost of buying or leasing land and acquiring the animals needed to start a herd are similar to the costs for cattle. Fencing costs will be a bit higher, and handling facilities will need to be sturdier. But don’t worry about building barns or loafing sheds, these animals want to be out in the open.

Although a bison heifer won’t give birth to a calf until her third birthday—compared to cattle calving at age two—a typical long-lived female bison will produce roughly twice as many calves over the course of her lifetime as a beef cow.

---

**FIGURE 4.6**
The National Bison Association is promoting the Bison Advantage in many forums, including the National FFA Convention each year. (Photo: Dave Carter)
Most producers today are balancing their agricultural enterprise with off-farm employment. The natural hardiness of bison, the ease of calving, and the fact that we don’t castrate, dehorn or brand animals makes buffalo production a great alternative.

The strength and stability of today’s bison business is creating a foundation for continued growth and profitability. Yet, even as we work to grow, we must recognize that customer expectations are constantly evolving. Customers are increasingly asking questions about the production protocols, handling practices, and other aspects involved with the animals we are raising. Our business has grown year after year because bison producers have earned the trust of their customers. Maintaining that trust will be key to the continued success of our business.

Dave Carter is Executive Director of the National Bison Association. Terry Kremejuk is Executive Director of the Canadian Bison Association.
Production Fundamentals
Characteristics and Behavior of the American Bison

BY JOHN FLOCCHINI

Or is it buffalo? What is in a name anyway?

While the name “buffalo” is most commonly and historically recognized for this magnificent animal, outside of scientific circles, it is truly a misnomer that supposedly stuck from the early settlers of Western Europe in North America. Therefore, for purposes of writing this book, and to be scientifically accurate, “bison” it is!

Bison are true survivors. They are known as the largest land animal in North America. Through a stroke of ecologic luck, they were just small enough to have survived the last ice age leaving all the larger species doomed to end up, at some point, as fossil fuel. One would not think of them as small, however. While most of the mature males, known as bulls, weigh around 2000 lbs. and stand around six feet tall at 5-6 years of age, there are accounts of bulls that have been as tall as seven feet and weighing up to as much as 3500 lbs. The females, known as “cows”, will average around 1000 lbs. or, half as much as the bulls and stand at least a foot shorter.

They not only are large, but also fast. They can run at speeds of 25-30 mph. They also
can run at a sustained, albeit slower, pace for hours. They have large windpipes that are capable of exchanging huge volumes of air, in and out of their lungs, giving them this capability. They are not only large and fast, but they are quick as well. A warning you might hear around bison producers is that “They can kick you twice before you know they kicked you the first time”.

I guess I forgot to mention that they can jump too. I have personally witnessed a 2000 lb. bull jump a 6-foot fence from a full run and just barely touch the top wire. I also have seen that same type of large bull jump from a standing position over and out of a six-and-one-half-foot alley wall. For all the reasons above and more, I like to refer to them as super athletes.

As a herd, they are matriarchal in nature, meaning, it is the females that will “lead the herd” from place to place. The males are along for the ride, so to speak. And the “ride” is typically only during the breeding season, aka “the rut”. The older bulls, around three years of age and up, will hang out in bachelor groups, preferring to do their own thing away from the cows, calves and yearlings for much of the year until, of course, that first whiff of spring, aka “estrus” or “cow heat” is in the air.

The bulls will travel for miles on the mission to buddy-up with the cows once they realize the time is near. Fences or natural boundaries like streams do not stand much of a chance to thwart their mission.

There are a lot of dynamics happening in the herd once the rut begins. This seems to range from early July (think fireworks around the 4th in the U.S.) to late September, depending on the climate and latitude/longitude. The bulls display courtship behaviors in trying to win over a cow, one-at-a-time, while at the same time, working very hard to ward off any potential competition for that cow from other bulls.

While usually other bulls will heed the vocal and visual warnings of the dominant bull in the vicinity, occasionally a threat is taken up which turns into an actual clash of these titan animals. The ensuing fight is loud and potentially destructive. The
behemoth bulls will aggressively push and shove each other head to head vying for a position to gore the foe with a horn into the vulnerable soft sides around the ribs or belly. Pushing, shoving, dust flying, other bison clearing the path of these powerful beasts bearing down on each other, all the while roaring like lions at one another. Fences, pickups, 4-wheelers, etc. don’t stand a chance if the bulls happen to fight their way. The fight will continue until one bull relinquishes, whether because he is injured or just ready to give up. Occasionally an injured bull will wander off and die. Most of the time the less dominant bull runs off to lick his wounds (many times broken ribs) and to try and recover and join back in the rut activity later.

The most dominant bulls, typically the older bulls, will do the early season breeding and then get worn out and stay behind as the herd moves on. Most of the time it is hard to say how many cows each bull breeds. However, we feel confident that these early dominant bulls, in good condition, will cover at least 30 females each in the first few weeks of the rut. It is not unusual for the bulls to drop hundreds of pounds during this 2-3 month period. With all they go through, you can understand why.

While mature bison bulls display heavy dramatic behavior in the open in the guttural roaring and pawing, aggressive rolling and intermittent battles, the actual breeding is rarely seen in large herds, leading one to believe that it mostly occurs at night.

Bison cows are generally benign creatures until their calves are born. This is not to be misconstrued into a belief that they are tame or docile; they are far from that. Like any other wild animal, they do have a comfort zone when it comes to their newborn calves; it is hard to even get near the mother with her newborn. They tend to swiftly move the calf away from any perceived danger. If confronted with a threat, they are surely up to the challenge and will fight aggressively to protect the most recent generation to hit the ground.

**REPRODUCTION**

Roughly nine months after the female is bred, the calf will be born. This typically works out to sometime between April and late June. These cinnamon red bison calves are naturally born small, normally around 40-50 lbs. This, in combination with the
fact that bison normally breed for the first time as two-year-old heifers and calve as three-year-olds weighing 800-900 lbs., provides for easy calving with little difficulty.

**FIGURE 5.4**
Minutes after giving birth, both mother and calf will be standing up and ready to rejoin the herd. (Photo: Dave Carter)

Amazingly, the calves will begin to mock their mothers and start to nibble the tender new grasses of the spring within a week of birth. They are also capable of nearly hitting the ground running after birth. The birthing process, another rather reclusive behavior, typically takes not more than about an hour. Once the calf is out of the womb, the mother begins in earnest to eat the birthing sack and lick all evidence of blood off the calf and the ground. This licking action stimulates the calf and shortly thereafter, the calf stands on wobbly legs while instinctively searching for the mother’s milk bag. Not long after the calf gets a drink of the critical, powerful, nutrient-dense and antibody-filled first milk, also known as colostrum, it is ready to run alongside the cow. The cinnamon color begins to turn the chocolate brown of their mothers at around four months of age.

**NUTRITION AND CONDITIONING**
To “feed or not to feed” is a question most producers face when raising bison. It is important for all in this position to determine one’s goals for the herd prior to making these types of decisions. So the answer is maybe yes or maybe no. If a yes, then how much and when need to be considered as well. If no, is that never-ever, regardless of extreme drought or winter conditions where animals could potentially starve? Some fundamentals that follow do apply to most situations and may help answer this question.

It seems as though the fundamental goal of a bison herd in nature was/is to survive. It is important to realize that most producers are asking their animals to perform above and beyond what nature has needed from them. The bison seem to be very sensitive to environmental conditions. If there is a hard drought, there is a good likelihood that many bison cows will simply not breed. The condition of the cow will not allow her to breed; therefore, keeping her alive rather than take a chance in having a calf that will likely pull her down while instinctively trying to get enough milk to survive itself. The cow does poorly as does the calf, both in jeopardy of succumbing to the extreme conditions that may exist during either that summer or the winter to come.
It is important for the females to be on a rising plane of nutrition in order to breed for the first time and even more vital for them to subsequently breed and continue to do so, after their first calf. Nature can provide for this to occur naturally in the spring with the green-up of new grasses and plants. It is not unusual for cows to naturally lose 10-15% of their body weight over the winter, which can be a good thing as it allows for less trouble during calving. Once the calves hit the ground, with good green grass, the cow will add back those pounds and more (the rising plane of nutrition) in short order. This benefits both the new calf, with good milk production from the mother, as well as the potential for the cow to breed-back for the next year.

Drought conditions can have a negative effect on the natural “flushing”, explained above, that should come from the new growth of the spring. It is possible to offset drought conditions with making supplemental feed available for the cows during when the natural green-up should occur. As mentioned, it is the rising plane of nutrition that is important, so the amounts and types of supplements will vary depending on conditions.

A direct correlation with the condition of the cow is whether the calf has been weaned. Naturally, the calf might stay on the cow for around one year. This can negatively affect the ability of the cow to be in good enough condition to breed back. Not only that, but calves that hang on, particularly the bull calves, have been known to fight off a new calf on a cow that managed to get bred back for the milk, therefore stunting the growth of the new calf. Many folks wean the calves in the late fall or early winter. Fall weaning does allow the cow an opportunity to dry up and put some weight on prior to the winter.

With diligent nutritional management of the cow herd, whether natural or supplemental, it is not unusual to expect close to 90% pregnancy rates when all things are clicking well.

Not to be overlooked and equally important is the need for the breed bulls to be in excellent condition in order to perform during the demanding rut as well.

On both the bulls and cows, body condition is a good indicator of their ability to do well. The NBA has a Body Condition Score Chart, which can be referred to for analyzing body condition during various times of the year. While it is natural and desirable to see some rib on them coming out of the winter, it is most ideal for the ribs to mostly disappear and for them to have nicely rounded rumps and hips as the breeding season begins.

Mineral intake and utilization for the animals is also important for a well-rounded
nutritional diet. It is also essential to keep in mind that mineral utilization in animals is very complex. Mineral shortages or imbalances can have deleterious effects for many forms of productivity from weight gain to heat cycles to milk production and more. While the bison have evolved for thousands of years managing to balance their own diets, in many contemporary cases, there may be limitations for them based on limited ranges. Even though there may be minerals existing in the soil and therefore the plants, certain minerals in the water they drink can “tie-up” other minerals, rendering them non-available for the animal to assimilate. It is because of these reasons that it makes sense in most cases to make minerals available to the animals.

There are many different types of mineral programs out there. We have chosen to use a free-choice, cafeteria-style program that is available 24-7 on a year-round basis for the animals out on the range. In this program, there are 16 choices of different vitamins and minerals in trailers that get moved with the herd from pasture to pasture. In addition, free-choice white salt blocks are used around the feeders. The animals literally choose themselves how much of which supplement to lick, or not, and move on once satisfied. It may not be perfect, but we see it as a way to mimic a form of the animal’s natural selection and a belief that the animals are capable of knowing what they need to balance their nutritional requirements. It is extremely interesting to observe how their choices vary depending on the time of year, the pasture they are grazing or with the timing of a recent rain. Indeed, they are amazing animals!

CONFORMATION AND SOUNDNESS
Historically, bison have had two main predators in North America: the wolf as a pack-hunting major predator and the human, Native American Indians. When it comes to culling animals from our herds, we continue in a sense to assume the role of predator for the bison. Not unlike the wolves and to some degree the Native Americans, bison with deviations from the norm, which made them more vulnerable to predation, were the ones that were easiest to choose as prey. Lame or unsound animals would be examples of this. Similarly, if we notice something wrong, unusual, abnormal, etc. with a bison, that would typically be one we would target for culling. Non-pregnant females or females that do not raise calves could be considered in that category for us these days.

One of the challenges most bison mangers have is in selecting replacement animals to keep the herd healthy and productive. Once animals reach a certain age, productivity drops off. This is important to consider if one of the goals of the herd is for economic gain or productivity. We find that once you are generally comfortable with the genetics of the animals in the herd, using fertility of the females is one of the most important
tools. If you cull cows based on pregnancy status, the rest seems to take care of itself.

We have borrowed a theme from the book *The Lasater Philosophy of Cattle Raising*. They are the folks from Colorado that developed the Beefmaster breed of cattle. The theme is that each year they receive either “a calf or a carcass” from a female. In other words, if a cow fails to get bred, then she becomes a cull cow used in a meat program. Additionally, to take it to the extreme, if the cow does not raise a calf through weaning, she also goes. There are a certain percentage of females that will breed, confirmed by a pregnancy-test, but fail to bring that calf all the way through weaning for one reason or another. The cows can be tested for this in a chute by simply milking the cow at weaning. If there is no milk in her bag, she did not raise her calf through weaning. The calf may have actually been born (as opposed to the cow aborting or reabsorbing the calf) and may have been bitten by a rattlesnake or struck by lightning. This could be viewed as a type of accidental mortality, if you will. The cow would have “dried up” by the time weaning comes, assuming the mortality was weeks before checking her in the chute. Paraphrasing the way Lasater said it: “You occasionally may be culling a decent cow but, for sure you get rid of all the lemons”. While this approach seems rather severe, it ensures that you take the emotion out of the decision making at the side of the chute and end up with the most fertile cows and best mothers in the production herd over the long run.

When choosing bulls for the breeding program, it is important to keep in mind that the animal’s conformation and structure are essential for performance. To pick bulls that will be less likely to disappoint, one should look for masculine traits. One such trait is the shape of the bulls’ head. It should be shaped like an upside-down triangle, wide on top and tapering towards the nose. A feminine head would be one that has more straight lines between the forehead and the nose, long and slender with only a slight taper. Additionally, straight feet on a bull are important to note. This will help support the heavy weight of the bull as he matures, as well as help allow him to soundly breed plenty of cows.
Bull fertility can be an issue, particularly with small herds where the number of bulls is limited. In larger herds with plenty of bulls it seems to be less of an issue. It has been our experience that fertility testing bulls is not an important part of regular herd management.

**GENETIC PURITY**
The subject of genetic purity in bison continues to unfold as more scientific research is done. The bison genome has recently been mapped, which will aid in the study of this subject into the future.

Through thousands of genetic tests to date, it appears as though a small percentage of the bison that live today carry some small amount of cattle genetics in their genes. It is believed that these are mostly remnant genes carried forward from the bottleneck period at the end of the 19th and beginning of the 20th century when the millions of bison roaming North America were reduced to a thousand or less. A few of the heroes that were partially responsible for keeping the bison species alive were conservationist cattle ranchers that experimented with crossbreeding cattle with bison. The ensuing hybrid animals were known as “cattalo” back then. The experiments were fairly short-lived, but have had a lasting legacy on some of the bison that remained to seed the herds that expanded into the descendant generations of many of today’s bison.

To be sure, the NBA and its members are against any sort of cross-breeding of bison with any other species and have written it in to their Code of Ethics: “(Members Shall) Never engage in deliberate cross-breeding of bison with another species.”

John Flocchini is a 3rd generation, large bison ranch owner/operator of the Durham Ranch near Gillette, WY. www.durhamranch.com
What’s all this Bull About Crossing Bison and Beef?
CLEARING UP MISCONCEPTIONS ABOUT CATTLE GENETICS IN TODAY’S BISON.

You may have heard comments on tv, or read stories on the internet, that today’s bison herds contain widespread cattle genetics.

WE WANT YOU TO KNOW THE TRUTH.

What’s behind these comments?
To understand the full story, we have to go back more than 120 years. As the 1800’s came to a close, the American bison teetered on the brink of extinction. The more than 30 million animals roaming North America at one time had been decimated to the point where fewer than 600 remained alive. Roughly 25 remained in the newly- created Yellowstone National Park. The remainder wandered in isolated clusters across the prairies.

Fortunately, five ranchers scattered along the Great Plains began to gather up those remnants and pulled the species back from the brink. Some of those ranchers experimented briefly with crossing bison with cattle in the hope of creating a hearty crossbreed. They discovered instead that the crossbred animals were highly infertile, had problems calving, and generally performed poorly. The ranchers soon dropped the experiment.

In the process, though, some cattle genetics were introduced into some bison.

How widespread are the resulting levels of cattle genetics in today’s bison?
We have to set the record straight. Some media stories refer to “widespread levels” of cattle genetics in the bison herds on private farms and ranches across the United States. Texas A&M University has conducted DNA testing on more than 30,000 bison in both private and public herds across North America. About six percent of those bison tested have shown evidence of cattle DNA. And, the level of cattle genetics in those bison average less than 1.5 percent of the genetic make-up.
Doesn’t crossbreeding still occur?

There is an animal called a beefalo, which is the result of some modern crossbreeding. However, those animals—and the meat they produce—are clearly labeled separately from bison or buffalo.

The members of the National Bison Association are dedicated to maintaining the integrity of the all-natural buffalo. That’s why our members have adopted a code of ethics that specifically prohibits crossbreeding bison with any other species of animal.

Can’t you just weed out the animals with cattle genetics?

Remember that all of the bison in the world today descended from the fewer than 600 left alive in 1894. That genetic pool is very important.

Many ranchers today are testing their herds and culling the animals that have remnants of the cattle genetics. But, those ranchers are also taking care to protect the vital bison genetics that survived the “bottleneck” of the late 1800s.

Today’s ranchers recognize that Mother Nature perfected this animal to thrive on the pastures and rangelands of North America. Even as we build the herds to meet growing consumer demand, we are dedicated to protecting the integrity of this species as an animal that produces nutritious meat, survives in harsh climates, and requires relatively little management.

We call it the Bison Advantage. *We hope you call it delicious.*
The Pasture Environment

BY ROLAND KROOS

UNDERSTANDING HOW BISON IMPACT THE LAND
In Chapter One, Bob Pickering reports that 30 to 70 million bison inhabited the North American continent when the first Europeans started to migrate here. Not only did this continent support these huge herds of bison, but very large herds of elk, deer, and antelope are also well documented in history. So, how could this continent support such massive herds on a sustainable basis? Understanding the answer to that question will enable you to sustainably manage the bison on your landscape.

The answer to how this continent could support millions of animals is that they migrated great distances – they were always on the move. Every day they moved in search of fresh feed and water. Those of you managing bison today realize it does not take bison very long to travel 30 miles. They can easily travel this distance in less than 10 hours. When given the opportunity bison love to travel. However, with today’s park boundaries, highways, croplands, cities, private property boundaries, etc., bison really don’t have anywhere to migrate. So, we have taken a very mobile species and made them largely sedentary.

Also, for most of the bison herds (wild or domestic), we have removed or eliminated all of the predators that historically keep the bison bunched and moving in large herds. Without the constant threat of predation, over time the bison tend to spread out into small clans or family groups. Without the dense concentrations, they no longer foul the land with their dung and urine, so there is no need to find fresh feed.

Mark Kossler, general manager of Turner Ranch Enterprises, recently shared these observations with me. On the Flying D Ranch, they manage a large herd of bison (+/- 4,500 head when they are all in one herd). On the ranch also resides a pack of wolves and a large herd of elk. In order to avoid the wolves, the ranch staff are observing the elk leaving the forested mountains and mixing with the bison in the wide-open grass meadows, especially during calving. The elk realize there is safety in numbers and the wolves will not venture into the middle of the bison herd to kill a young calf just
born. This has led to some animal health issues that others will talk about in this book.

Now that we know how the great prairies on the North American continent were created and sustained for thousands of years, how can we use this knowledge to manage our bison herds today? Is there a way bison managers can mimic the migratory patterns of old?

**RANGELAND (PASTURE) ECOLOGY AND MANAGEMENT**

Ecology is the study of interrelationships of organisms and their environments. Rangeland (pasture) ecological systems are very complex and consist of relationships that are all interconnected. So, how you manage the bison on your landscape will affect the biological health of the soil, the biological community of plants and insects, other wildlife, and your financial and social well-being. Most bison operations require abundant, dependable, and affordable forage supply.

Creating a healthy rangeland ecosystem isn't just good for your bison and your pocketbook, it benefits a multitude of uses: other wildlife, maintains open space, provides recreational opportunities and healthy watersheds that produce abundant water for urban and industrial uses, preserves historical sites, and produces clean air for all to breathe. Most rangelands today do not support cultivated crop production because of soil characteristics, topography, and climate constraints. When managed correctly, they provide abundant vegetation that can be grazed by livestock (bison) and transformed into usable products. Proper rangeland management is essential for the sustainable production of food and fiber, as well as for supporting a number of other users.

For the purpose of this handbook, you will probably be grazing your bison on native rangelands or improved pastures. Rangelands involve mostly native plant communities consisting of grasses and grass-like plants (graminoids), forbs (wildflowers) and/or shrubs. Rangeland can be open grasslands, savannas, most deserts, tundra, alpine grass communities, fresh and coastal marshes and wet meadows. Pasture lands are agricultural lands that have been seeded with non-native plant species to increase forage production. These pasture lands might be grazed and/or the forage could be harvested using machinery. To increase forage production, these introduced forage species may be irrigated, fertilized and periodically renovated to increase forage production.

---

**FIGURE 6.1**

As bison pass over the land, their hooves return unpalatable plant material to the soil surface, break crusted soil and push seeds into the soil, creating excellent seed and soil contact.

(Photo: Roland Kroos)
Do bison overgraze plants? One of the romantic beliefs is that bison will not overgraze plants. Is this bison in photo 1 from the Flying D Ranch overgrazing these grass plants? Research shows that anytime you remove more than 50% of the above-ground leaf, there is a detrimental effect on the plant’s root system. Photo 2, below, depicts an area the bison herd was grazing. They severely grazed these plants in less than four hours. Bison will severely graze plants just like many species of domestic livestock today. So, simply selling all your domestic livestock and switching to bison may not cure your land management problems. To improve the ecological health of your pastures, you will need to understand and practice good grazing management.

If you were the bison manager, was there any way that you could have prevented this from happening?

For those plants that were grazed within one inch of the soil surface, is it bad?

Is there a way to teach your bison to take half and leave half of every plant they graze for the whole year? NO!!

Bison and elk are severe grazers just like the domestic livestock many other ranchers currently manage today. Can this severe defoliation actually be good for the plant?

Yes, plants need exercise just like you and I.

Bison managers need to understand that it is not foreign or detrimental for a plant to be severely grazed. This has been happening for thousands of years. Our prairies and grassland communities developed under tremendous grazing pressure.

Figure 6.3 was taken on a ranch in south central South Dakota. It shows a grass plant that was severely grazed ten days ago. You can see how this plant has sent up two inches of new growth. As long as the growing point (meristematic tissue) has not been removed, the plant will quickly try to replace what was removed. Speed of recovery (regrowth) depends on plant species, soil temperature, available moisture in the soil, and overall vigor of the plant. During favorable conditions, I have seen plants send up new regrowth.
within five to six days. During adverse conditions it might take ten to twenty days before you will see new leaves produced. There is no way to accurately predict when plants will grow fast or slow, because we have no control of the weather. This means you will need to carefully monitor and observe how plants respond when they are severely grazed. With this on-site information, you will need to adjust your grazing program.

If you wish to minimize or eliminate any overgrazing, you should move the bison from the area severely grazed and not allow them to return to those plants until they have fully recovered. Depending upon a whole host of factors, it might take 30, 60, 120 days or more than a year before a plant has fully recovered.

In the old days, before European settlers interrupted the natural migration habits of the large bison herds, it was the fouling affect that caused the bison to move. Bison (most domestic livestock) prefer not to graze plants that have been urinated on or defecated on. Depending on weather, it usually takes 15 – 30 days until this fouling effect has worn off the plants. With no barriers in their way, these large herds of bison were probably 200 to 300 miles away and would not return for months or maybe even a year.

Bison today do not have the entire North American continent available to them. We have created all sorts of barriers that greatly restrict their movement. Due to these barriers, it is very common for bison to revisit an area where they grazed 10 to 15 days ago. They will find many of those plants they severely grazed 10 to 15 days ago, and remove all the regrowth. If you allow this to happen, this is OVERGRAZING.

When Ted Turner bought the Flying D Ranch south of Bozeman, MT, the ranch involved more than 120,000 acres, covering a distance from the Gallatin River all the way to the Madison River. Envision a landscape almost 20 miles from one end of the ranch to another and 10 miles deep. After purchasing the ranch, Ted had his staff remove most of the interior fences. Ted’s expectations were that with such a large landscape, the bison would naturally migrate from one area to the next and improve the health of the land. Within five years, the managers noticed bison severely overgrazing portions of the ranch. They would watch the bison herd travel miles through really tall grass,
only to park on the same areas they grazed 10 to 15 days previously. Today, the Flying D Ranch is divided into eight large pastures.

To meet their high nutritional needs, bison recognize that those young grass shoots are more tender, easier for the rumen to digest, and much more nutritious than some of the 3 to 4 foot tall Timothy grass plants with stems the size of a pencil.

Even the bison herd in Yellowstone National Park does not have enough room to self-regulate and eliminate overgrazing. In the park there is a large herd of bison that inhabits the northern portion. Commonly, you can find this northern herd somewhere between Gardiner to Cooke City, Montana -- 56 miles. Even in the dead of winter when portions of the park might have 48 inches of snow covering the ground, you can still find bison lingering in this area. As news reports have shown, when conditions and feed get short, the buffalo want to leave. They begin to spill into the Paradise Valley below Gardiner, MT along the Yellowstone River. There are some great historical accounts of bison and elk traveling down the Yellowstone River close to Livingston. At times it would take one to two days before these huge herds would pass, and the wagon trains or soldiers could proceed. I believe Yellowstone National Park could support more bison and elk than it does today. I have taken photos of severely overgrazed grass plants along the Lamar River before the wolves were reintroduced. Even though we have reintroduced wolves, the Yellowstone Park bison are still not migrating like they historically did.

Healthy vigorous plant growth and development are dependent upon a strong root system. I tell ranchers that what they see happening above ground is mirrored below ground. If you allow your bison to overgraze the regrowth and allow plants to only reach one to two inches, the root system for those plants will also be very short and unable to withstand those long periods when rain no longer falls. When roots are healthy, they enable the plant to withstand stress from drought, extreme heat or cold, and rebound rapidly when grazed. Healthy roots are the fabric that holds the soil together and makes it resistant to erosion.

Creating healthy root systems allows your land to be more resilient. This resiliency will allow to withstand periods of drought and other weather events.
I now want to focus on the impact these animals have when they step on the land. The hooves of the animals from these large herds had a profound impact on the land. The large herds were the gardeners. They returned old plant material to the soil surface, they pressed billions of seeds into the soil, and created the proper seed to soil contact necessary for good germination.

If you are properly managing your grazing program and allowing many of your plants to recover from a severe grazing, you should always have several species of plants (grasses, wild flowers, etc.) that are producing viable seed. So, my question to you is: How do all these seeds get planted in the soil?

To drive this point home, let me use this analogy. You ask me to help you plant your garden and you hand me all the seed packets: radishes, carrots, lettuce, spinach, corn, beans, peas, squash, etc. I ask you where you want this garden planted, and you show me a tract of land where last year’s garden was planted. Some of the soil is loose. In other parts of the garden the soil is bare and has a hard crust. With no further tillage or soil preparation, from your kitchen window, you watch me open all of the seed packets, pour the seeds into my hand, and then simply toss the seeds into the air. I come back into your kitchen in less than five minutes and announce that your garden is planted. Will you have a productive garden? Will all the seeds that are sitting on top of the soil germinate and grow?

When you pass a bison herd over the land, the hooves of the bison will return unpalatable plant material to the soil surface. If the bison don’t want to graze these plants, have them dance on it to where they are returning most of it to the soil’s surface. Break
crusted soil and push these seeds into the soil.

CREATE EXCELLENT SEED AND SOIL CONTACT
To create the desirable impact (gardening) to the land, the bison herd may need to be stimulated. How do you stimulate a large or small bison herd? Watch how the herd acts when a wolf or neighbor’s dog moves close to the herd. Many times the herd will tighten up and probably is no longer calmly grazing. As the predation pressure increases, the animals in the herd become agitated and they no longer worry about what they are stepping on. Old rank vegetation that they have been avoiding gets quickly crushed to the soil surface. Many of you simulate this in the winter when you are feeding your bison. When you create a feed row with cake (cubes) or hay, watch how the bison push each other around trying to get to the feed. Rather than feeding in the same area over and over all winter long, everyday move to a different part of the pasture and use this gardening to your advantage. I have seen bison trample down tall sagebrush and cause new grass plants to grow in areas previously bare.

I suspect many of you have seen the impact on the land wherever you place your salt block or mineral tub. If you leave this block or tub in an area too long, the soil around the tub or block may become completely bare and extremely compacted. I encourage my clients to move this salt or tub every two to three days. Aaron Paulson from Snow Crest Ranch uses anise oil to attract bison to the far corners of the pasture. He ties a rag dipped in anise oil to his mineral feeder, then drags this mineral feeder into areas where bison rarely graze. Aaron tells me his bison will travel miles once they smell the anise and know that mineral awaits.

The bison of the old days traveled in large herds where there were commonly 30 to 40 head per acre. One of the ways I’ve discovered to increase the gardening effect on the
land is by dramatically increasing the stock density. Stock density is the number of animals you have on the land at a given moment in time.

My monitoring data from ranches across the western US shows that when you can achieve at least 30,000 lbs. of animal per acre, magical things begin to happen to the landscape. You will see an increase in desirable plant diversity, plant production and plant growth. And, many times the plants will stay green longer, allowing you to harvest more sunshine and produce more forage.

Since predators have been largely eliminated from most bison operations and you require the neighbors to control their dogs, how can we keep the bison concentrated in tight herds? Fences today act as the predators of old.

In a following chapter you will find different types of fence used today to contain bison. Many bison producers are using electric fence for interior fencing. This type of fencing is cheaper to build and I have seen bison really respect electric fence. Once bison have been trained to electric fence, they rarely challenge it. On the Durham Ranch they use electric fence and six foot tall woven wire fences. They have watched the bison herd level the tall woven wire fence when it would have taken much less energy to break through the electric fence. If you’ve ever been shocked by an electric fence, you do your best to never touch that fence again. With bison it leaves a lasting impression that they don’t quickly seem to forget.
For almost 30 years, I have been assisting bison ranchers in creating grazing and land management plans. I have also been monitoring how bison graze and how they impact the land for the last 20 years. I’ve learned that you don’t want to make really big changes too quickly with a seasoned bison herd that has been on the same landscape for a number of years. Slowly expose them to smaller pastures and new types of fence. If you have always grazed your pastures the same time every year, you will need to break the repetitive grazing patterns that the animals may have established.

Mark Kossler has a great YouTube video entitled: Management Intensive Grazing With Bison. The video talks about how they used yearling bison to intensively graze pastures. I believe yearlings are more adaptable to the changes you may want to make. Even with yearlings, Mark makes some great recommendations involving pasture design and water facilities.

If you are just getting started in the bison business, I would encourage you to start with yearling heifers. Yearling bison are easier to manage and you do not need quite the infrastructure to handle the animals. You can immediately introduce these animals to the grazing management program you plan to use on the land. If you start with mature cows that had miles to roam and stick them in a small 80 acres pasture with a lot of their friends, they might begin to look for a weak point in the fence.

I have been working with John Flocchini from the Durham Ranch since 1986. In about 1990, John began to cross fence some of the large 10,000 acres pastures. Initially they split these 10,000 acres pastures into five or six smaller pastures. Today the Durham Ranch’s approximately 55,000 acres are divided into more than 70 pastures. The large herd of 1,000 plus cows with all their calves and bulls, easily approaches or exceeds 2,000 head at times. Many of the pastures today are under 500 acres in size. As water and financial resources allow, they still plan to cross fence some of the larger pastures. Depending on availability of forage and time of year, the bison are commonly moved into a new pasture every three to four days.

The Durham Ranch receives an average of 14 inches of precipitation every year. Due to this limited precipitation, most pastures are grazed only once each year. To recover from the severe grazing and animal impact, each pasture averages over 300 days between grazing events. This allows most plants to recover and produce seed, and allows new seedlings to germinate when favorable moisture conditions exist.

How many pastures you will need to adequately manage your bison herd and reduce overgrazing depends on several factors:

- What is your landscape and production goal for the land you are managing?
- What level of grazing and bison management are you committed to implementing?
What are your financial resources? Water developments and fences require significant capital investments.

How much precipitation does your area receive and how reliable is it? If you get more than 20 inches of rain and it seems to rain every 14 days, you might be able to re-graze your pasture two to three times each year.

Whether you plan to manage 10 head on a couple hundred acres or over 1,000 head of bison on several thousand acres, you need to create a well thought-out grazing plan. This grazing plan will help you minimize or eliminate overgrazing and use the natural attributes of the bison to improve the health of the land. The outcomes of a well thought-out Holistic Grazing Plan are:

- Helps you increase profits by minimizing outside inputs.
- Shows how you plan to utilize the tools of grazing and animal impact to improve health of land and improve forage production.
- Helps you anticipate and meet the nutritional needs of your bison (livestock).
- Helps you to create essential wildlife habitat (year-round forage; essential cover for nesting and winter protection).
- Allows you to maximize forage production during the growing season.
- Shows you how to ration out forage during the dormant season.
- Helps you to outline a Drought Management Plan.
- Creates a low-stress environment for animals and people.
- Integrates all other social, financial, and environmental events to move closer to achieving all three parts of your holistic goal.

Here are the steps that will assist you in creating a well thought-out Holistic Grazing Plan. Do not skip any of these steps. These steps are taken from the Holistic Management Handbook: Healthy Land, Healthy Profits written by Jody Butterfield, Sam Bingham, and Allan Savory.

**Step 1. Make Opening Decisions:** Look at the big picture for the season (growing or dormant) you will be grazing. Gather all family, employees, and management advisors for a pre-planning session and brainstorm. Identify all factors and issues that you need to consider regarding when and where you place this bison herd. On one or two large pieces of newsprint, record all issues and factors that can influence when and where you place your bison herd. Here is an abbreviated list of items that you may consider:

- Water availability in all pastures.
- Number of pastures, variability in production, location of pastures.
- When the bison calve, when they breed, when you plan to wean the calves.
- Wildlife issues such as nesting or game birds, predators, big game issue, hunting seasons, etc.
- Problem weeds or poisonous plants.
- Land management issues in each pasture.
- Flooding or other weather issues.
- Planted crops/hay that will exclude your bison.
**Step 2.** Setup a Grazing Plan for each herd you plan to manage separately. Grazing charts can be obtained from www.holisticmanagement.org

**Step 3.** Identify management concerns affecting the whole cell. These factors are not pasture specific and will occur regardless of where the bison are grazing. Factor such as calving, breeding, hunting seasons, vacations and family events are commonly considered in this step, including being busy irrigating, planting crops, or haying.

**Step 4.** Record bison exclusion periods. Identify time periods when bison cannot be in a pasture; areas where crops or hay are being grown, timber harvest, or heavy hunting pressure on public land.

**Step 5.** Check for unfavorable grazing pattern. To avoid any animal and land health issues, your bison should be grazing each pasture a different time each year.

**Step 6.** Note and identify pastures having special management needs. Review your brainstorming list and carefully identify specific management needs of each pasture; i.e., problem weeds, a buildup of too much dead plant material, limited water, creating nesting habitat(s) for birds, stockpiling feed for the winter time, etc.

**Step 7.** Evaluate and rate pasture productivity. To maintain the nutritional requirements of the animals and equalize grazing pressure, you need to estimate how productive each pasture is. NRCS can help you determine what your pasture productivity is if you are having difficulty with this step.

**Step 8.** Determine length of recovery between grazing events. In arid environments, I would recommend that you graze each pasture only once during the growing season. In more humid-wet environments, you can probably use a 60 to 90 day recovery period.

**Step 9.** Determine Average Grazing Period (formula below).

\[
\text{Average Grazing Period} = \frac{\text{Desired Recovery Period}}{\text{Number of pastures for this herd}}
\]

I’ve listed a couple of examples below regarding how I would calculate the average grazing period.

**Example 1:** I’m grazing my bison in a fairly arid environment and I want to only graze each pasture once through the growing season. I consider my growing season to be
from May 1 to September 30 – 150 days. I have ten pastures available for my bison herd. So, the average grazing period would be 15 days.

**Example 2:** I’m raising my bison in the upper Midwest where I get fairly reliable rain through most of the growing season. I feel most severely bitten grass plants can recover in 60 days. So, I use 60 days as my desired recovery period. I have six pastures, so the average grazing period would be 10 days.

REMEMBER: If your grazing period is much longer than 10 days, your bison will probably be overgrazing select plants during fast growth in your pasture. The only way to completely eliminate any overgrazing is to shorten the grazing period by creating more pastures.

**Step 10.** Using the average grazing period, determine what the grazing period should be for each pasture using the information you gathered in Step 7. In Step 7 you determined that some of your pasture produces only 10 ADA (Animal Day/Acre) forage while others produce 40 ADAs forage, and you call this pasture average. So, you base the grazing period of all the rest of the pastures on this average pasture. If a pasture was only half as productive, I would reduce the grazing period by 50%. If another pasture was twice as productive as the average, I would increase the grazing period by 200%.

**Step 11.** Now with all the information you have recorded on the grazing plan, determine how you plan to graze each pasture by recording the planned grazing periods on the grazing chart.

**Step 12.** Implement your grazing plan and continually monitor and make adjustments based on what is actually happening on the land.

If you are grazing your bison year-round, you will need to create two Grazing Plans, one for the growing season and one for the dormant season.

Roland Kroos has consulted with numerous bison ranchers the last 30 years and teaches on-site Holistic Management seminars on a couple of Bison Ranches each year. [www.crossroadsranchconsulting.com](http://www.crossroadsranchconsulting.com)
Modern Bison Handling Systems

BY KEN KLEMM

Much progress has been made since the early days of bison handling. We have learned how bison view the world and how best to handle these amazingly powerful, excitable and often dangerous creatures. These insights can be built into a corral system.

Over the last 30 years, I have worked with bison in all manner of corrals and pasture situations. My primary instructor has been the bison themselves. My education in handling bison originated on a large ranch that often found me alone with small bands of bison, or large groups of up to several hundred in number, with the task of returning them to their home range, sometimes as many as 15 to 20 miles distant.

In this situation, brute force through massive manpower was not an option. Only through careful study and hundreds of hours of application of various techniques was I able to master the art of getting bison to do what I wanted them to do. What I didn’t know then was that I was learning to speak bison – from the bison themselves. These principles, learned out on the open ranges, have deeply impacted my design and use of corrals.

In this chapter I will share with you the basic principles I’ve discovered and provide you with the layout of my current corral design. I’ve designed and built many working facilities around the country, but this design is one that was so different than my prior designs that I never had the courage to build it for someone else. That changed when our family moved to our own ranch and we bet all we had on starting our own enterprise. I built the corrals and have used them now for 16 years with amazing results.

A good set of corrals should be able to work all classes of bison in a manner that minimizes or eliminates injury and stress to man and beast alike.
Here is what I describe as a proper set of bison corrals:

- They can be worked with one person but can also be worked three or more people with a resultant increase of hourly capacity.
- The bison are in the “nucleus” (the area of high stress) of the facility for a very short time – under ~10 minutes.
- The corrals will effectively handle animals, of all classes, that have come straight off the truck and have never seen the facility. This shows the layout speaks the universal language of bison.
- Animals that are processed regularly flow through the system better each time.
- It is easy to corral the bison and stage them for processing.
- When the animals are not in the nucleus they are calm and can be held, fed and watered and made comfortable (the spa treatment).

The importance of a proper set of corrals cannot be understated. If you don’t have the capability to gather and ship your animals any day of the year, you are not truly in the bison business. Many start-ups feel that buying the bison and taking them home is the start and plan to build corrals sometime later. This can be a big mistake. Just like when you get in a vehicle, experience tells you that it’s best to make sure you know how all the systems work and that they are operational. Don’t get in the bison business unless you have a proper set of corrals, either built or in the latter stages of completion. Save yourself the wreck!

A proper set of bison corrals will allow you to apply the following principles:

- You will be able to apply and release pressure to the animals’ ribcage (side view) flight zone from the head to the tail, up to and including the load-out and entry into the squeeze chute.
- Humans over the count of three are largely hidden from bison view. I believe that bison can count to three. Threats numbering over that amount cause an ever-increasing level of anxiety and stress. Once a bison is stressed there is perhaps no harder animal to handle. Hence, the fewer the people the better.
- When threats (people) are in the corrals, the animals must always have somewhere safe to get away. A proper design will allow you to carefully apply pressure as needed and they will “escape” right to where you want them to go.
- Bison will always come back better than they went. This principle can and should
be used to get them to go places that they would prefer not to go.

- Bison are herd animals, and as such, there are followers and leaders. If your corrals allow you to work the leaders, the rest will follow at a run. If your corrals ignore this trait and treat them as one big blob, with no social structure, you will be adding stress where it is not needed. Additionally, if your corrals ignore that they are herd animals and require you to needlessly separate animals, the stress levels will increase.

- Working bison is an exercise in trust building. At the end of the experience, if your lead animals feel that you have been firm, but fair and everything worked out pretty well, you’ve had a good day. Conversely, if your animals feel like they have been rammed, jammed and abused – good luck with next time.

A short list of no-no’s includes:

- Dead ends. Bison hate dead-ends. Of course, some-dead ends can’t be prevented (squeeze chutes, kill boxes, etc.) so it is best to allow or provide light so it doesn’t appear to be a dead-end. Paint colors matter, too. Light colors will help draw animals in. Often, tough spots in the corral appear to be a dead-end due to shadows or perspectives. Take the time to study a tough spot and see it thru your “bison eyes”. Get down at their level and look at it. Imagine that you are a prey species with an attitude and fight is equal to flight if the chips are down.

- Places where bison can pile up in large groups are a big no-no. Bison instinctively know they can get seriously injured or killed when heaped in a mass. Make sure your corral system doesn’t jam large numbers into small areas. Large numbers should be in large pens and small numbers should be in small pens. Don’t get greedy and try to stuff in more than is comfortable.

- Brute force (lots of people, loud voices, hot shots, pushing with tractors, etc.) may work with cattle and may get you by in a pinch with bison, but more often than not, the more brute force you apply, the bigger the problem will get. Use your mind and intuition to get them to want to do what you want. That said, often times a little brute force is the most humane and the least stressful method to proceed. For example, it is not uncommon that right before the squeeze chute some animals will hang up. A well-placed jolt of electricity (usually right behind the should blade) after quickly trying non-electric means, will keep the animal from getting more excited by keeping the flow going. Use force such as this very sparingly.

- Loud voices are only for life and death situations. If a bison is about to run a horn through you, then you have permission to use all means necessary to save your hide. However, voices carry a long way and the animals can sense the stress in your voice. Those loud voices will stir up animals yet to enter the stress zone and you will create an ever-increasing environment of stress in which you will lose and the bison will suffer.
Consider the historical accounts of how the Native Americans herded bison over cliffs. What sort of techniques did it take to get bison to do this? Remember, the Natives didn’t have the advantage of fences or even the mobility provided by horses until very late in their coexistence with bison. Yet, on foot, on the open range, they knew how to “speak bison” so well they could convince hundreds of bison to plunge off cliffs to their deaths below.

Historical accounts relate that a fleet-footed and very brave young man would don a buffalo hide and get in place to lead the herd, once spooked by the tribe, to the cliff edge. Once there, with a stampeding herd of buffalo at his back, he would insert himself into some pre-discovered crevice and hunker down while the herd stampeded over him to their death. Early drawings of these drives show tribesman driving the herds from their sides, not pushing from the rear. Often crude wings were constructed to help direct the drive. Accounts like these prove the validity of much of the bison language experienced bison handlers now use. Bison will follow the leaders. Apply pressure to their rib cage and not to their backside. The bison we raise today are no different than the bison of that era and respond likewise.

Bison are masters at reading body language. They have had thousands of years of predator patrols pass by and if they took every patrol as a threat, they would never rest, flourish or propagate. They read body language and they read yours. They feel what you feel – crazy sounding, I know, but proven true by thousands of hours of my observation. Even the difference of 45˚ of the direction of your face has big meaning to a bison in close quarters. I liken this to driving a high performance sports car vs.
an old, worn out pick-up. Small movements with the sports car make for big impacts, whereas the old, worn out pick-up that has a half turn of slop in the steering wheel, is more like herding sheep down the road. Bison are Ferraris. You must be attentive and precise.

Move with purpose and never faster than needed, but never slower than prudent either. Your actions should exude confidence, courage, perfect timing and an understanding of bison thought, while relating firm kindness and consideration for their excitable, herd nature.

The design you see below allows the bison to always have somewhere to go. It gives you the opportunity to apply pressure, with very few steps and in precise amounts, to get the animals to flow through quickly. The nucleus is very small and, as such, animals are only in that zone for a very short time. With three people, we commonly work as many as 350 head through this small set of corrals in an eight hour period. It is rare if we hurt animals (even to damage horns) and we’re all getting pretty old ourselves, so we need it geriatric friendly!
I prefer a curved alley to feed the squeeze chute, but found it to be cost prohibitive when we built this system. As is usual, there are a few tweaks I would make if I did it again, but I would not change the basic layout. The design can be adapted to your site and budget as you see fit.

Notice that with the aid of a couple of ropes and pulleys, the squeeze chute operator can sort five ways out of the squeeze chute without moving.

Preferred materials are welded pipe, and plate steel where needed. Materials of lesser strength may have “give” and the bison will try these types of fences. This creates a handling/training problem in that if the bison feel they can break out, they are not going to give you their undivided attention. All wild animals are trainable to some degree, including bison, and, in essence, a proper set of corrals will afford you the opportunity to train the animals. It is best to reserve the use of solid-sided fences for the very nucleus of the corral. I feel it is best to have visual contact with the animals even as they load into the chute so as to continue to apply the flight zone principles instead of force. When sheeting corrals do not use less than 10 gauge steel, as lesser thicknesses will not hold up to the bigger animals’ abuse.

Spend effort in design and construction to limit rattles and other noises. Be certain to have tops welded onto feeder alleys and squeeze chutes. Bison can pile like sheep and will get out. Make sure single file alleys have tapered sides so as to protect smaller animals from being crushed. This also helps keep animals from turning around.

Circle style tubs, while very popular, have their problems. Most operations that have these have figured out that it is best not to close the gate much past a 180°. With this in mind, I questioned the expense and need of a tub, and instead opted for a much lower cost angular design that works better.

I can work about 30 head an hour by myself through this facility and can sort in the
alley, on foot, and load out goosenecks or semis without help. With one good assistant I can do much greater volume. We have off loaded semi loads of even mature bulls from big range country and worked them well without incident. Being able to sort stock on foot, without running them through the squeeze chute, is a great time and stress saver. Make sure your corrals have this feature, but make sure you always have an escape route. Solid sides are the most dangerous in this regard, so greater thought and care for safety should be given in those areas.

I find 6’6” is the minimum height for side alleys and 7 feet is required for high stress areas. Bison can jump with ease!

Hydraulic squeeze chutes are very nice – if you can justify the expense. If you decide to use a hydraulic chute make sure you move the motor off the top of the chute (to limit noise) and move the controls off the chute too. A man standing with his arms overhead looks a whole lot like a trap to a bison – think, lion pouncing on their back. I like the controls mounted hip height, slightly to the rear and about three feet away from the chute. From that position I can actually use my body language to help load the chute, which is really important, especially when working by yourself.

If you are in the bison business you are in the meat business. Can you imagine a butcher without a meat scale? You must have scales so you can measure progress and evaluate management decisions. I like a set under the squeeze chute rather than in the alley behind the squeeze. It saves a step and only requires the animals to stand still in one spot (and the chute will hold them still for you). Make sure your flooring is poured in such a way so there is no step up to the chute. For larger outfits, an additional set of platform scales to load out truckloads is useful – especially if they are certified. Shrink loss is BIG money if not accounted for.

Flooring choices are very important, as many injuries can occur with incorrect flooring. I like concrete in the very nucleus. Concrete assures that all the tolerances will remain...
the same, wet or dry. The finish on concrete should be almost as rough as you can make it. You want it to hold dirt and yet have rough concrete edges showing. I stomp the concrete when it is firm with a coarse toothed rake. Your concrete man will cringe but slick concrete is a sure recipe for broken legs and hips! Make sure your corrals have proper drainage. The alleys should be packed and graveled. I also find a simple sprinkler system made from hoses and sprinkler heads wired to the pens makes all the difference on dusty days.

What’s on the horizon? Maybe working your animals in the dark? During some of the many terrible hot, dry spells we’ve experienced, I have had to gather our herd in the cool of the night to sort off animals to ship so as to follow our drought plan. With a clear sky and a good moon we’ve had great success in gathering the herd. A few times we felt brave and went even a step further and sorted in the alley, on foot and in the dark, with great success. We found the animals behave much different at night – much calmer and focused. The limitation seems to be our night vision. We just don’t see well enough to be 100% effective. I wonder if night vision goggles would solve that problem and open a whole new realm of bison management.

Lastly, I’ve never met a stockman who felt that his corrals were done. There is always room for improvement and modification. It is wise to plan a small budget each year for this. Right now I’d like to get a couple more gates on ropes so I can sort a few more ways out of the chute and maybe even get some of the ropes on hydraulics. If I’m going to be doing this when I’m 80, than I need to make a few things easier!

I hope this short primer in bison handling and corral design helps you get off to a good start. Your working facility will be the heart to your operation. It need not be extravagant. Often the extravagant facilities don’t work all that well anyway. Learn to speak bison, walk with a cool confidence and a firm kindness and learn to tap your innate intuition and you will enjoy working these great beasts for years to come!

---

Ken Klemm is the proprietor of Homestead Ranch near Goodland, KS and a founding member of The Buffalo Guys - www.TheBuffaloGuys.com.
Selecting the Right Foundation Stock

BY DICK GEHRING

Animal selection for your foundation herd can include a number of different venues. It takes as many dollars to feed a poor animal as it does a good one. So you might as well start out right. What makes a good animal? A number of different characteristics come to mind, but conformation, mass, and efficiency are key to ending up with what you want.

Conformation (shape or structure) encompasses a number of different characteristics that we look for in bison. Characteristics that give an animal a “look” that you’re after should include sound legs, overall bone structure, growth potential, and body score. With a little practice these are relatively easy to identify. Sounds legs need to have correct curvature and straight lines in the right places for athleticism, fluent movement, and the ability to easily do what they are designed to do; move, grow, and breed.

The following are some pictures of problem legs. A. rabbit-legged B. cow-hocked C. post-legged D. splay-footed E. fine-boned.

FIGURE 8.1
Example of a sickle-hocked or “rabbit-legged” bison. (Photo: Dick Gehring)
As you can see, a rabbit-legged or sickle-hocked animal is at a disadvantage for a number of things. The hind feet end up positioned under the body too far. For a bull performing his duties, his balance is going to be compromised greatly. It will take extra energy and stamina to maintain balance and endurance, neither of which he can afford to waste during the heat of the summer and the breeding cycle. The added stress and strain on his joints may end up being debilitating.

Buffalo tend to have a cow-hocked stance to them naturally. An over exaggeration will add stress and strain on joints as well. If a cow isn’t able to hold her weight easily because of her hind leg conformation, introducing an energetic bull into the equation will make it very difficult to support the added weight of the bull during that time. The rest of the year she will suffer from extra stress to her hocks and pelvis as she moves about.

We don’t see post-legged bison too often. It’s easy to imagine how difficult it would be for a buffalo to be running, jumping, dodging each other, or breeding in high heels. But a post-legged bison looks like a woman standing in stilettos. None of these activities would be advisable in high heels...for a bison.
Splay-footed or knock-kneed is not preferable for many of the above reasons. Fine-boned animals can mean two things. Meat to bone ratio is very important to your bottom line as we market our product. More on that later. However, too fine of bone structure is not advantageous in terms of strength and agility, but more importantly we tend to see a lack of growth potential in finer boned animals. Look to the lower legs and in particular the front lower legs to compare thickness of bone.

Another indicator of growth potential is the width between the horns and the size of the head particularly in bulls. You don’t want a jug head, but balance is important and too small of a head may indicate lack of growth potential.

Topline is a term you’ll hear that relates to the highest point over the shoulders and moves toward the tail head. Most producers like to see a straight line sloping down from the highest point of the hump to the start of the tail. Midway along that segment is the loin. The length in the loin section will yield more high-end cuts (tenderloins, etc.). The length in the pelvis will equal more steak and roast cuts. The width of the pelvis means more weight to these cuts, but more importantly for the cow, this will indicate easier calving.
Capacity in the girth (thickness and depth) typically equates to more room for heart and lungs (stamina and endurance), as well as more room for feed. The more capacity an animal has for converting feed, the better the feed conversion (cost of gain) for both bulls and cows. Additionally, in the case of the cow, this will typically mean more milk production for her calf. That means a larger calf and more pounds to sell.

Body Mass: Since it holds that length, width, depth, and thickness equals more mass, you would assume that you would automatically want larger animals. This, however, is not necessarily the case. How much meat is on the bone is what is important, as we are selling pounds of meat. So it stands to reason that we look to the higher yielding animals, not necessarily larger animals, when considering retaining breeding stock from within our respective herds. This is a little bit of an art form that takes time to recognize with the hide still on. As time goes on and you spend the time in the slaughter house to see which animals dress higher (carcass weight compared to live weight), and even more importantly yield, (the weight of sellable meat compared to the carcass weight) a higher percentage of cut-ability, you will be able to look at a glance and make an educated guess as to which animal will make you more money.

This will take practice and some data gathering in the form of comparing live weight to carcass weight to yield, and then remember how this animal looked from pictures you took prior to slaughter. I target for a 63 to 65% dress and, more importantly, a 75 to 78% yield. This information from the seller, if available to you when looking at breeding stock, would be very valuable. Mass is important when selling meat, but meat to bone ratio is more important. As I said earlier, meat to bone ratio is paramount to profitability. A smaller amount of bone and a larger amount of meat obviously makes more dollars out of a carcass.

Efficiency has many elements that you want to take into consideration when selecting your breeding stock. Size matters, but at what cost? Buffalo typically eat three percent of their body weight daily. A larger cow will eat more feed. Feed costs money. In the same breath, larger cows hopefully will wean a larger calf. At the end of the day we are
selling pounds in whatever form, whether it’s live breeding stock, carcasses, wholesale, or retail meat. So the age old question is, “Is bigger better”? It may sound like I just contradicted myself when talking about size and mass, then switched gears and said the smaller the cow and bigger the calf, the better. Both are true and if you concentrate on your percentages and data, you’ll be fine.

The ratio of weaning weight to size of cows is important. The percentages of saleable meat as it relates to the carcass size and the carcass size to the live animal are also important. As with all considerations in this book, balance is key. I can get into a very sophisticated and complicated formula that involves stocking rate, animal units (AUs), pounds of forage eaten, rent, land payments, cost of mineral, death loss, etc., etc. To find out the best answer you can add up all your costs and compare them to your receipts. But ultimately, it is a simple answer. Since all of these costs are a reflection of a cow herd as it relates to the size of the cows and the size of the calves, divide the mother’s weight by the weaning weight of her calf. A smaller cow that weans a larger calf is a winner. As you’re looking at different herds trying to figure out which herd to purchase your stock from, ask what the average weight of the cows are and what the average weight of the weaned calves are. Also, look to the program that has animals that don’t require an excess of extra inputs to attain the end results. You want cows that can go out and get the job done in their everyday clothes. Not cows that need pampering and expensive feed to maintain their weight, become pregnant, and raise a calf.

Another important element when judging efficiency is how does this animal and its’ progeny perform? A clue to how they might perform is obviously a track record of past performance. A strategy that can have added success is familiarity. An animal that grew up in your region with similar topography and ecology, will likely do very well when introduced to essentially the same environment that they just left. Does that mean you should stick with poorer quality animals because they are from your region? No, I don’t think poor quality animals are a good bet. Bring in the best animals you can afford and balance the purchase by acclimating them to your area.

Younger buffalo acclimate more easily than older ones. Any age bison will acclimate. Some may take longer than others and some may take a little more care, but this is a most resilient species and with a little management and vigilance, the switch over to your area can be achieved. The term acclimation can take on many different meanings in many areas of concern. For this chapter, my meaning is centered on overall nutrition. Simply put, if an animal new to the area starts to lose weight, consider where it came from and how it was cared for. If the region it came from typically supports higher feed value, you may want to supplement it so the animal does not crash. A little weight loss is not a crisis. A large amount of weight loss can be. Continue supplementing and gradually decrease the amount of supplement until the buffalo are used to the forage
available in your area and able to maintain themselves with what is available. An animal that has had a larger than normal amount of high energy feed doesn’t have to crater. Take care to ease it out of a diet that it’s been exposed to and ease it into the diet that you are going to provide. In the end “balance” of all these things makes sense.

Ratios: Many people ask the question: “How many cows should I run with a bull?” If you ask someone who is selling breeding bulls, they might say one bull per cow. If you ask someone selling heifers they might say the one bull you have could handle 50 heifers. I know of several producers that have single sire pastures and are using a proven bull to cover 50 females, and have been successful. However, they are managing their herd very well, they have a very good environment with excellent grass quality, and quantity, as well as access to minerals, water, etc. that encompasses the entire year round. Nutrition along with an exceptional bull play a big role in determining his ability to cover that amount of females. Not everyone would see the same results. I suspect the answer lies somewhere in the middle. A bull worth his sand should cover 20 females. Size of pasture and herd will play into his challenges. Too many acres, too many female groups splitting up would make it impossible to cover the distance, gather the groups, and have the time to court the prospective gals as they come in heat. If you’re not single siring your herds, multiple bulls allow for the above challenges. Some suggest an odd number of bulls. Their thinking is that if the rut didn’t define the hierarchy adequately, as two bulls are still deciding who is actually in charge, a third younger, energetic adult might just sneak in and take care of business while the pushing and shoving is going on. We tend to use one sound adult bull to 25 cows in the smaller pastures. Two bulls if they are younger, or one aged bull and a younger clean-up bull.

Another ratio that folks ask about is herd size and in particular, how it relates to yearlings. Two different trains of thought can be considered. One is, separating your yearlings from the cow herd. This can often result in better yearling gains from lack of competition and the absence of being “kept in their place” by the natural hierarchy of the herd. The ability to supplement or manage yearlings differently than you would your cow herd is easily attained. A third advantage of this situation is the ease of which a producer can de-stock in the time of crisis, such as a drought. You can also take advantage of the ability to quickly and easily gain access to cash flow by selling your yearlings at an unexpected but lucrative time. With a separate pasture for your yearlings, all of this can be accomplished without causing chaos in the herd, disrupting a breeding season, and certainly reducing the likelihood of injuring calves or the yearlings themselves as you try to separate them at a less than opportune time. The second train of thought is to leave them all together as a natural herd and allow for the hierarchy and natural order of things to dictate how the yearlings grow and learn to mesh with the group. I try to balance both of these thoughts by typically separating those that are definitely slated for future slaughter while leaving prospective, or at least known replacement
heifers, in the herd. Those replacements that remain in the herd fit in very well and perform well for their intended purpose.

The last thing I will say about herd size is *do not overstock* your pastures. Others will address this issue in different chapters in this book. Please pay attention to them. Nothing will have a bigger impact on your success than stocking rate. Overstocked pastures will affect pasture quality and quantity, which in turn will affect disease transmission and propagation, parasite load, rate of gain, breeding percentage, and in general, profitability. This is likely the one area that affects practically every other facet of our industry. Pay attention to this subject as you read through the handbook.

The last item I feel important to address will be covered in the health chapter by Drs. Dave Hunter and Murray Woodbury. You need to pay particular attention to this segment. I’m asked all the time about vaccination regimens for your herd. In the past I’ve taken the approach that if I provide adequate nutrition, space, and healthcare, these bison will take care of themselves. My insistence to not pre-vaccinate for diseases unseen on my property was driven by my belief that the longer we keep from vaccinating for anything and everything, the longer it will be before we are required to wipe noses and powder behinds. I still believe that. In the case of vaccinations for cattle diseases never proven in buffalo, I stand behind that premise. However, in the case of a disease properly diagnosed in bison, please understand that many of these diseases have been present in the cattle world for thousands of years and cattle have developed immunities to many of them. As our herd numbers increase, our concentrations increase, and our exposure to cattle increase across the fence or close proximity, we will likely see an increase in disease breakouts that may be devastating to our herds. *Mycoplasma Bovis* in particular is one such disease that will jump up and bite you. When it does, it is very humbling and disheartening, knowing you could have reduced your exposure potential very easily by a simple vaccination program. Please listen to what these veterinarians have to say.

Dick Gehring owns and operates Black Kettle Buffalo and has been in the buffalo business for over 30 years working in cow/calf, commercial feeding, processing and sales.
Small Scale Management

By Ryan Hanna

Getting Started
Like so many small scale operations out there, this is not our full-time business. My wife, Ramie and I have two full-time jobs in town and two young children, Blake, age 8, and Levi, age 4, who are becoming more and more active with 4H, school, sports and everything else you can imagine. Top that off with a ranch to tend to on the side. People at work ask how we do it—here’s how: there are a lot of late nights, early mornings, long days, and some of the best partnerships, friendships and neighbors you could ever ask for to get it all done.

We have had days where you think, “Why in the world are we doing this when we have jobs?” Then you sit on the back of the feed truck with your family on a spring evening watching the newborn calves play in the horizon of a Kansas sunset, and you quickly are reminded why we all do this.

In this chapter, we will share some of the things we have learned, advice that has been given to us, and mistakes we have made to get to the point of operating a successful small scale bison ranch.

Figure 8.2
Taking a few moments to watch your herd on the land is one of the benefits of bison ranching. (Photo: Ryan Hanna)
When we started our adventure in the bison industry in 2005, we were not any different than any other first timers. We had a small piece of ground, no facilities, not much for fence and knew absolutely nothing about bison. What we did have was a lifelong fascination for the animal and the desire to learn more. Getting started is no doubt difficult. With anything new it easy to get discouraged. Are you truly serious about it? Then make your own circumstances. Don’t ever let yourself focus on why you can’t do something, but focus on how you can.

The best advice we can give is to find your local bison association, join it, and offer to help. Some will be reluctant to bring in a greenhorn to help work animals, but if you are truly interested, be persistent when asking. Offer to help at sales, ask to ride along during chores; these are all things that got us where we are today. You will quickly discover this is the most diverse crowd of people you will ever be around and everyone is willing to offer advice on what you should and should not do. Many of these people (admit it or not) have made mistakes. Learn from that every chance you can. You will never know everything there is to know about bison and ranching, you don’t have to! Just know when to ask for someone else’s help or ideas. It can save you time and money!

**FENCES**

Typically a small scale farm or ranch will be close to a populated area. A 200 acre ranch within 10 miles of a major city is a different ball game than a 2,000 acre ranch in the middle of nowhere. Kansas has a state song that we are all familiar with called “Home on the Range”, and of course our favorite line is “Oh, give me a home where the buffalo roam”. The key word in that line is “home”. There is nothing worse than a call from the sheriff in the middle of the day when you and your wife are at your job in town, or even worse -- a call from your neighbor that your bull is standing in her garage eating flowers that she just bought, or licking the salt off her new car. (That bull is for sale, by the way!)

Build a good fence. Sure, there are cheaper options out there. Will they work for you? Maybe? Will you have to come back and put insulators on your high tensile every time
Fence is not any different than your animals; it is a long-term investment, so build it accordingly. We have built every kind you can imagine and have quickly learned that you don’t need a super max type pasture fence. We have a lot of five strand barbed wire and a lot of woven wire. Personally, I am a fan of the 48’’ woven wire on 7 foot T posts with a barb on top. Set good strong corners and put a wood or pipe post every 60 to 100 feet, and it will be problem free. It is the one and only fence that we have not had to go back and maintain frequently. Calves don’t get through it and cows don’t stick their heads through it to eat.

FORAGE
Make sure you understand your ecosystem. A key role in keeping your animals healthy, happy and in the pasture they should be in is by having plenty for them to eat and drink. If there is one thing I can’t emphasize enough, it is learn how to manage your stocking rates before you even turn an animal loose. Every area is different, every pasture is different. Work with your local NRCS (Natural Resource Conservation Service), they will be one of your best sources to guide you on the type of grass you have, rotational grazing practices, and stocking rates in your area.

A small scale bison ranch today is by far different than what a large herd of bison saw 100 years ago. These animals migrated and rarely saw the same piece of ground twice. They had free choice to every mineral they needed and did not have a parasite problem. This is not the case with a 40 acre farm or ranch; even with a good rotational grazing program these animals will still see the same ground more often than their system is designed for. Part of the challenge of bison, is the fact that they are never domesticated. They will always maintain a certain amount of wild instincts. Like any wild animal, they are designed not to show weakness when sick or injured. By the time you notice an animal is looking bad, it can be very difficult to diagnose the problem and get them turned around. The best way we have found is to be very proactive and work with the animal to provide everything they could possibly need, which could include mineral, protein, and some free choice hay when needed.
FACILITIES
This is always a big question when getting started. Our advice: keep it simple. If you’re going to start with five animals you don’t need a series of pens like a western Kansas feed lot. Build a good strong catch pen large enough to hold the amount of animals you are going to run. Have an alleyway that you can sort in and a good strong chute. Your vet will be more willing to help you out if he doesn’t feel like he needs to re-visit his last will and testament before he comes to your place! We built pens before the animals came home, and purchased a chute afterwards, which worked out all right. But, it could have been rough if we needed to work something.

FIGURE 9.4
A small-scale operation often involves a lot of improvising. (Photo: Ryan Hanna)

ANIMAL SELECTION
Your animal selection will depend, once again, on your ecosystem. If you are in an area that is heavy with lush, cool season grasses, be careful bringing in animals from a region with warm season grass and vice versa. Animals from different parts of the country will have different frame sizes for climate, different enzymes and bacteria in the digestive system, and different natural antibodies. You could quickly find yourself running damage control trying to get weight back on an animal you just paid big money for simply from changing its diet.

As you shop for the right animals to fit your ecosystem, you will probably have several eye-opening experiences. Some animals are going to be higher maintenance and have higher energy levels; a lot of this can be caused by nothing more than the way they have been handled. If an animal knows it’s going to be chased with a four wheeler or pickup every time they see a human, then my advice is don’t bring them home. You will have problems. On the flip side of that, if an animal knows it’s going to get something to eat or just something new to check out when it sees a human, you will be accepted as
part of the herd. As a result of that, when you do need to work something, move them or load them, it will make your life tremendously easier and less stressful for them.

**WORKING ANIMALS**
You will probably be eager to help someone work animals. It is exciting, it can be dangerous with the wrong facilities, and it can also be very educational with the right facilities and leadership. Be open to helping if someone invites you, but follow their lead. It is their ranch and their way of doing things. Don’t be offended if you offer, and someone doesn’t want your help either. As you learn more about bison, you will quickly discover that less help is better. We have learned over the years that it is by far simpler to add a couple more gates and pens than have four more people. When you confine a bison it is threatened. Add a couple strangers to that mix and you and your help are no different than a pack of wolves to that animal. They will quickly become nervous and flighty and your help will quickly wonder what they got into.

**PRODUCTS AND SALES**
Once you have established your herd and are ready to start selling some animals, you will need to think about options. This has undoubtedly been the biggest learning curve for us. There are so many aspects and markets you can reach out to. We have done some retail, some wholesale, some live animals and some carcass animals. The best advice I can give is to pick an option that fits your personality and your schedule.

Retail markets can be profitable and enjoyable if you have time and the right personality. You may choose to do it out of your home or at farmers’ markets, or even have the opportunity to have a storefront. It is a very good place to sell meat, skulls and hides.

Wholesale markets can be a great avenue to move larger amounts of meat product, but sharpen your pencil because you’re probably going to be dealing with a seasoned purchaser that knows exactly what the margins are. This can be an excellent opportunity for both sides to build a long-term relationship and an easy outlet for your products.

Live animals of all types are usually in good demand. They can go for a variety of uses from breeding stock to butcher animals. There are some excellent auctions across the country to sell live animals, or you can deal private treaty. We have done both and both work well.

When you sell animals for carcass weight you will typically be paid by the hot hanging carcass weight (also called rail weight). It is also an excellent opportunity to sell a larger number of animals and make a long-term relationship with a buyer.

No matter what you choose for outlets for your products, keep the long-term in mind.
Be honest and up front with whomever you are dealing with and you will find how easy it is to build these relationships.

**SUMMARY**

If you are one of the few people lucky enough to care for bison, it will no doubt be the most fulfilling adventure that you have ever taken on. Whether you want five or 500 animals, set goals for yourself, have a plan, and see where it takes you.

At some point, all of the large scale producers started from nothing other than the desire to raise bison. You might reach the point where it’s time to “Go big or go home”. The bison industry is no doubt in the spotlight. Bison are fascinating animals and people are drawn to them. It is crucial that you always have the best interest of the animal and the industry in mind -- you are our best salesman. The friendships you will make and the people you will meet will be nothing shy of awesome.

Ryan Hanna is the proprietor of Hanna Buffalo Company, a small scale producer located in east central Kansas.
Large Scale Bison Management

BY DUANE LAMMERS

In this section I hope to cover a few of the basics with general guidelines to get one started in developing their bison management plan. I have worked with federal, state, tribal and private bison herds in several states and Canada. I’ve been involved with multiple bison research projects and have well over 10,000 hours of herding, rounding up, film production and processing animals. There were a lot of things tried that did not work and mistakes made along the way. But as a lifelong animal behaviorist nurtured by my father, a cattle rancher and horseman, I have made a lot of progress.

FENCES FOR BISON

Popular pasture fence construction types include: barbed wire, woven wire, and electric fence. Your choice will depend on location to populated areas, neighbors and personal skill. It is also a critical component of biosecurity.

Electric fence is very common in the bison industry.

Advantage:
- Cheaper to put in.

Disadvantage:
- A personal time study put the maintenance level at six times that of barbed wire fence.

This was an electric fence put into company specs using the best insulating posts on the market.
- Wildlife incursions and flora and fauna drain power and effectiveness.
- Neighbors may not want to touch or help maintain fence you border with them.
- Limited knowledge of how electricity works for temporary help and others to
provide assistance in maintaining fences.
• Animals, when pushed hard, can easily run through the fence.

**Barbed Wire**

*Advantages:*
• Known by most on farms and ranches when repairs are needed. Repair and maintenance is easier.
• A well constructed 6-7 wire and five foot high provide a sturdy fence.
• Individual animals can be repulsed when running into the fence.

*Disadvantage:*
• Cost is higher in materials and installation than electric fence.

**Woven Wire**

*Advantage:*
• High level of security due to its net-like characteristics.

*Disadvantage:*
• Cost is highest.
• Damaged fence is more difficult to fix.
• Animals will sometimes work holes into fence since there are no barbs to deter them from working over the fence.

**CORRAL DESIGN**

*Layout is not an easy answer. There are many factors. I have four key recommendations:*

• Locate a high dry spot with good drainage between pastures with access to an all-weather road. Make pens larger than you think necessary and at least three times as big as you would need for a similar number of cattle; 400-500 square feet for old cows, if you are holding for more than a few hours. If you hope to grow the herd, do not hem yourself in.
• Use as many portable corrals fastened to posts where you are not sure about the final design. While I have worked animals in totally portable set ups, I am not recommending that long term. I have built and taken out my share of corral fence. There is always a use for portable fence in a livestock operation, and it seems to hold its value should you decide to sell it. A fortune need not be spent on buffalo corrals.
• Construct all pens and alleys with a safe method of getting out. The solid-sided walls are dangerous. A rather solid looking wall with slats wide enough to get a big boot in to crawl out or rails animals cannot get caught in, work. I believe Dr. Temple Grandin has designs for this, as well as complete systems.
• When you have animals holding in a corral for several days or weeks, take the time to move them to different pens on occasion. The new scenery will do them good and it will allow you to train the animals. It teaches you and them how to respond to each other. Leaving gates open for them to wander is a good first step, but animals need to learn what response you are looking for.

**TRANSPORTATION**

Suggested reading: *2010 Recommended Animal Handling by AMI Foundation* written
by Dr. Temple Grandin.

When using Dr. Grandin’s graph to load your animals, keep in mind that an 8.5-foot semi trailer is narrower inside. I have found her graph quite helpful for allowing healthy animals to come off the truck.

Also, load similar animals together. For instance, do not load cows and yearlings together or old bulls and cows. Old bulls should be close in size. If you know of obvious issues with one animal, cow or bull, it would be worth isolating them, if it can be done safely.

I have bent these rules a bit over the years for very short hauls and got along like many people, but I strongly recommend against it for the health and safety of the animals. Every animal industry is being scrutinized when it comes to animal welfare. Let the chicken and pig guys hold onto that limelight.

Grazing, Feeding, & Supplements
Is the goal for your herd to have them survive or thrive? The number of times I have heard or read how bison can utilize lower quality feeds than cattle are numerous. The trap many people fall into is feeding bison poor quality feed and expecting high quality performance.

I continue to work on grazing management skills. I recommend understanding the plants animals are grazing and the timing for optimal nutrient value to the bison. There are rotational grazing systems and methods. Spend time with local range experts and join the Society of Range Management in your area to also better your understanding. Understand the methods of Holistic Resource Management.

While the short grass prairies of the upper Great Plains lend themselves to winter grazing with minimal hay supplied most years, other parts of North America are not so lucky. There are various protein supplement methods available for animals on winter grass; these include alfalfa hay, range cubes, lick tubes and liquid protein supplements. Cost and convenience are the primary factors when choosing the right supplement. Some ranchers have had good luck using lick tubes, while others only have the bison play with the barrels.

Reproduction and Replacement Selection
Animal reproduction comes from a nutritional surplus beyond what is necessary for survival. The condition of bulls and cows is important going into the breeding season. Bulls will use a massive amount of energy tending cows and fending off other bulls through the season. Semen testing bulls is always wise. I have seen results of a dominant bull in a small herd shooting blanks. Cows that are short nutritionally will not likely
cycle, but if they do, there is a probability they will not maintain the pregnancy through the first trimester.

**Bull to Cow Ratio:**
In nature this will be close to 1-1. I have often used one bull to 12-15 cows with a pregnancy rate of 88-92% of cows exposed, usually on large open range conditions with pastures in excess of 4,000 acres. A smaller range of 100 acres, in situations with good nutrition with limited travel for the bulls, can likely get by with one to 20. Given that ratio, if I only had 20 cows I would still have two bulls, should something happen to one during the breeding season. A shortage of bulls can stretch out the calving season as well.

Over the years I have seen several instances of problems with under feeding and a few from overfeeding bison. Don’t forget that it is often micronutrients like minerals in a particular area that can make a big difference. With all of the various eco-regions in North America, my best recommendation is to identify local concerns related to beef production on range for a starting point. A feed dealer may be a source, but remember they are selling their program.

The excess of one mineral can limit availability of another. Checking grass, feed and water sources for minerals will give you a start in developing a mineral program. Later on, when culling animals off of grass one might pull a liver sample, which can be sent to an appropriate lab. This will give you a profile of long-term mineral levels in the animal.

Fetal programing is something that is being discussed in livestock production. The dam’s nutritional status at all stages of pregnancy may have various effects on the long-term health and productivity of the calf; health, future reproductive ability or growth into adult size to name some key attributes. For years, the last trimester of pregnancy was a time of added nutritional quality. But even the first half of the pregnancy, when the early organ and gland development occurs, is showing its importance in mammal long-term health and reproduction.

Your animals might have very good phenotypic and genotypic characteristics, but with poor nutritional management, they may not show itself in the offspring. Or, you might think you need better bulls when you really need a better pasture, feed and mineral program.

**Transporting pregnant cows:**
Cows that are less than 60 days pregnant have been shown to have up to a 10% embryo loss while transporting cattle, according to a recent published study by South Dakota State University. I would expect similar losses in the bison industry as well during this time period when shipping pregnant bison cows. It is also common to see a reduced
pregnancy rate the following year after pregnant females are moved to a new ranch.

In my many years of working with bison herds and purebred and commercial cattle herds, I have come to the conclusion that I really like the management level required to have a bison herd. We have not spent years trying to make them better and subsequently, have an excellent low maintenance animal that reproduces well and thrives with minimal hands-on care.

Most producers tend toward the cattle model for selecting replacements for their reproduction herd. I would suggest that one also review the recently published Bison Conservation Model as part of their decision making process. The numbers of animals (500) and acres (5,000) does not leave out small producers. Producers working with small numbers and acres can be part of a meta-population (interchange of breeding stock with other producers) that achieves a similar level of diversity. The model also identifies methods of selection for alternating years. We tend to have a bias in selection even when we try not to. I do not intend to be critical of producers who selectively breed animals. There is a place for all who care for this animal and there are numerous management methods that, I think, protect the animals’ integrity long term even in the selective bred herds. I would only say I have seen the dark underbelly of the purebred industry several times and the hidden negative secrets of those animals, so use caution.

HANDLING LARGE HERDS
The fight or flight distance is at least three times that of most cattle herds.

Over the years, I have moved buffalo using feed wagons, horses, pickups, motorcycles, ATVs, UTVs, helicopters, airplanes and on foot. My personal preference is with a saddle horse or on foot. With over 10,000 hours of working with bison, I have made my share
of mistakes; more than most people I expect. We fixed a lot of fence in the early years and rode some horses long and hard. But wanting to understand animals, as instilled by my father, has made me seek out people like Bud Williams, Temple Grandin and many others I have watched and talked to over the years.

Having a long heritage of working cattle on horseback, daily, during summers from the age of 10, I am fond of this method. Since improving my herding methods using Bud Williams’ techniques, it has become very normal to move a herd on foot from one pasture to another. The largest group was over 2,000 head on a 3,500 acre pasture. That was a lot of walking and it took two and one half hours. (Mostly had to see if I could do it). Moving the animals on foot has risks. Always use caution and consider personal safety and the safety of others when working with animals.

I believe it is important to learn how to herd your animals. It sickens me every time I hear of bison getting out and the only method to get them under control is killing them. This also comes under biosecurity, which I will write about later. If you have a lot of people wanting to be cowboys and stressing the animals, it is hard for them to consider a feed wagon to lead them back to the pasture or corral. There are many times of the year when the green grass is just more desirable to a buffalo than chasing after a feed wagon.

**MOVING TO A NEW PASTURE**

Animals unfamiliar with a new pasture may do well being led by a feed wagon followed by herders. I have had bison herds unfamiliar with feed with no interest in following a feed wagon to a new pasture. In one instance, we could herd the animals to the open pasture gate, but since it had been closed their whole time in the pasture, they only looked at us. After an hour of this standoff, we abandoned the effort for another method the next day. I had the wrangler for that herd drive out in a UTV into the herd and throw out an old un-tanned bison hide on the end of lariat rope. I then instructed him to drive to the gate and across the road to the other gate and new pasture. He was done in about five minutes.

**GATHERING THE HERD (HERDING NOT CHASING)**

I will usually gather the herd once each year, which allows an opportunity to vaccinate, worm, pregnancy test, cull, select replacements and sale animals; usually done between October and February. Timing depends on several factors, including: available winter forage, weaning, sales, optimum timing of parasite control and vaccinations. It is best to have all of this planned out to limit herd handling to once per year, even if sale animals have to be re-worked later.

While I’ve used the methods parks and large ranches implemented for years, the fun of a big buffalo chase to the corrals soon wore off. While developing our
grazing plan for the ranch, we decided to move the bison through the corrals a couple of times a year. Our typical fence was five or six strand barbed wire five foot high. Usually two to four people would gather and move 2,000 plus animals at a walk into the corral. And we could do this from more than one direction as there were four pastures off this corral. For other producers I’ve set up systems where the animals go through the alley behind the chute, moving between pastures. One person could easily roundup 200 animals in a short time depending on the distance to the back of the pasture.

Having the alley and chute where you come into the corral is best because it is easy for them to want to leave the corral. Almost every corral works fine the first time, as was the instance with a corral built by a friend new to the bison industry, but familiar with cattle. The first year went well. The second year we could bring the animals from the big pen up to the pen before the alley, but they would not cross through the gate. The herd of 100 or so animals would walk right up to the gate and stand there politely, but not cross the invisible force field of fear. The standoff went on for about 45 minutes before a backdoor method, going out the gate they came in, was devised with a few portable corrals panels. Then it went fast.

Coming into the corral with little stress pays dividends in handling in the corral later. Stressful actions build as you start working your herd through the chutes. So, starting from low stress keeps the high point of stress lower.

**BIOSECURITY**

- Sourcing & storing feeds and products for use on the ranch can include:
- Purchase of clean hay without noxious weed seeds.
- Keeping herbicides and pesticides in separate areas from feeds.
- Suppliers that will confirm ingredients in manufactured feeds, including mineral quality. For instance, there are several sources for calcium and some are more bioavailable to the animal than others.

**Good fences, and relations with neighbors and community:**
Bison can be gathered and returned in most instances without the guns coming out and the whole incident playing out nationally.

**DISEASE PREVENTION:**
When starting a herd or adding to it, get a history from where you are sourcing those animals. Healthy closed herds will limit exposure to importing a disease. Disease outbreaks in a herd usually are imported. Even when you are confident in the source of animals, a minimum three-week separation from the rest of your herd is warranted. This should include two fences between herds and no common water sources.
EMERGENCY SERVICES AGENCIES, NEIGHBORS, COMMUNITY

In the open prairies, the primary people you notify of a problem and assist you are your neighbors. While there are the cattle people who will tell you that they will shoot your animals if they get out, just ask them if that is the normal protocol when their cattle get out.

In a populated area with towns and major roads nearby, develop a plan that includes emergency services and law enforcement, should animals get out. Emergency service agencies, likely to get a call if animals are out, are people you should invite for an educational tour about bison. The perception of bison, by many, is that they will attack unprovoked. And the people who often want to help are more interested in a Buffalo Bill reenactment than herding animals back home.

I believe it is critical for anyone in the business to be able to herd their animals and not just lead them with a feed bucket. It is often said, “You can get a buffalo to go anywhere they want to go”. My point! You must be able to convince the bison that where they want to go is where you want them to go. And it is Herding, NOT Chasing. Take the time to learn about these animals and their behavior.

In conclusion, I must say bison have provided me many opportunities during the last 38 years. While learning about bison, I’ve marketed every part of the animal, including the sounds they make. And along the way I’ve had the pleasure of meeting a wide variety of interesting and knowledgeable people in the bison industry.

Duane Lammers manages ranches in three Canadian provinces and consults for governmental agencies and private ranches in the US, with an emphasis on profitable bison conservation.

duane.lammers@gmail.com
The last forty years have seen the development and marketing of “resistance free” training in horses as a “new way” of training horses and riding them that makes them soft, safe, reliable, and extremely responsive to the rider’s direction and control. During the same time period, “low stress” livestock handling has been taught and promoted by many, though most would attribute its recent advent and promotion to Bud and Eunice Williams.

Both of these disciplines seem to promote training horses or livestock to “handle” better, and both use similarly aligned principles to do so. But an in-depth study of either of these might reveal that the training is of the people, not the animals. To take this a step further, one might realize that handling problems with livestock may have more to do with how people approach and try to control them than with the livestock themselves. Could it be that “we” are the root problem with poor handling and performing livestock?

Do these “low stress” principles work with bison?

Much has been written and taught about bison being “semi-free ranging wild ungulents” with a built in predilection that renders normal livestock handling techniques, fences, corrals and equipment insufficient to handle and control these animals.

This perception has lead many to build physically large and imposing fences as the “standard” bison fence In fact, some of the “Jurassic Park” corrals developed for working bison could easily be used for working elephants. Yet many producers use minimal fencing (two wire electric) for pasture separations with little or no problems, and some use minimal corrals made out of wood, rubber belting, wildlife screening, or big straw...
bales to routinely work their animals.

Why the difference between producer facilities? They are running the same animals; could it be the difference is in the people, their attitude toward the animals and the philosophy and techniques they use to manage and control them?

Stress is defined as mental, emotional or physical strain caused by anxiety or overwork; to cause somebody or something to experience mental, emotional or physical stress. Isn’t this what we are really talking about? Can some producers minimize the stress their animals experience while others may be blind to it and by design of their production system or handling methods exert huge amounts of stress on their animals causing all sorts of problems? Stress can be brought about in how we handle or move our bison; how we manage them on range; how we confine and feed them; as well as how they are worked in the corral.

“Low Stress” livestock handling should create an environment, in facilities and handling methods that keep animals mentally calm, content, and unafraid. Bud Williams would say that the essence of low stress livestock handling is handling the animals in a way that suits them and keeps them “mentally” intact or keeps them from becoming “mentally fractured” which results in wild, erratic and often aggressive behavior. It is developing an environment on our ranches that responds to what the animals show us they need. As Bud will often say in his clinics, “our animals are continually communicating to us by what they do or don’t do, but are we listening”?

In essence, do we manage and handle our animals in such a way that we minimize the stress they experience or do we manage and handle our animals in ways that increases their stress? Steve Cote says in his book, Stockmanship, A Powerful Tool for Grazing Lands Management, “Stress occurs when we (people) place demands on animals that they can’t calmly meet or respond to naturally, and failure to meet our demands has undesirable consequences.” In many instances, these consequences are poor handling,
poor animal performance, aggressive behavior, death loss, injuries, increased disease and health problems, increased handler stress, and economic loss.

It is impossible in the space provided to thoroughly talk about every nuance of “low stress livestock handling” as it pertains to bison, however this overview will address many of the main points operators are faced with in owning and managing bison and how “low stress” methods can indeed help them better manage their animals.

HANDLING BISON – THE “LOW STRESS” BASICS
Bison and other livestock will respond to pressure we put on them as we place ourselves into their comfort or flight zone. This zone is the area around them that causes them to take notice we are there, and then, if the pressure isn’t removed, to move away from us.

This gentle “dance” of us applying pressure, the animal moving away from the pressure and us the pressure is the main method of getting our animals to move for us in a “low stress” manner. What makes it low stress? The fact that we move into an animal’s flight zone giving it pressure and when it moves away from us, we release the pressure by either not moving with them in the same direction (by stopping) or we move in a different direction. This sets up a positive cause and effect relationship – that is we get into their flight zone putting pressure on them, and they, by moving away from us get released from the pressure.

If we are diligent and consistent in using this “give pressure – get release” relationship effectively gives control of the release of the pressure to the animal. They quickly learn the responses that gives them release from the pressure. Once our animals establish this relationship, they can effectively take huge amounts of pressure without getting stressed or emotionally fractured. Why? Because we build a relationship with them that lets them know they are in control of releasing it and over time a level of trust and respect exists between animal and handler.

What causes “high stress” in our animals? Putting pressure on them and never releasing
it, or worse, no matter what they (the bison) do, continually increasing the pressure. This is how to get bison to become aggressive to their handlers. Unfortunately, most of us were reared in the mode of “high stress” livestock management where things are generally done fast and loud! If movements with our livestock look like a controlled stampede rather than a calm, slow, orderly move then we are operating on the “high stress” side of livestock management.

Following are some foundational principles we will have to work on to develop our ranches into “low stress” operations.

1. Realize that it is our fault, not theirs, if our livestock live in a high stress environment. We will need to change how we operate to affect a better outcome for them. Our attitudes towards our animals and philosophies of animal management will have to change, as they are just operating the best they can in the environment we provide for them.

2. Consistently use signals that livestock can respond to naturally so they can understand our meaning or what we want them to do. Get consistent in how we move our bison in the pasture, from pasture to pasture or in the corral. Realize that if they become unsettled or emotionally fractured, it is something we did that caused it. Analyze the responses (feedback) we get from our stock, as this is how they are communicating to us. If we are not getting the desired feedback, then we are the problem and will need to change what we are doing.

3. Apply only the amount of pressure needed to get the desired response, not an ounce more!

4. Stop “forcing” our bison to do what we want. Replace force with consistent sound handling principles that allow them to learn what we want and gives them opportunity to do it willingly.

5. Stop doing things that cause immediate “high stress” in our bison such as yelling; moving fast and erratically; not moving in straight lines; not giving them time to think, analyze and respond; putting continued unrelenting pressure on them with no release.

6. Stop having a definite schedule when working with our bison. We must realize that our “schedule” puts pressure on us that often times is transferred to our bison, which causes its own problems. In working with animals, not every day is the same and how we approach it often times affects the outcome. If we are on edge and in a hurry, the animals will pick up on this and react accordingly.

7. Start getting on the “other side of the horns.” Spend some time thinking about what we do with our bison and how it may look or feel from their perspective. If we can get inside them and see what we do through their eyes, it well may change how we do things.

8. If one approach does not work, even if it did yesterday, try another. Conditions are constantly changing and we must account for that with our method and approach. Be flexible in what we do and how we do it.

9. Remember that every time you are in or near your bison we are training them – either for good or for bad. Be consistent and give them the opportunity to understand you and your intentions. It is especially important to work in straight lines all the times, even when we aren’t asking them to move.

This list is talking about a change in our philosophy and attitude. Unless we work at changing how we operate, nothing significant will change in our operations and how
we manage our animals. It is not impossible to bring about a change in how we operate on our own but it is normally done with some reading, research, and lessons from those who know how to do it. If we have not had any training in low stress livestock handling, we will not know many of the things we are doing that create stress in our livestock.

**PASTURE MANAGEMENT**

The pasture environment would include the size and shape of the pastures, forage quantities and qualities available, watering sources, spatial requirements for individuals and or family groups as well as a myriad of other considerations. Is there a method or plan in place that monitors both forage condition and animal performance? Does this method or plan focus on creating optimal animal performance and contentment as well as efficient use of the pasture or range, minimizing areas of forage overuse or under use?

Bison have a very intact social structure that has definite spacing requirements between individuals and family groups. This spacing requirement may be different for different sexes and ages of animals throughout different times of the year. Herds that generate their own replacements from offspring will develop family groups between related individuals. Many think that these family groups interact with one another at times but most often require spacing between the groups while on pasture.

Social stress will become a factor if pasture size is too small to give adequate spatial requirements for individuals or family groups for large herds. This causes discontent and disharmony within the herd, causing animals to breach fences and become difficult to handle. Low forage quantity, quality, or lack of water sources can compound the situation, causing animals to be discontent while suffering poor performance.

![FIGURE 11.3](image)

The pasture environment must not only provide adequate forage, but also enough space to accommodate the dynamics of the herd. (Photo: John Flocchini)

Adequate spatial requirements are easily achieved if pasture size is very large for the herd size, and animal performance may not suffer. But land use may not be efficient as many areas of the pasture may become over used or under used, both of which are detrimental to range condition. Do we have the ability to move animals onto portions
of underutilized range, have them be content, getting them to stay and utilize it, even returning there after going to water? A high level of stockmanship could be used to solve this problem in many instances, without the expense and cost of further fencing in large pastures.

When bison are first put onto a new ranch or perhaps moved into a new pasture, the manner in which they are introduced to their new environment can determine how they will settle in. How were they handled prior to arrival or the move to the new pasture, were they worked and shipped gently, keeping them mentally “together” or were they mishandled and mentally fractured? Are their herd mates or of the same family group with an intact social order or of disassociated origin so that the “group” has no intact social structure? Are they of mixed ages giving some mature leadership to the group or are they of similar young age (weaned calves or yearlings), lacking natural group leadership? Are the animals coming from an environment with similar climate, water and forages or is everything quite different and new?

Are we weaning our calves at six months of age and running them separate from the herd? Do we have to feed or supplement them heavily to keep them gaining in spite of them being on good pasture? If we do, it may have more to do with social dynamics and group leadership than nutrition. It has been my experience that 6 month old bison are not ready to be on their own and may be dysfunctional grazers, not working a pasture as needed to get the best nutrition possible. Worse yet if they are emotionally unsettled, they will not get sufficient dry matter intake to sustain or have a positive weight gain. This social and environmental stress we place on our calves may require significant feed or supplement inputs to overcome. Is there a way around this?

Many producers experiencing problems with juvenile animals that have been separated from the herd have tried the following:

- Not weaning;
- Weaning calves for several weeks or months and then putting the calves back with...
the herd so mom can pick up where she left off;
• If calves are to be weaned and separated from the herd for a long period of time, spending time with them – moving them to water and to feed, putting them on the feedline, teaching them to correctly respond to pressure and how to “handle”. Developing “mentor” bison to put with them that will supply leadership and social order – such as older dry cows or aged bulls that handle well.

Introducing bison into unfamiliar environments can be troublesome and often contributes to the conclusion that bison are difficult to hold and contain. The real problem is that the bison were thrown into a new environment with little or no consideration made for all the factors listed above. This sudden introduction into an unfamiliar environment makes them difficult to contain as they may be emotionally unsettled, lack social leadership, lack knowledge of new forages, feed sources and basic knowledge of where to go and what to do. A good analogy would be if we were kidnapped in the evening, roughed up, shoved onto a plane and shipped overnight to Shanghais then dropped off on the south side of town. Would we experience any stress figuring out where we were and what we would need to do to find food water and shelter?

CONFINED FEEDING AND DIET
Many marketing systems require feeding of concentrates to your animals prior to slaughter. Systems used by producers range from supplementing concentrates while on high quality pasture or in loose confinement on harvested forages to putting animals into commercial cattle feed yards. These systems are being utilized each year by producers with varying degrees of success, but how might our bison see each system? Is the stress the bison experience the same in each of these systems? The following table lists some basic parameters for a typical low input on ranch feeding system and a commercial feed yard.

The typical “on ranch” feeding system for exposing bison to concentrates will normally have bison in smaller groups, in larger pens with more square footage per animal while on a menu ration of forages and concentrates where animals have some selection in their diet.

The larger pen per group size addresses the social need for more spacing, particularly for young bulls that are just reaching sexual maturity. The smaller group size helps the “pecking order” of the group so that the “tail end” group is smaller. The menu ration gives animals some choice in what they eat and the amounts of concentrate consumed. The animals will address rumen acidosis by selecting more forages and less concentrate. This in effect lets individuals customize their ration to their nutritional tolerances and needs. Disease exposure is generally limited as the bison are in a closed herd system with limited exposure to diseases from off ranch sources.
The typical “commercial feed yard” will have bison in larger groups in small pens, giving much less room for each animal due to pen and bunk space costs per animal. Group sizes tend to be much larger, leaving a large “bottom” end in the pen that will not do well in the tight social environment until some of the top end is finished and taken out of the group. Nearly all rations fed are total mixed rations that have all components processed and mixed together, leaving no choice for individuals to customize the ration for their individual nutritional compatibilities and no way to buffer an onset of acidosis by limiting concentrate intake and increasing fiber intake. Disease exposure is high due to the off ranch environment and exposure to cattle or other bison from numerous sources.

Though the “commercial feed yard” system has become the standard in the cattle industry over the last 60 years, we need to remember that we have selected cattle to fit this system by selecting breeding stock (typically bulls) that did well in this environment (tight confinement) and on this type of ration (high concentrate total mixed ration).

Bison on the other hand have not been selected for this environment, have a dominant social order that demands more space per animal to keep social stress minimized, have not been “bred” to do well on the same high concentrate rations as cattle and are easily challenged in a high disease environment of concentrated ruminants. The stress bison experience in the commercial feed yard environment is less than ideal and often times will yield much higher death loss and higher costs of gain than on ranch feeding.

**WORKING BISON IN THE CORRAL**

Working bison through the corral is a time that challenges our abilities as stockmen, as we are in close proximity with the animals. And if our corrals are substantial, it gives them little choice but to submit to what we may do to them. It is very easy to overpressure them as they do not have the ability to just leave or move away from us.
to release pressure. If bison become over pressured they will become aggressive often times causing harm to themselves, their pen mates, the facilities, and their handlers.

Much talk has been given to the corral that is “perfect” for working bison. I have seen and worked in corrals of different design and configuration and feel that the perfect corral has not been built. Some, however, work better than others. Bus Williams has said it is our responsibility as animal handlers to make whatever corral we have work for the animals by accommodating whatever they need to feel comfortable in going through the corral. Dr. Temple Grandin of Colorado State University would say that corral design matters a lot and that we need to build or change our corrals so that they work well for the animals and the average handler. Both of these philosophies can be appropriately applied in getting out bison to work through our corrals better.

I have worked in corrals that eventually were modified so that it was easier to get animals to go through them. Do you have an area that does not work well in your corral? Modify the existing corral with big straw bales and see if it fixes the main issues. If it does, then spend the time and money to make a permanent change. If you are really struggling to figure out how to get your bison to come through the corral in a calm orderly manner, invite another producer to come and visit, as the needed change may be in how the handlers are working the bison. If you are building a corral from scratch, spend some time and a little money traveling to visit other producer corrals when they are working bison. This time and research up front can be invaluable investment.

Working bison in the corral really starts on the outside. Have we been successfully moving them in our pastures in a low stress method? Have we established a rapport with them by giving pressure and letting them release it? Are we so consistent in how we do this that we have built a trust relationship with them? Do we routinely move our bison into or through the corral when we do not need to work them, so they do not have a negative experience every time they get there? Are our corrals set up as part of the pasture environment, so that one or more pastures use the water sources in the corral for watering points, allowing animals to come into the corral on their own when we aren’t there?

Have we devised a system or method of getting them into the corral without “stampeding” them there? Do we always bring them into the corral the same way or do we use a different way or method every time? Is the approach into our corrals on flat ground or do the animals have to climb up or go down? Animals feeling threatened have a natural propensity to go up. If we need to move them down into the corrals, it is unnatural to them and may not work as well. Where are the prevailing winds from? Bison will often want to drift with the wind. Are the corrals and capture points designed with this in mind?
If we are using the stampede method (multiple people, horses, helicopters, atv’s and vehicles all loudly moving at a high rate of speed), we have just set the stage for them to work very difficult for us as they will be mentally unsettled and on edge, being overly sensitive to any pressure that is applied to them. We can then expect the whole process to be arduous for everyone involved. If we have been successful in getting them into the corral without excessively pressuring them, then we have set the stage for them to work for us in a reasonable manner that helps everyone.

If our herds are large for the relative size of our corrals, do not try to bring the whole herd into the corral at once. Remember that bison get pressure from us and from their herd mates, as they have a social need for space between each other. The areas we put our bison into get progressively smaller from the time we bring them from a pasture to the corral and eventually into the squeeze chute, a very confined space with room for one animal. We need to progressively take smaller groups as they get closer to the squeeze chute or they will become over pressured and mentally fractured from pressure they get from each other and us. Make sure that the animals have sufficient water and feed available while in the corral.

The number of people used in the corral working often times is larger than optimum. Why? High stress livestock workings typically take a lot of people because it is a hard task which typically forces animals to do what we want them to. We tend to take this standard and apply it to a low stress environment where one experienced person can get a lot done with the animals by correctly applying and releasing pressure. The problem is when we add more people to the equation, we usually add inexperienced folks that are not trained or supervised in low stress methods. It only takes one high stress person working in a low stress environment to wreak havoc on the process for everyone. Are we careful whom we invite to help us work our bison? Are they trained or supervised to keep them from over pressuring or slipping back into high stress practices?

I have found that up to several thousand head of bison, can be effectively worked with a crew of six or less people in the corral if the corral is adequate for the task and the handlers are experienced and trained in low stress methods. Typically this crew would consist of 1 person in back (PIB) bringing animals into the lead up behind the chute, 1 person behind the chute (PBC) working the lead up and putting animals into the chute and a crew of three or four at the chute processing animals, keeping records and possibly separating animals into different groups as they leave the chute.

The most important position in this crew is the PIB as he is typically on foot in the back pens with the animals bringing them into the lead up. If he is consistent in using low-pressure techniques, animals will typically move into the lead up behind the squeeze chute with a minimal amount of stress, and will then move into the squeeze.
chute with a minimal amount of pressure. If the PIB mishandles animals coming into the lead up by over pressuring them to the point of them being mentally fractured, they will be difficult to move into the chute, require the use of hot shots and other less than desirable methods.

Lead ups to the squeeze chute that are patterned after most modern cattle facilities are often much longer than necessary as these are often stacked with cattle for “group” vaccinations. The problem with an excessively long lead up is that we can talk ourselves into filling it with bison. This is a huge mistake.

Bison in the lead up are extremely vulnerable and are under pressure by just being in this environment. The longer they are in the lead up, the worse this gets for them, as they feel vulnerable to the animals in front of them and behind them, as well as to people that may be hovering over them if there is a raised catwalk beside the lead up. They are vulnerable because they have no way of releasing or escaping from pressure from handlers or herd mates.

The amount of time an animal is in the lead up is the “soak time.” The longer the soak time for each animal, the more pressured they will feel until they may become emotionally fractured and non-responsive to correctly applied pressure. If we stack an excessively long lead up with more than three or four animals, the ones in back will have an excessive “soak time.” This will lead again to the use of hot shots and other less than desirable methods being used to move them into the squeeze chute.

The PBC is in a position to overpressure animals in the lead up. He or she can do this by doing too much. If the animals come into the lead up and stand reasonably quiet, the best thing the PBC can do is to stay quiet and away from them (out of sight) until it is time to move one of them into the chute.

The worse thing the PBC can do is to try and separate them with dividers if the lead up is equipped with them and stand over the animals in their view, making noise, visiting with everyone within ear shot, drinking coffee and spilling donut crumbs on them! I say this half joking but this is exactly what happens in many situations. When animals are in the lead up they feel extremely vulnerable and just seeing a handler above them in their view puts additional pressure on them. If we have a raised cat walk beside the lead up, is it wide enough so that the PBC can stand away from the lead up out of sight and sound of the bison in the lead up?

When the animal in the chute is released and the chute is reset for another animal and the back door of the chute opens, is the next animal in the lead up given a little time to assess this change? Bison do not process multiple inputs well. If the chute gate clangs
open, this is a change in the environment for the next animal in the lead up. They need just a little bit of time to assess this change. The worse thing the PBC can do is immediately get into view and put physical pressure on this animal at the same time the gate opens. The animal will lock up as simultaneous things are happening all at once.

Instead, the PBC should count slowly – “one thousand one, one thousand two, one thousand three” – before getting into its view or applying any pressure on the animal. Usually, subtle pressure applied will convince the animal to move ahead into the chute. If the animal starts to move forward, freeze or withdraw the pressure, letting it escape.

The following is a “Low Stress Corral Working Checklist” that we can apply to our operations.

1. Multiple ways to moving stock into the corrals? Do we change methods or directions periodically?
2. Bison have been in the corrals when we do not need to work them and they did not have a negative experience while there? Feed and water are present at all times?
3. We have progressively smaller pastures or holding pens outside of our corrals to begin herd divisions on larger herds?
4. Divide and conquer – we progressively divide the herd into smaller groups while moving them closer to the squeeze chute, constantly monitoring stress they put on each other in the space they are provided and making adjustments as necessary to minimize social stress?
5. Number or people needed to work the bison herd is minimized, with low stress training being done before and during the operation? Non-experienced participants are minimized or adequately supervised to keep them from overpressuring the bison?
6. Do you need more than five or six people if your corrals are adequate?
7. Is the PIB and PBC consistently using pressure and release techniques? Is a knowledgeable person monitoring how things are working and making corrections as needed to keep animals calm and coming through the facility?
8. Is the most experienced stockman working as the PIB? Is he being used to train others in low stress methods while working in this position? Is he consistent at bringing one to three or four animals at a time into the lead up, not overloading it (anything over four is too many)?
9. Is the second most experienced stockman working as the PBC? Is the catwalk beside the lead up wide enough so that he can get out of the view of the animals in the lead up? Is the PBC quiet – not saying or doing more than is absolutely necessary?

10. Does the PBC give the “three” count before putting pressure on animals to move into the chute? When animals give to the pressure applied, does he freeze the pressure (or motion) being applied if he gets the motion he wants from the animal?

11. Does the chute crew stay as quiet as possible? Do they stay out of site and quiet until an animal is in the chute and head catch? Is the operator continually monitoring the condition of the animal in the chute the whole time it is there, monitoring the breathing, making adjustments to the head catch and body squeeze as needed? Is actual chute time efficient and minimized, limiting “soak time”? Is the animal released by opening the head catch first then releasing the body squeeze? Does the chute crew need to use a hot shot often or seldom?

12. What is your average “soak time” from the time an animal comes into the lead up until it leaves the chute?

13. Is there an adequate area animals are released into that lets them cool down and recover from the stress they have been through? Is there adequate water, food, and space? Is the release from the corral a soft release or a modified stampede?

14. Just how often did you have to use a hot shot in the process of working your bison? The low stress standard is to never need to use one!

15. Are we concerned about how many animals we worked in one day or how well we worked the animals? Are we working on our time schedule to the point of creating stress our animals to get done on time?

So how are we doing in working our animals in the corral? As the saying goes, “you can’t manage what you can’t measure”! Following is a Bison Welfare Audit developed by Brian Ward and Temple Grandin that can be used to measure several areas of working bison in the corral. Use it, as it will highlight areas of concern that are causing stress in working your bison!
BISON WELFARE AUDIT

RANCH ____________________________ AUDITOR ____________________________

DATE ____________________________

CLASS OF ANIMALS __________________ TIME OF DAY ______________________

TOTAL TIME ________________________

SCORE 50 CONSECUTIVE HEAD - SCORE EACH ANIMAL INDIVIDUALLY
- REPEAT AUDIT AS NECESSARY

A. ELECTRIC PROD USAGE

The goal is to not carry a hot shot in hand - even a touch without the shock counts as usage.

CIRCLE NUMBER IF PROD IS USED – SLASH OTHERWISE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

Note where usage took place: ____________________________

B. COLLISION WITH HEAD GATE

Use your best judgment here. If the bison hits hard enough to cause a bad headache, count it. Moving further from the chute, or enclosing the sides and/or front of the chute are common solutions.

CIRCLE NUMBER IF HARD HIT OCCURRED – SLASH OTHERWISE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
### C. CHUTE EXIT SPEED

A rubber mat for footing, or a visual barrier in front of the chute will help this problem. A knee hitting the ground, or worse, constitutes a fall.

**CIRCLE NUMBER IF THE BISON FELL EXITING THE CHUTE – SLASH OTHERWISE**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |

### D. INJURY

Broken legs, broken horns, broken ribs, puncture wounds, etc.

**CIRCLE NUMBER, IF AT ANY TIME, RECENT INJURIES ARE APPARENT – SLASH OTHERWISE**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |

### E. CROWDING

Position in the stack does not matter, count all involved; also include bison that turn over backwards.

**CIRCLE NUMBER IF ANY BISON CLIMBS ON ANOTHER – SLASH OTHERWISE**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |

Note where crowding occurred:

---

---

---

---

LOW STRESS BISON HANDLING
<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>Yes</th>
<th>No</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bison were gathered from the pasture into a holding area at a slow pace</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bison were moved into the corral system at a reasonably slow pace</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The bison were generally relaxed while in the corral system before processing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bison flowed through the corral system to the tub smoothly with minimal effort</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel moved slowly without making excessive noise (yelling, slamming gates, etc)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bison were moved easily through the corral with one or two people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post processing, bison receive ample space, water, and feed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weaning pens have adequate space, water and bunks, and dust is minimal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panting was observed in some animals in the corral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust was a problem during processing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive poking, beating on, or multiple electric prod use on animals occurred</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old bulls were a problem when gathering and/or processing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too many serious bison injuries occur during processing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The corral system needs significant modifications</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional comments: __________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
So how are you feeling about all of this? Are you stressed out? If you are, take some time to come up with a plan - to lower your stress and the stress you may put on your bison! It can have great benefit for all. Here are some places to get help and education on Low Stress Handling.

Bud Williams Stockmanship at www.stockmanship.com is a good place to start as well as Temple Grandin at www.grandin.com. The book “Stockmanship – A Powerful Tool for Grazing Lands Management” by Steve Cote gives a great layman’s explanation of low stress livestock handling philosophies and methods. It is available from the Butte Soil and Water Conservation District in Arco, Idaho. The Stockmanship Journal by Whit Hibbard is an ongoing journal by Whit and others on how to learn and apply low stress livestock principles www.stockmanshipjournal.com. Also contact the National Bison Association for references and recommendations for members who are using Low Stress Livestock methods on their ranches.

Mark Kossler is General Manager for Turner Enterprises, Inc., and was formerly the manager of the Vermejo and the Flying D Ranches.

Aaron Paulson manages the Snowcrest Ranch in Alder, Montana.
INTRODUCTION
Animal health is more than just the absence of disease. The presence or absence of disease is usually not the best measure of individual or herd health. Every producer should have well defined production goals. The best indicators of a truly healthy herd are whether these production goals are being met. If the herd is a cow-calf operation, the weaning percentage might be a good indicator. In a feeding operation, rate of gain might be the best gauge of health. Subclinical disease like parasitism or trace mineral deficiency can often reduce production indices in a herd and yet there is no real “disease” in the obvious sense. If a calf producer’s weaning rate is only 60% then there’s a problem whether there is mortality in the cow herd or not. In a herd with optimal health there is optimal production; regardless of how it’s measured, in pounds of meat or number of calves. Productivity is the best overall measure of health. Therefore, optimizing herd health leads to maximum productivity and profitability.

It is important to remember that disease occurrence is more complicated than just a bison meeting a disease-causing organism (a pathogen). Understanding the exposure to pathogens and the outcome of the exposure in your herd is important. Whether or not disease results from the exposure is determined by a complex interaction between the animal, the environment, and the pathogen. Healthy bison are disease resistant, and clean healthy environments don’t support pathogenic organisms. The nature and strength of pathogen exposure is more difficult to control and so it’s easier to avoid the pathogens than to modify or neutralize them.

Health is an expression of many interrelated factors, each one contributing to the well-being of the animal. Similarly, disease is almost always the result of many contributing factors. Some factors are “necessary” or specific to a disease before it can occur and others are only “sufficient” or general causes for disease occurrence. For example, a necessary factor for Malignant Catarrhal Fever (MCF) is the presence of the virus
OvHV2, which causes MCF. If that specific virus isn’t present, then whatever the disease affecting the animal, it’s not MCF. On the other hand, “sufficient” causes are more complicated and usually have several components or factors. In the example of MCF disease, the OvHV2 virus is necessary to cause MCF, but it usually isn’t sufficient or enough to cause disease in a herd all by itself without other factors like suitable environmental conditions for transmission from sheep and a compromised immune system in the host bison; perhaps from stress.

Environmental factors that can become sufficient cause for disease include climate extremes (too hot or too cold), wet and/or dirty conditions such as those found in poorly drained pastures with heavy fecal contamination, and overcrowding the herd. Environmental factors exert their effects on the bison by causing stress, which decreases resistance to disease. Stress can have a cumulative effect and may involve nutrition, physiology, environment, social order, and management such as handling events. Bison health is dependent on all of these factors and minimizing stress on your animals will be a major factor in the well-being of your bison.

In summary, productivity is a better indicator of bison herd health than disease occurrence and mortality. When disease appears in herd it is the result of a complex interaction between animal (host), environmental and pathogen factors. To some extent environmental influences can be minimized but the main disease prevention strategy should be to create disease resistance in bison through minimizing stress, the presence of sub clinical diseases like parasitism, and optimizing nutrition.

**BISON ARE NOT CATTLE**
Bison are a unique species when fenced and raised for production or as a recreational herd. In the past they have been treated and managed by cattlemen and have been considered by many who did not understand their biology and nature to be a “bad ruminant” because of temperament and manageability issues. We have learned much about bison management over the years.

The first lesson we have learned is that bison are not cattle. This fact is easy to forget because they are ruminants like cattle and form herds like cattle. But sheep and deer are also ruminant animals and nobody is tempted to compare the two. The problem lies in the fact that bison look roughly look like cattle and have similar looking calves. There are significant physiological and behavioral differences between cattle and bison that are important to bison health and productivity.

Differences include the age at which first breeding occurs in bison (2.5 years), nutritional requirements over winter, nutrition for slaughter animals, social structure and longevity. For example, bison are seasonal breeders and eaters whose metabolism slows in the
winter to accommodate the relative scarcity of food for growth and lactation. Bison have relatively good resistance to many pathogens that affect cattle, but are naïve to more recently introduced microbes. Bison are susceptible to some cattle diseases because they did not co-evolve with these pathogens and have no innate or genetic resistance to them.

Secondly, we still have much to learn about what makes a bison a bison. Bison are still behaviorally wild animals. Keeping them behind fences for a few generations without deliberately selecting quiet, tame temperament for breeding has not served to make them domestic animals. They are genetically hard-wired to defend themselves when trapped or threatened and have well developed survival instincts that create dangerous situations for nearby humans. Bison are not yet domesticated and many bison owners are reluctant to do so.

---

**FIGURE 12.1**

Bison are not domesticated animals. (Internet photo)

---

**THE BISON ADVANTAGE**

Bison have some advantages over domestic livestock species. We call it “the bison advantage”. The term has been tossed around for many years by some producers and has even been incorporated into scientific journal publications. When it comes to health and disease the bison advantage can be found in the fact that fewer than 1,000 bison survived the introduction of new diseases and market hunting during the late 1800’s and early 1900’s. Arguably, the remaining bison had a genetic resistance to the diseases introduced by European cattle and sheep. Over the last 25 years many wild ungulates across the Western States have been tested for evidence of infections. All wild populations show exposure to these introduced pathogens without major detrimental effects, yet these same pathogens remain of importance to the domestic livestock industries. This may be because producers have arguably never bred cattle, sheep or other domesticated species for disease resistance. The creation of vaccines has diminished the need for such selection in these species. The natural evolution of genetic disease resistance in bison has allowed those remaining bison to thrive in a world of novel diseases and we believe the resistance persists to this day. Some pathogens such as malignant catarrhal fever, anthrax, and tuberculosis are problematic, but bison are
generally very hardy animals, genetically equipped to handle exposure to many cattle and sheep pathogens.

**STRESS IN BISON**

Farming bison as if they were cattle creates stress in the bison. As explained above, because of the wild nature of bison when we restrict their movement with fences, feed them forage instead of allowing them to graze freely, mix up their social groups for management purposes, and interact with them frequently we create physical and psychological stress in them. Stress is one of the sufficient or general causes for disease discussed in previous paragraphs. Not all stress is obvious or observable and over time stress can lead to decreased immune function and increased susceptibility to disease and death.

Stress has two components, acute and chronic. Acute stress causes the adrenal gland to secrete adrenalin and corticosteroids (cortisol) causing the body to shunt blood to heart, muscle, brain and lungs. All of the other body systems, such as the digestive system, are put on hold. Bison are great at handling acute stress that creates the “fight or flight” response to a stimulus. They can fight or run from grizzly bears or humans and when all threats are passed, go back to grazing and the adrenalin and cortisol levels return to normal.

Chronic stress is more subtle. Adrenalin for fighting or fleeing is less significant and cortisol becomes the important hormone. Research has shown that during rut bison can double their cortisol levels and they don’t return to normal until post-rut. Among other things such as needlessly making energy available to muscles, cortisol depresses the immune system and can make animals more susceptible to health issues. It “wears them out”. Our farming systems impose multiple chronic stressors on our bison. In confined situations during their catabolic period (winter), constant changes in social structure and, with or without adequate nutrition, we may place our bison in a situation that overrides the bison’s innate ability to deal with stress. The bison advantage of easily coping with acute stress to fight predators becomes a disadvantage when dealing with persistent or chronic stress. Unlike other domesticated species we have not, and hopefully will not, breed the wild out of our bison. The more we can let bison be bison, the better for both of us.

**MAJOR DISEASES OF BISON**

This chapter is simply an overview and is not intended to address all health issues that you might encounter when raising bison. The factors important to best management practices for raising bison are all inter-related and involve the whole operation on your property. Maintenance of health and prevention of disease is not just based on your vaccination programs, but must involve the chapters on nutrition and handling.
Diseases discussed below are for information and not to be used to diagnose health/disease issues with your animals. Additional information on common diseases of bison can be found through the National Bison Association resource pages. A more comprehensive list of health problems seen in farmed bison can be found at http://www.usask.ca/wcvm/herdmed/specialstock/bison/bisondis.html. There may be newer information available on many of the health issues in this chapter as researchers are constantly learning more of how these diseases impact bison. When problems arise, consult with your veterinarian.

Bison are exposed to a wide variety of pathogens that are part of the landscape and many will never negatively impact your herd. Several pathogens are important in that they are production limiting diseases causing reduction in reproduction or feed conversion, or are diseases of regulatory importance. These diseases include bovine TB, brucellosis, Bovine Virus Diarrhea (BVD), Malignant Catarrhal Fever (MCF) and now Mycoplasma pneumonia. If you suspect any of these diseases in your herd, contact a veterinarian immediately.

**FIGURE 12.2**
Your large animal veterinarian is an important partner in helping you develop a heard health management plan. (Photo: Dave Carter)

SIGNS OF POOR HEALTH IN BISON
The signs of potential health issues created by disease are, at times, subtle or hard to recognize. Any producer or veterinarian who has investigated and done post mortem examinations on bison understands that a bison can be walking around and seem bright while suffering with severe disease or trauma. Close observation of the herd is critical for you detect disease.

Health issues manifest themselves in several ways. This chapter will not list specific diseases, treatments or vaccinations. Instead it will cover some signs of disease and potential causes for those signs.

One of the critical signs you might notice in your bison is coughing, extended neck breathing, salivating and isolation from the herd. There are many potential causes for these behaviors and they can be physical, bacterial, viral or traumatic.
Physical causes include foreign material stuck in the esophagus or throat. Bison are usually very selective in their diet. However, bison have been known to ingest twine, sticks or other items not easily swallowed. Trauma from working chutes, fighting other bison or entanglement in fence lines have also caused the extended neck breathing.

Bacterial diseases causing these signs include pneumonia, necrotic laryngitis and oral abscesses. The most critical and potentially zoonotic diseases include bovine tuberculosis and rabies. Yes, bison can get rabies.

**BOVINE TUBERCULOSIS (TB)**

*Bovine tuberculosis (TB)* is a slow, progressive bacterial disease that is difficult to diagnose in the early stages. As the disease progresses, animals may exhibit emaciation, lethargy, weakness, anorexia, low-grade fever, and pneumonia with a chronic, moist cough. It usually is transmitted through contact with respiratory secretions from an infected animal. TB is a “zoonotic” disease meaning it can be transferred to other species, including man and is therefore of regulatory importance.

Free-ranging and privately owned bison in the U.S. have been free of TB for several decades. TB testing in bison has proven to be effective in diagnosing infected animals and managing the disease. If you are buying animals to start or augment your herd where TB is endemic in wild deer or other species, have animals over 12 months old tested for TB.

**MYCOPLASMA**

*Mycoplasma pneumonia* has become the most important disease affecting the bison industry. It is different from other bacterial diseases in that it has no cell wall components for the bison immune system to recognize, making them slow to respond to infections. The onset of observable disease may be slow or relatively rapid. Herds across the western portion of North America have been severely affected, some losing 40-50 percent of their animals. Antibiotics may slow the course of the disease but when the treatment regimen is complete, the disease process continues. This is a disease that must be diagnosed by post mortem examination and laboratory culture. At present there is no blood test available in the live animal. Researchers are working to develop a blood test for bison.

---

**FIGURE 11.4**

*Mycoplasma bovis* (M. bovis) has become a major herd health issue for bison producers in the United States and Canada. (Internet photo)
**PASTEURELLA AND MANNHEMIA**

*Pasteurella* and *Mannheimia* bacterial organisms have been considered part of the normal bacterial population found in the upper respiratory tract of many bison and other ruminant species. However, they are not normally found in the mid and lower respiratory tract (bronchial tree and lungs). Once in the lungs these bacteria can be deadly. Bison respiratory disease (BRD) associated with either *Mannheimia haemolytica* or *Pasteurella multocida* is often due to their role as a secondary bacterial invaders following extreme stress, or viral or other bacterial diseases. Pneumonia associated with either organism often occurs when the animal’s normal defenses are compromised. Examples of compromised defense mechanisms include damage to the cells lining the upper respiratory tract by viruses such as infectious bovine rhinotracheitis virus (IBR), parainfluenza virus (PI-3), or bovine respiratory syncytial virus (BRSV). Damage to the tracheal lining could also occur due to inhaled irritants such as exhaust fumes, smoke or dust. These are diseases that are best handled by changes in management. Vaccines against Mannheimia and Pasteurella are mildly effective in bison. (See vaccination section below)

Another bacterial disease sometimes found in bison feeding operations is caused by *Histophilus somni* (formerly *Haemophilus somnus*). It can also be found in the urinary and reproductive tracts. It is most commonly seen in the fall and winter months and is associated with cold weather and stressful situations.

Viruses that may cause respiratory signs include Parainfluenza-3 (PI-3) and Bovine Respiratory Syncytial Virus (BRSV). These viruses usually infect the upper airways. They are frequently mild subclinical infections but can cause fever, depression, increased respiratory rate, cough and nasal discharge. Young animals are more susceptible to infection. Resulting secondary bacterial infection is the main concern during these viral infections as this can lead to pneumonia caused by Pasteurella, Mannheimia or Mycoplasma organisms. Since antibiotic drugs don’t kill viruses, the treatment for these viral diseases is based on the secondary infectious processes. Without secondary infections recovery from these viral infections occurs in 4-7 days. These viruses have been implicated in abortive events linked to the high fever subsequent to infection in cattle. Cattle vaccines appear to be protective from severe infection.

**INFECTIOUS BOVINE RHINOTRACHEITIS**

*Infectious Bovine Rhinotracheitis* (IBR), caused by bovine herpes virus-1 also infects the upper airways but can have more serious consequences. It can cause the same signs as PI-3 and BRSV but herpesvirus infection also causes small lesions on the membranes of the mouth, nose, and conjunctiva and creates corneal opacities. Like the other upper respiratory viruses, secondary infections are the major concern. Bovine Herpesvirus-4 has also been found in bison with mycoplasma infection. Cattle vaccines for PI3 and
BRSV are available. (See vaccination section).

LUNGWORM

*Dictyocaulus, Muelerius and Protostrongylus* infestation can also cause respiratory issues in the form of chronic coughing. It can also be a common cause of secondary pneumonia. Fecal exams to detect these parasites should be done regularly on your bison herd.

PARASITES

*Poor body condition, dull hair coat, weight loss and diarrhea*

Parasitism is a problem in many cases of poor body condition and poor hair coats. There are several parasites that can cause these signs. A list of intestinal worms is listed below.

<table>
<thead>
<tr>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemonchus</td>
<td>Barberpole worm</td>
</tr>
<tr>
<td>Ostertagia</td>
<td>Brown stomach worm</td>
</tr>
<tr>
<td>Cooperia</td>
<td>Cooper’s worm</td>
</tr>
<tr>
<td>Trichostrongylus</td>
<td>Nodular worm</td>
</tr>
<tr>
<td>Oesophagostomum</td>
<td>NThread-necked worm</td>
</tr>
<tr>
<td>Nematodirus</td>
<td>Hookworm</td>
</tr>
<tr>
<td>Bunostomum</td>
<td>TRoundworm</td>
</tr>
<tr>
<td>Toxocara vitulorum*</td>
<td>Tapeworm</td>
</tr>
<tr>
<td>Dictyocaulus</td>
<td>Lungworm</td>
</tr>
<tr>
<td>Moniezia T</td>
<td>Liver flukes</td>
</tr>
</tbody>
</table>

*Toxocara vitulorum* has been found in Canada but is usually found in tropical or sub-tropical environments. *Toxocara vitulorum* is the only roundworm or ascarid parasite with a normal host cycle found in ruminants. It is a calf parasite but is spread by adult female animals. It is commonly seen in water buffalo and cattle from tropical and subtropical climates but has been found in bison herds in Manitoba and Minnesota as well as North Carolina and Florida. Clinical signs associated with heavy parasitism include loss of appetite, intermittent colic, bloat, diarrhea resembling white scours, weight loss, rough hair coat, loss of plasma proteins and death. Treatment is centered on treating young calves which creates a problem in bison herds.

Internal parasites are a manageable problem in bison. Time of year and diet of the bison are important for the internal parasites to produce eggs. One negative fecal exam is not 100% effective in addressing internal parasite loads. Producers should
check for parasite eggs in the feces a minimum of twice a year. Many internal parasites can become problematic because of inadequate pasture of paddock management. All of the parasites listed above have a specific life cycle. Many can complete life cycles quickly and re-infect the bison within days. Bison with parasite problems can often have poor, dull or excessive old hair coats. If the problem persists poor condition and calving percentages will follow. If your veterinarian identifies these parasites in your herd, ask to address the lifecycles and management changes that will minimize future infestation.

Another cause of poor hair coats are the external parasites. Your area may include one or more of the external parasites. Ticks and lice have been identified on bison and could potentially be detrimental. Bison have a thicker hair coat and skin and identification of lice in bison is rare. Ticks have been found on bison around the tail head. In many areas where elk and deer are infested with ticks, bison sharing the same habitat are tick free. When working your animal check for these external parasites.

If you find bison in the herd that lag behind, become isolated from the others, and has a noticeable change in body condition or diarrhea there are many potential causes. It is important to examine the animal in a timely manner. Antemortem (before death) examination would include blood and fecal sampling along with a physical examination of the overall physical condition of the animal.

Diarrhea is a common finding. There are many causes including nutritional, toxic plants, parasitism, viruses and bacterial pathogens. Nutritional diarrhea can come in many forms. Excessive protein levels had caused loose stools and diarrhea in bison yearlings. Toxic plants signs have been both as an irritant or severe diarrhea in bison that can be deadly. Parasitism mentioned above can be a major cause of diarrhea in bison along with weight loss and poor reproductive rates.

JOHNE’S DISEASE

Johne’s disease in bison has been well documented in several free-ranging and captive bison herds. The tests currently available to detect Johne’s disease in bison are poor and unreliable on an individual basis. Detection of positive herds is easier than detection of individual animals. Johne’s disease is caused by a bacteria named Mycobacterium avium subsp. paratuberculosis, and is an infection primarily of ruminants. It has been documented in a majority of ruminant hoof stock species, including bison. As bison mature, it is thought that their resistance to infection increases, although complete resistance is unlikely. In most cases, adults serve as the source of infection to young animals, shedding the organism in manure, and possibly milk and colostrum as well. It is a direct fecal-oral cycle. Most bison calves acquire the organism by suckling from manure-soiled teats, by licking contaminated flooring/fencing/feed bunks or by eating
off of ground contaminated by manure from an infected animal. They also can take up the organism by drinking water contaminated by manure from infected animals. There is a long duration between infection and identifying the diseased bison since signs in bison are only seen when the animal reaches 6-8 years of age.

**CLOSTRIDIAL DISEASES**

Clostridial diseases occur in bison. There are several species of Clostridia that cause disease in bison and other ruminants. These organisms are ubiquitous throughout North America. *Clostridium chauvoei* (Blackleg), *C. perfringens* (Enterotoxemia or Overeating Disease), *C. septicum* (Malignant Edama) and *C. tetani* (Tetanus) are all non-contagious infections (don’t spread from animal to animal) and these organisms are normally found in the soil or intestine of normal animals. Several of the diseases caused by this group of organisms occur though wound infections e.g. dehorning, castration, poor vaccination techniques and animal handling accidental wounds. Enterotoxemia or overeating disease is caused by one of several exotoxins of *C. perfringens*. This is induced by producers through providing rich diets during feeding operations or placing bison on “hot” pastures with rapidly growing alfalfa. Cattle and sheep vaccines appear to be effective against Clostridial disease (see vaccines section). Blackleg (*C. chauvei*) is another bacteria in this family causing disease in cattle, but *C. chauvei* is the only one that has been reported in bison. *C. chauvei* is a soil borne bacterium and can survive in the environment for many years. The bacterium enters the body through consumption of contaminated grass or hay and disease is usually seen in the late summer.

There are several species of *Leptosirosis* bacteria that cause disease in bison and other free-ranging and captive ruminants. This is a group of organisms that infect many body systems and are excreted by the kidneys and spread through the urine. Feed contaminated by rodents or infected animals urinating next to water sources is the most common means of spread. Overcrowding bison in confined, wet pastures can exacerbate the disease in a herd.

Many viral diseases can cause poor body condition, dull hair coat, weight loss and diarrhea. These include but are not limited to BVD, Bluetongue, Epizootic Hemorrhagic Disease (EHD) and several of the upper respiratory viruses.

Anywhere in the world there are cattle, there is Bovine Virus Diarrhea (BVD). This worldwide distribution makes this disease important to cattle and other susceptible species. BVD has not been well described in bison. BVD is a complicated disease to discuss as it can result in a wide variety of disease problems from very mild to very severe. There may be high morbidity (number affected) and mortality (number dead) in an infected herd.
Both Bluetongue and EHD viruses are Orbiviruses and are very similar in modes of spread and signs of disease seen in bison. Both diseases are spread around water sources by insects often called “no-see-ums” because of their small size (Culcoidies veripenis). The viruses infect bison with minimal clinical signs most of the time, but several of the mutated strains of EHD have had serious effects on bison. Once infected, bison can run a high fever for 18-36 hours, present with signs of temporary lameness and show swelling of the mucus membranes of the gums and tongue. Infections usually occur in mid to late summer when water sources are visited by deer, elk, and bison. If infection with one of these viruses occurs after breeding, the fever from the infection can cause damage to a fetus in the first trimester causing re-absorption or abortion of the fetus. The severe consequences of Bluetongue and EHD have been known to cause permanent lameness and chronic poor body condition, making these bison non-productive members of the herd. Vaccination is ineffective for these diseases.

SUDDEN DEATH
When the first signs of disease seen in a bison herd is rapid or sudden onset of death, there are several important disease pathogens that must be ruled in or out. Toxic ingestion of poisonous plants is the first assessment to be made on your pastures. A list of these plants can be found through your county agent or university.

MALIGNANT CATARRHAL FEVER
In North America, Malignant Catarrhal Fever (MCF) is a generally fatal disease of bison caused by viruses belonging to the Herpesvirus family. MCF occurs in cattle worldwide and is a serious problem, particularly for bison in the United States and Canada. MCF in bison is caused by a virus called ovine herpesvirus-2 (OvHV-2) spread from domestic sheep. Most infections are characterized by depression, separation from the rest of the herd, loss of appetite, and in many cases bloody diarrhea and death.

FIGURE 12.4
Recognizing clinical signs of MCF can be most difficult, even for veterinarians. Your animal may look perfectly fine, yet be infected with the MCF virus. This picture was taken three days before the bull died. (Photo: University of Wyoming)

ANTHRAX
Anthrax is caused by the bacteria Bacillus anthracis, and occurs naturally in many locations worldwide. As a part of their life cycle, the bacteria can enter a spore phase and remain viable, but dormant in soil for several decades. Under certain environment
conditions the bacteria emerge from the spore phase and become infective to animals. Anthrax occurs when bison eat activated or vegetative bacteria in soil and on plants as they graze. The organism can also spread in water. The disease kills bison quickly, typically within 24 or 48 hours. Natural anthrax outbreaks are not uncommon in the Western U.S. If anthrax is suspected in your area, call your veterinarian immediately. A vaccine for anthrax is available and offers protection to bison and cattle.

PRODUCTION INDICATORS
Poor pregnancy rates and low calf recruitment is an issue that can have a strong impact on your optimal production goal. There are many causes in apparently healthy herds suffering from poor reproduction. Inadequate nutrition, trace mineral imbalance, pathogens, infertile bulls or management mistakes are all potential causes. Several toxic plants can create infertile, non-productive animals. Check with your county agent about toxic plants in your area.

Nutrition is critical to breeding. A bison cow produces a calf, produces milk for her offspring and strives to put on weight over summer for breeding. Spring and summer are a time when that cow needs to be on a good nutritional plane. (See nutrition chapter).

Pathogens can also cause unapparent infections, leading to reproduction issues.

BRUCELLOSIS
Brucellosis is a disease that has strong regulatory and economic guidelines for all states. Livestock in most states have been brucellosis-free for many years. Notable exceptions are states that border Yellowstone National Park. State and federal regulatory agencies consider the Greater Yellowstone Area (GYA) or the area of interaction with infected wildlife species the last nidus of infection in the U.S. In female bison, infection by Brucella abortus causes placentitis and abortion. In male bison, B. abortus infection causes testicular problems (orchitis, seminal vesiculitis, and epididymitis). The frequency of abortion in bison may not be as high as in cattle. Disease can only be spread by an infected female through an abortion or birthing event. This is a zoonotic disease that can infect other ruminants and humans. Therefore it is a reportable disease.

Many of the upper respiratory viruses along with Bluetongue and Epizootic Hemorrhagic Disease can cause infertility or early abortions in healthy appearing animals. Many viral infections cause a transient febrile episode and these fevers can cause early losses of a fetus.

VACCINATION RECOMMENDATIONS
(Adapted from Haigh et al, Proceedings of the 2000 International Bison Conference, Edmonton, Alberta)
Every bison herd has specific vaccine requirements, depending on herd management and specific disease risks. Some diseases are known to occur only in particular geographical locations, whereas others, such as blackleg, can occur anywhere. Some diseases are associated with certain methods of production. An example is Histophilosis, which is found to occur most frequently when recently weaned bison calves are maintained in large groups in feedlot like settings, but rarely occurs in cow calf bison operations that wean small groups of calves. Some diseases are associated with certain environmental conditions. Calf scours in newborn bison calves most often occurs when bison cows are tightly confined in wet environments during calving.

The best way to find out which diseases your bison herd may be at risk of contracting is to consult your local veterinarian. He/she will know which diseases occur in your area and will be able to combine this information with an assessment of the way that you manage your bison to come up with a list of diseases that your bison herd may be at risk of contracting. This list may not be the same as a list drawn up for your neighbor 5 miles down the road. The reason for these differences is that you and your neighbor may not be using the same management practices. This is also the reason why one bison producer may have a problem with a disease such as pneumonia in his weaned calves every year, and his neighbor across the road may have never had a problem with the disease.

Bison producers should be aware that some vaccines can cause adverse reactions when they are used in a species for which they were not intended. All of the vaccines that are currently being used in bison have been developed for use in cattle. There have been no safety trials conducted on any of these vaccines in bison. Pharmaceutical companies make no claims about, and are not responsible for the safety of any bison to which these vaccines are administered. Bison producers who use a cattle vaccine
in their bison herd must be aware that they are assuming the risk for any losses that may occur from adverse vaccine reactions. It is true that many bison producers have been using cattle vaccines on their bison for years with no adverse reactions. Although this past experience may make us think that cattle vaccines are safe for use in bison, it does not necessarily mean that all cattle vaccines are safe to use in bison under all conditions. Modified live virus BVD vaccines have caused outbreaks of diarrhea when they have been administered to recently weaned bison calves. Certain respiratory vaccines are not designed for use in beef calves that are very young or are under certain body weights. These vaccines may precipitate outbreaks of pneumonia in beef and bison calves when used on very young or small calves. Some modified live virus respiratory vaccines are not recommended use in pregnant beef cows and certainly should not be used in pregnant bison cows. For these reasons it is important to consult someone who has some knowledge of cattle vaccines before using these vaccines in your bison.

While most cattle products are safe for bison, they may not produce a protective immune response in bison. In other words, does the vaccine induce the production of antibodies or cellular responses in bison that are capable of inactivating an invading bacteria or virus? In general, bison producers use cattle vaccines on their bison with the same dose and re-administration recommendations that are used for cattle. However, there have been no experimental trials conducted on any of these vaccines in bison. Therefore it is not known whether any cattle vaccines can produce an immune response in bison. The dose and frequency of re-administering these vaccines to bison is also not known. Because we have no information about these vaccines in bison it is important to use them with caution. Only vaccinate your bison against those diseases that pose a definite risk to your herd. Vaccinating your bison against diseases for which they are not at risk is at best a waste of money, and it predisposes your bison to any adverse reactions that maybe associated with the vaccine.

MANAGEMENT ISSUES, STARTING A BISON HERD AND PURCHASING BISON
There are many ways to assess the health of your bison herd. Bison are tough animals and you may only identify sick animals when they are close to death. Frequent observations of the herd and their environment is critical, but here are additional recommendations for bison health management.

- Be aware of any history of pertinent diseases in your area.
- Identify disease sources and bison populations at risk.
- Assess the potential for contact between disease sources and your herd.
- Evaluate the potential consequences of transmission to your herd.
- Develop strategies to minimize risk of introduction of disease to your herd.
- Assess potential preventive actions and collateral impacts to your operation.
- Stocking density is important in disease spread within a herd.
Other factors can contribute to the introduction and prevention of disease in the herd. A short list of factors that influence disease introduction and spread in bison are listed below.

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>DISEASE EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional history of pathogen</td>
<td>Anthrax, parasites, brucellosis, TB</td>
</tr>
<tr>
<td>Proximity of bison to potential disease sources</td>
<td>MCF, bovine TB, Brucellosis, Johne’s disease, BVD, Bluetongue, EHD, foreign animal diseases e.g. foot-and-mouth disease</td>
</tr>
<tr>
<td>Weather patterns and environmental suitability</td>
<td>Anthrax, parasites</td>
</tr>
<tr>
<td>Presence and abundance of mechanical or biological vector(s)</td>
<td>Anaplasmosis, Bluetongue, EHD, Pinkeye</td>
</tr>
<tr>
<td>Bison stocking density affecting level of infectious contacts)</td>
<td>Most infectious diseases</td>
</tr>
<tr>
<td>Season</td>
<td>Diseases with unique transmission patterns (e.g. Brucellosis, Bluetongue, EHD, Pinkeye)</td>
</tr>
<tr>
<td>Nutritional and other environmental stresses to bison</td>
<td>Infectious diseases that capitalize on depressed immunity e.g. respiratory viruses</td>
</tr>
<tr>
<td>Geographic location and climate</td>
<td>Pathogens capable of surviving climate extremes e.g. winter</td>
</tr>
</tbody>
</table>

If a risk assessment indicates the need for a disease management plan, the manager should include the help of a veterinarian to evaluate strategies for the health of the herd and plan for the “worst case” issues.

**Other considerations**

*Purchasing new stock.* When going to a ranch to purchase bison ask to see the whole herd, not just the ones being offered for sale. Look at the condition of every animal in the herd and make mental notes of the calf crop, yearlings, etc. Ask about management techniques regarding vaccination, worming and if health problems were identified in the herd over the past several years. After your purchase of new stock the first thing to do is process them with your worming, vaccination protocol and apply your unique permanent identification. If possible quarantine the newly purchased animals from your main herd for three weeks.

*Bison are highly social herd animals.* Never place just one bison in a corral or pasture for extended periods. Solitary bison are problematic as bison are a very social species with strong matriarchal divisions. Bulls separate from the herds after breeding and only young bulls are allowed to stay with the cows and calves. Post breeding, the bulls
have been nutritionally and physically stressed and should be checked for wounds or other forms of trauma.

**HOW TO IDENTIFY SICK BISON**

Many of the diseases affecting bison produce a fever. Typical signs of fever include animals spending additional time at water sources, more frequent trips to the water source, drooping ears, mouth breathing and separation from the herd. Bison that lag behind when bison move to graze new pastures are suspect as this might indicate either problems with locomotion or rejection by other herd animals. (Bison have a very strong social order and behavior.)

Bison are tough. Frequently, bison that appear sick from a distance are hard to assess due to their strong predator avoidance behavior when you try to get “a closer look.” A sick bison can run with the herd when aroused. It is often best to maintain your distance or assess the animals when performing normal management procedures (feeding, checking water, putting out supplement, etc.). Spend extra time in observing your bison. At times the first sign of illness in bison is a moribund or dead animal.

**Key points regarding detection of disease in your herd:**

- Spend time with your herd – observe daily
- Have a veterinarian that has worked with bison and understands that bison respond differently to ill health than cattle
- Information to share with your veterinarian
- Recent changes in diet
- Recently acquired animals
- Past history of health issues
- Changes in pasture rotations
- Climate factors – moisture, drought
- Any stressors on bison
- Other species on property (please no goats or sheep)

**BISON ARE DANGEROUS WHEN SICK OR CORNERED FOR EXAM.** You should have a good working facility or do not commercially raise bison!

As mentioned earlier in the chapter, historically bison have a genetic ability to handle many of the common disease pathogens. But do not have a false sense of security when health issues arise. Many, if not all, of the diseases in bison involve inadequate management of the bison herd. When issues arise or you identify the signs of disease, look closer at the disease. Explore who, what, when, why and how issues. Don't just treat the signs, find and treat the actual problem.
MEDICATIONS
Several medicines approved for cattle have been used extensively with no ill effects reported in bison or cattle. REMEMBER - Most medications and vaccinations used in bison are not listed on the label. Therefore, when medicating and vaccinating your bison it is considered an “off label” use on the product and the responsibility is on the veterinarian or the owner. The company will accept no responsibility if issues arise from use of their product.

There are three basic ways to give medications--orally, topically on injection. Orally medications can be given as a bolus (pill) or drench (with or without a stomach tube), or in the feed or water. Topically they can be sprayed on, rubbed on (salve), or poured on (such as wormers, grub, and lice preparations). Injections can be given subcutaneously under the skin (SQ), in the muscle (IM) or intravenous (IV) depending on the drug you are using. If the animals are going to the meat market all injections should be in the neck. Any residue or abscess in the rump, leg or back can created a loss of income from discarding those cuts at slaughter. Subcutaneous injections are given along the side of the neck and intramuscular injections are given deep into the muscled portion of the neck.

CONCLUSION
We must do all we can in this industry to better understand this amazing creature under our care and not be afraid to implement those changes that benefit both - the bison and us.

Please read the chapters on handling, managing and nutrition in this handbook. The secret to understanding your bison’s health is to understand all the aspects of how they are managed. Small changes in rotations, time of year and time of day when working your bison, calving pastures, breeding pastures, and supplementation can make big changes in costs and health of your herd.

You have many allies who are learning to raise bison in North America - so do not be afraid to ask questions. The National Bison Association and its members are a great resource. Question everything when issues arise. Many producers and veterinarians treat the symptoms of disease and not the problem. If you have disease issues in your herd, ask how to prevent this from happening again.

The only constant in this world is change. We must do all we can in this industry to better understand this amazing creature under our care and not be afraid to implement those changes that benefit both - the bison health and us.

APPENDIX OF DISEASES DISCUSSED IN THIS CHAPTER.
This chapter mentions only a few of the most important disease issues in farmed bison. A more comprehensive list with information concerning specific diseases known to
occur in bison can be found at http://www.usask.ca/wcvm/herdmed/specialstock/bison/bisondis.html

Dave Hunter, DVM, is the chief veterinarian for Turner Enterprises, Inc. He previously served as the Wildlife Veterinarian for the state of Idaho.

Murray Woodbury, DVM, is an associate professor and the Agri-Food Innovation Fund (AFIF) Specialized Livestock Health and Production Research Chair at the Western College of Veterinary Medicine, University of Saskatchewan in Saskatoon, Canada.
**Grass Finishing Bison**

**BY JILL STEENBERGEN**

**INTRODUCTION**
Feeding practices are among the many management decisions that need to be made when operating a bison farm. There are a number of different options that should be looked at closely before choosing a particular feeding practice. One major farm management decision to be made is the proportion of grass vs. grain when it comes to finishing rations. Understanding all the background information before deciding where you fit on the spectrum will allow you to proactively set up or change your operation to fit the management style in which you will likely be successful.

**FUNDAMENTALS OF GRASS FINISHING: ALIGNING VALUES WITH MANAGEMENT DECISIONS**
The main concept behind grass finishing is raising animals naturally and producing lean meat. This affects both management practices and marketing strategy, so it is important to ensure your value system and skills are aligned with both the management practices and marketing strategy that go along with grass finishing.

Producers of grass finished meat often refer to themselves as “grass farmers.” That is because grass finishing relies on capturing energy from the sun, converting it into grass, which then produces meat for human consumption. When properly managed, this system maintains itself and can naturally dispose of all by products, minimizing negative environmental impact. Energy input for production is primarily natural, rather than relying on machines and fossil fuels that damage the environment. This is referred to as sustainable agriculture, which can be practiced for eternity, in theory, because finite fossil fuels are not required for the system to function. This aligns with current trends which are focusing on environmentally friendly, sustainable agriculture.

Grass finishing can be marketed as a less intrusive form of agriculture that keeps the animals within their natural diets and rates of weight gain. This preserves the relatively self-sustaining nature and lean carcass qualities of the traditional bison. Many grass
finishers are low input managers; they believe that the less you do to them the better.

Grass finishing is less labor intensive at the operational level than grain finishing, but may involve more work on the marketing end. Many producers who are successful grass finishers have found success because they feel good about the whole process of how they raise their animals. In turn, their customers value those qualities. In addition, the concept of the local family farm is making a comeback as more media attention focuses on the shortfalls of factory farming. Some consumers place great value in the trust built between producer and consumer when visiting a local farm and seeing both the producer and animals on the farm.

Which route you choose is personal and specific to you, but making an educated and conscious decision to choose one route or the other is important. It is not a fast or easy process to switch between grass and grain finishing.

**NUTRITIONAL FACTORS SPECIFIC TO GRASS FINISHING**

Beyond the basic nutritional requirements of bison outlined in previous chapters, there are some factors that are specific to grass finishing. These basic principles are very important to the health and reproduction of your entire herd.

First, ensure that your bison have access to the right amounts of high quality forage. In the summer, the animals should be on a rotational grazing system (which is explained in the next section) to make sure that the grass is grazed when it is at the peak nutritional value.

There are a few ways you can determine how many head of bison can be pastured in each area. One is to find out the carrying capacity for beef for your area through government agricultural extensions, then experiment and ask advice from established bison producers in your area. Another way is to use a calculation of the forage available specifically in your pastures and how many head that will feed. One resource for this is a document called *Improving Grazing Efficiency with Management* by Dr. Eric M. Mousel. This approach measures the carrying capacity specifically for your pastures,
then the stocking rate is determined, as well as your rotation plan. This document is available through your national association.

In the winter, high quality hay will allow animals to maintain adequate weight through the cold season. Do not overfeed pregnant cows through the winter, as the unborn calves will gain too much weight, resulting in calving problems. Pregnant bison cows will lose weight in the winter as they incubate a healthy calf. A rate of 10 percent weight loss through the winter is normal and healthy to prepare for calving.

Adequate mineral supplementation is the next consideration. Grains contain vitamins and minerals that can supplement the grass finished diet that lacks these grains. Many bison producers feed a broad spectrum mineral supplement or a mineral supplement that is specific to their region’s soil and feed quality. Loose mineral that can be fed in a bin with low levels of sodium is optimal. If a mineral supplement is not offered, the result could be low conception rates and/or weak calves that cannot survive.

Soil and feed testing should be done annually or every few years. These tests reveal the nutritional quality of the grass, density and diversity, which are region specific. These tests are a minimal cost when considering the health of your entire herd. Conception rates are closely related to nutrition, so this can have a large impact on your bottom line. Soil and feed testing could be your way of improving conception to close to 100 percent.

Talking to experienced bison producers in your area or accessing government agricultural extensions for existing knowledge and resources are very good ways to get region-specific nutritional advice. Knowing the capabilities of your pasture and the protein content of the grasses will help you determine the herd size. Still remember to be flexible based on what you find the ranch is capable. Choosing an average growth spot in your pasture will give you a good reference point for these tests.

**ROTATIONAL GRAZING**

The most important thing when managing a grass finishing operation is to monitor
your pastures and animals to maximize the benefits of the land/animal relationship. Although bison are considered to be a more self-maintaining livestock than some others, careful consideration is still required when growing animals for meat. Survival is different than growth, and survival alone will not allow you to compete in the meat market.

Stay in tune with quality, trends and forage reserves to find the optimal animal density in your pastures. Walk through your pastures, take pictures and make notes for future reference. Understanding the relationship between your pasture conditions and resulting animal body conditions (which can only be done by monitoring both closely) will allow you to fine tune your operation for maximum profitability.

You want to rotate your animals faster when the grass grows faster. One method is to rest the pasture for twice the time it was grazed.

There are many pasture rotation options available, ranging from daily rotation to every few months. For the more frequent rotation methods, smaller pastures are used and the animals are trained to move often. This method requires a routine where the bison are moving to a pasture with more grass and adequate mineral supplementation and water. This increases their desire to move.

During the calving season, you will want to take special care to make sure newborn calves are not left behind if rotating frequently. Opening the gate between pastures and giving the bison a few days to move reduces stress and gives new calves and their mothers’ time to move when they are ready. Conduct a sweep of the pasture before closing the gate to make sure the entire herd has moved. For rotation methods as frequent as daily rotation, cost of fencing may be a barrier for some producers. This works best with a small, quiet herd.

The benefit to rotating pastures quite frequently is that it is most closely aligns with how the animals live in the wild. Free roaming bison graze grasses quickly and thoroughly, just once in between being left to replenish. The pasture is trampled by the animals enough for aeration but not enough to severely compact the soil beyond optimal growth conditions. Fecal matter is spread out and left to dry between rotations, which greatly reduces parasite infestation. Leaving pastures void for 4-6 weeks gives the manure time to thoroughly dry out and kill off the parasites. Performing fecal tests can also show you if your pasture rotation method is avoiding this danger. In addition, the proper rotation allows dung beetles to perform their valuable role of recycling nutrients into the soil.

You may choose to manually control weeds so that the grasses can take over.
Some bison producers let the animals do the management themselves. Rather than dictating pasture rotation times, the gates between three to four pastures are opened up and the animals are left to rotate themselves and use their own instincts. This management technique requires keeping records of where the animals have been. Keep track of the grasses, the herd and the fences. Hay is put out in the early spring until the animals stop eating it. In the fall, hay is put out early and the animals will begin eating it when the like. This lets the instincts of the animals dictate what they need.

Many bison producers finish their bison on premium pasture for the last 60-90 days prior to slaughter. This increases carcass weight and profitability for the finished animals going to slaughter.

The main objective when choosing a pasture rotation method is to keep the animals on fresh, nutrient dense pasture and optimize the land/animal interaction.

SEASONAL VARIATIONS AND GRASS/ FORAGE ALTERNATIVES
The economics of grass finishing are closely linked with climate and the amount and quality of forage naturally produced on the pastures. Some adjustments in certain regions will compensate for shortcomings in the pasture quality during parts of the season. Feeding length in the winter varies depending on the climate that particular year. Some climates allow for year-round grazing. This makes preparation for winter a lot less cumbersome as long as moisture levels are adequate. Some planning can be done to have adequate forage under the snow for winter grazing. In regions where a longer winter season persists, forage must be fed through the coldest months of the winter.

When planning for winter grazing, you want to make sure the grass is left as tall as possible, but is still in the vegetative stage, when it goes into dormancy. The vegetative stage is when the leaves and stalks are still growing but the grass has not yet gone to seed. Managing your pasture rotations through the summer is an important factor in preparing for winter grazing. Continual and consistent rotations will keep the grass in vegetative stage into the late fall for optimal winter grazing conditions. The animals
should be rotated less frequently in the winter, to allow them to thoroughly graze the forage under the snow.

When feeding winter forage, rolling hay bales out over the snow offers the benefits of naturally re-seeding the area, which stimulates healthy pastures in preparation for the next growing season. Roll the bales out in different areas in the pasture to spread out manure to fertilize the grass that will come in the spring. This also reduces pushing and shoving, allowing all animals in the herd access to the feed. Some producers feed a forage supplement during the winter to maintain adequate body weight on the animals.

**PLANNING AND MAKING TIMELY MANAGEMENT DECISIONS**

Some factors specific to a grass finished bison operation may present challenges. Be aware of these challenges and plan your strategy to overcome them. Do this before making the decision to grass finish your animals. You must make a conscious decision whether you plan to grass finish or grain finish and not attempt to switch between the two practices. It takes two years between starting as a grass finisher and seeing your initial profit from the new operational practice. Thus, this transition must be thoroughly planned. It takes longer to change from a grain finishing operation to a grass finishing operation than the opposite. Do your research prior to making a long term change such as this one to your operation.

The initial challenge when running a grass finishing operation is the requirement of a large land base. Existing producers sometimes lack access to this and new producers may not be able to afford this investment.

Another challenge is that growing season length varies in each region and also varies from season to season. Your herd size will need to be tailored to your land availability and climate track record. Then you will need to continually adjust the stocking rate based on seasonal growing conditions. You must cull animals early when hard times come. This is the key to maintaining the condition of animals you have chosen to keep in your herd.

Region/ feed quality relationship is more important for grass finishing than grain because you are depending on local weather and environment conditions. Grains are more easily and routinely transported to the animals (or vice versa) than forages. In times of drought or exceptionally long cold winters, it is also more difficult to meet caloric requirements with forage than grain, so you need to consider this.

Grass fed animals take longer to finish and it is more difficult to control the timing of the finish. The overall cost of producing animals of comparable weight is higher when compared to grain finished bison. This factor requires that you be able to attain a
premium price when marketing the meat. Grain finished animals often go to slaughter at 18 months, while grass finished animals are ready closer to 26 months. This may require you to winter them for an extra season.

Resulting fall weights of animals can be inconsistent in comparison to grain finished animals. This is because there are more uncontrollable factors when grass finishing due to climate effects on pastures.

*Good genetics are critical for a successful grass finishing program.* Because there is less manipulation of weight in short periods of time, you cannot quickly change undesirable carcass features.

*A specific marketing plan must be decided on early.* There are specific characteristics of grass finished bison that draw a premium, but the meat must be marketed properly to the right group of people that see value in those characteristics (a niche market).

Because many marketers who sell grain finished animals require consistency in product, you will not be compensated at a premium from these marketers and will need to have your own marketing plan in place. The difference between success and failure in your operation could be whether or not you set up a marketing plan and establish a customer base early, long before the animals reach prime age for meat or breeding stock.

**MARKETING**

Marketing and production are separate segments of your business and each carries its own separate financial investment. You need to consider not just fences and other farm infrastructure any more, but processing facilities (distance from the farm), cutting & wrapping, whether you’re selling fresh or frozen product, using freezers or refrigerated transportation, etc.

You need to consider that facilities that have to meet different health regulations. When it comes to selling the product, understand what it takes to promote your product successfully. Presentation may be everything. Locating a satisfactory processor is sometimes difficult. People who market their own product often end up setting up their own processing facilities – another expensive investment to finance.

Pricing can make or break an operation in both production and marketing. An assessment of your farm business operation is money well spent. Partnering with a successful marketer may be a wise thing to do.

The marketing concept behind grass finishing is unique and preparation is key prior to investing in this type of operation. You will need to connect with consumers that are
making choices based on nutritional content and management practices rather than price alone. Many large retailers differentiate on price alone. Grass finished meat does not fit within these high volume commodity markets; and is instead suited for a niche market where the customers pay a premium for the specific attributes of the product.

Because grass finished bison meat is not marketed in large volumes, it has to be promoted more actively at a smaller scale. This will challenge you to be entrepreneurial to be a success. Successful marketing requires more inventory control (customers lined up early) and you must deal with carcass utilization. The more outlets you have for different cuts of meat, the more stable you will be as a business. Once a customer base is established, grass fed bison meat customers are very loyal due to product quality.

There is a large variety of marketing options for grass finishing. The main choices are commercial marketing (which includes retail or food service channels), or small scale marketing such as farmers markets, farm-direct marketing, and internet/catalogue sales. Your product will likely appeal to people who want to make healthy decisions and want a unique and different product. Be sure to have a fairly specific idea of how to market the product before you set up your grass finishing operation and even have a customer base. Talk to other grass finished producers to learn how many they will buy from you in the future.

Commercial marketing includes both food service and retail markets. You can contract with grass finished meat marketers, but there are not as many to choose from as grain finished marketers.

Your meat will likely be marketed through a unique business, such as a health food store or restaurant where the customer base is looking for something healthy and different. Certain restaurants have a chef that wants to market something unique. They will likely obtain fresh ingredients at a higher price. Small scale marketing such as farmers’ markets or farm-direct marketing may require you to be more involved in the process. For some producers, spending time on the phone and giving farm tours to potential buyers is considered time well spent. For others, this is seen as a burden. Deciding where you fit is very important.

Something to keep in mind is that grass finished meat has a yellow colored fat, which differs from the white fat seen in grain finished animals. Customer education is important for things like this, which may be seen as negative if the customer is unaware of why the meat has that appearance. Cooking is also important; taking the time to offer cooking instructions (or market your product at a place that does) can be the difference between a very positive or negative eating experience for the consumer.
Grass finished bison meat has certain health benefits that can draw a premium price if marketed properly. These benefits include:

- The story of a wholesome, locally and sustainably produced food, the family farm and raising the animals naturally and humanely. Many negative perceptions are avoided such as association with factory farms and feedlots, which often have perceived animal welfare issues.
- Flavor is a strong attribute; it is sweet with a high moisture content.
- The meat is lean, meaning it has a lower fat content, especially saturated fats which are linked with diabetes, heart disease and high cholesterol levels.
- Higher proportion of omega-3 fats to omega-6 fats (this ratio is key when differentiating good fats from bad fats that contribute to heart disease).
- Higher levels of conjugated linoleic acid (CLA), which has many health benefits.
- Higher levels of vitamin E, which is an antioxidant that has been linked with lowered risks of cancer and heart disease.

When marketing, remember that prime age makes the best meat. You may want to use older cows and bulls for sausage. Some producers will use the good cuts of meat from these animals to sell for more money. The risk is that the meat will have an off flavor and the customer will be turned off bison meat. Making sure your product is consistently high quality is key in maintaining customer loyalty.

The way a producer treats his animals definitely helps to determine the flavor and tenderness of the meat: a facility with less stress, corrals and handling systems that they walk in undisturbed and freely for water, gentle handling and always have at least two animals together.

Jill Steenbergen is with Alberta Agriculture & Rural Development, Red Deer, Alberta, Canada.
Finishing Bison with Grain

BY VERN ANDERSON, PH.D, P.A.S., AND MURRAY FEIST, M.SC., P.AG.

INTRODUCTION
Bison evolved as seasonal grazers with excellent forage digestion. That fact complicates the idea of grain feeding. However, with good management, ruminants can adapt to a wide variety of feeds, including moderately high levels of grain in their diets. Feeding high energy diets to market animals for 90 to 100 days or more just prior to harvest increases the quality and consistency of the meat. Some bison meat marketers recommend or required feeding concentrates for a period of time before harvesting animals. Feeding bison must be profitable to be sustainable. This does not necessarily mean using the cheapest feed. It means feeding for the most economical gain. Feed procurement decisions will have significant effects on profits. Feed prices vary daily with significant seasonal trends caused by many factors. This chapter provides an overview of grain feeding and should be supplemented by further study of ruminant nutrition, nutrients in feeds, and lessons from experience, with concern for bison husbandry and management.

PRINCIPLES OF FEEDING RUMINANTS
The principles of bison feeding are similar to feeding other ruminants, as far as we know. There is very little research documenting differences of the bison rumen. However, social structure, season, and other factors do affect bison more than domesticated ruminants. Microbes are the ruminant animals’ mechanism for digesting forages and concentrates. Cellulosic bacteria digest forages (cellulose) and amylolytic bacteria digest grains (amylose is a starch). Bison have more forage digesting bacteria than other species. The decaying microbial bodies are a major nutrient source to the animal. It is critical that bison diets be changed slowly, over time, especially when introducing starch from grains. The microbial populations need time to adapt to the new feeds as rapid increases in the starch content of the diet can cause acute acidosis, bloat, and death.

The time required for adaptation from grass to concentrate will depend on several factors. Slowly increasing grain over several days or a few weeks will alleviate many
problems. Using high fiber co-products in the diet (distillers grains, wheat middlings etc.) can reduce acidosis concerns. Most of these products contain little or no starch but provide energy from digestible fiber (essentially the hemicelluloses fraction). While some feeders use high levels of grain in totally mixed diets, one needs to be especially careful with bunk management to insure that the feeder or bunk is not empty for more than approximately one hour. Hungry animals may gorge themselves, which can result in acute acidosis. The starch in whole corn or peas is relatively slow to digest. Starch in barley and wheat ferments rapidly in the rumen, so ration formulation, mixing, and supplementation become even more important.

**NUTRIENT REQUIREMENTS**

**Maintenance and Growth**

Feed consumed by warm-blooded animals is used for maintaining basic body functions like respiration, movement, tissue repair, and heat production. Any nutrients left over are used for growth of muscles, organ tissue, bone fat deposition, and reproductive functions. Feed intake is a critical factor in growth rate, especially with larger animals that have higher maintenance needs. Generally, the greater the feed intake, the faster the growth rate. Cold temperatures significantly increase maintenance requirements. Higher maintenance requirements reduce feed efficiency and increase cost of gain. This is compounded by the fact that bison have a natural tendency to eat less than beef cattle at the same weight, but lower intakes lead to more efficient digestion, especially in bison, because the passage rate is reduced and feed spends more time in the gastrointestinal tract being digested.

**Nutrients from Feeds**

Ruminants need fiber for rumination, energy, protein, minerals and vitamins, in addition to water for optimum health and growth rate. We do not have an accurate understanding of the nutrient requirements of bison, but know that energy-dense diets allow more of the ration to be used for gain, therefore increasing feed efficiency. Energy density is achieved by increasing the proportion of concentrates. Concentrates are grains (corn, barley, peas, oats, milo) or co-products (several ingredients from processing plants that include wheat middlings, distillers grains, corn gluten feed, several oilseed meals, soybean hulls, and many others). We also know that starch from rapidly fermenting grains (wheat and barley) may cause acidosis at more than 50 percent of the concentrate portion of the diet. Not all starch digests at the same rate. Starch from corn and peas are slower to digest in beef cattle, and peas digest more thoroughly than other feeds. While we have some experience with feeding co-products, the lack of starch and high levels of digestible fiber make them particularly interesting for bison, at least as a portion of the concentrate in the ration.

Replicated research trials at the North Dakota State University (NDSU) Carrington
Research Extension Center concluded that bison can make use of relatively high protein diets. Crude protein was fed at 9.4, 11.6, 13.9, and 16 percent of the ration dry matter. Bulls fed the 13.9 percent crude protein ration gained the fastest (1.84 lb./day) followed by 16 percent (1.75 pounds/head/day), with 11.6 percent and 9.4 percent crude protein supporting the slowest gains (1.66 and 1.65 pounds/head/day, respectively) during the nine-month feeding trial. Corn was fed at 60 percent of the diet with canola meal used to meet target protein levels. Chopped grass hay made up the rest of the mixed ration.

The optimum proportion of bypass protein for bison is not known. Bypass, escape, or rumen- undegradable protein all refer to protein not digested in the rumen but absorbed by the animal in the lower gut as amino acids or peptides. We do know that very fast growing beef and very high producing dairy have significantly greater bypass needs than slower growing animals. Dry distillers grain and feather meal are the best sources of bypass protein. In cattle, approximately 60 percent of the protein (actually nitrogen, a component of protein) is used by microbes in the rumen with the remaining 40 percent bypassing the rumen and absorbed by the animal directly. Mineral requirements have not been determined for bison. Field observations (Dr. Ken Throlson, personal communication) suggest that calcium and phosphorous should be equal in the ration. Most supplements for grain-fed beef cattle provide high levels of calcium and very little phosphorous, but grain is an excellent phosphorous source. Until research to determine the minimum requirements or maximum tolerances has been published, a broad-based mineral supplement suited for grain-fed beef cattle is recommended.

Bison can tolerate very high levels of selenium and may require greater levels than bovines. Blood serum survey work by Dr. Charles Stoltenow et al., at NDSU indicate bison have tolerance for very high levels of selenium and possibly higher requirements for this mineral. Glaciated soils in the Midwest and northern regions have much less selenium than non-glaciated soils west of the Missouri River, so supplementation in these areas with an inorganic or organic source is important. Bison also benefit from a balanced supply of other trace minerals such as zinc, copper, manganese, cobalt, and iron at levels similar to that of beef cattle requirements. Water and soil quality may introduce compounds such as elevated sulfates or iron that can alter trace mineral status and intake levels.

**FEEDING BISON FOR MEAT**

Bison vary widely in mature size due to the diverse gene pool of the species. Knowing when to market animals will minimize maintenance feed costs, yardage, excess fat accumulation, and increase efficiency and net return. Bison bulls are generally harvested at 900 to 1200 pounds, depending on frame size. Market heifers may be optimally harvested at weights as low as 800 pounds. How animals are fed during
the growing period from weaning to the final concentrate feeding period affects end weight. Extending the forage feeding period from weaning through a second summer of grazing will shorten the concentrate feeding period and should increase the final weight. Periodic weighing, or careful visual assessment by experienced individuals, can help one determine when to market animals. In many cases, feed intake will decrease when animals achieve a level of condition for marketing, but this signal is difficult to detect in a pen of mixed-weight animals, or if self-feeders are used.

Breeding bulls should be raised on high-forage diets to preserve the species’ natural ability to digest forages. Forage diets can consist of various hays, silages, and high fiber co-products such as barley malt sprouts, soyhulls, wheat middlings, or oilseed meals. Bulls raised for breeding should receive only minimal concentrate supplementation with little or no starch during periods of stress. It is not recommended to place bulls on a high grain diet and select breeding bulls based on feedlot performance. High forage “grower” diets or diets with co-product feeds that contain little or no starch may better serve breeding bull growth and selection. Records should be kept on carcass quality traits of offspring for future selection criteria.

FEEDS AVAILABLE
There is a smörgasbord of “concentrate” feeds to choose from in some regions of the country. Some concentrate feeds have very high starch levels (grains) and some have almost no starch (co-products) but contain significant amounts of energy in the form of digestible fiber or fat. Many co-product feeds are high in protein, especially oilseed meals.

Corn
Corn is the base grain in a vast majority of high-energy diets. Energy in corn is from starch, with modest amounts of fat and digestible fiber. The protein content of corn (~9.8% crude protein, NRC, 2000) is lower than estimates of animal requirements so a supplemental protein source is recommended.

Co-Products
There are several processing co-products that are excellent feeds that compliment corn, including wheat middlings, barley malt sprouts, beet pulp, soybean hulls, corn gluten feed, distillers grain, cottonseed hulls, field pea chips, and dry bean splits. There are several different oilseed meals that are high in protein including soybean, canola, sunflower, linseed, safflower, and some others. Many of these feeds are available in pelleted form and anecdotal information suggests bison eat more of pelleted feeds compared to dry powdery meal. For more information on a wide variety of feeds, see the NDSU publication on alternative feeds for ruminants at http://www.ag.ndsu.edu/pubs/ansci/beef/as1182.pdf.
**Barley**

Studies with barley as the primary grain source (0, 25, 50, and 75 percent of the ration dry matter) with reciprocal levels of soyhulls indicated that bison calves gained the fastest on the 50 percent (1.81 pounds/head/day) and 25 percent (1.71 pounds/head/day) barley diets that also contains 25 and 50 percent soyhulls, respectively. The ration also included 25 percent chopped forage. With barley at 75 percent of the diet dry matter, there was apparently too much rapidly fermentable starch, which reduced intake and gain (1.56 pounds/head/day). Wheat midds included at 66 percent of the diet supported competitive gains (1.63 pounds/head/day) with a commercial bison ration (1.61 pounds/head/day) at equal intake.

**Oats**

Oats are characterized as a mid-level energy feed with ~77 percent total digestible nutrients, mid-level protein content of 12 percent and 0.08 percent calcium and 0.40 percent phosphorus. Based on its fibrous hull, oats have a crude fiber level of around 12 percent, ensuring a slower rumen-digesting rate as compared to corn at 2.2 percent, wheat at 2.0 percent and barley at 6 percent crude fiber. In general, oats do not have to be processed before feeding, especially for young calves and starting bison on feed, as the groat is relatively soft and easily broken down by chewing. Beef cattle research indicates rolling oats provides a modest 10 percent increase in digestibility when fed to adult cows and a 5 percent increase in digestibility in calves. Rolling oats may not be economically feasible when considering the modest gain in digestibility. Oats are often fed in combination with grain screenings, barley, and corn.

**Field Peas**

Field pea, a grain legume that is equal to corn in energy and contains up to 25 percent crude protein, is grown in the northern states and Canada. This very palatable and digestible grain has been observed to improve the tenderness and juiciness of beef ribeye steaks when fed at a minimum of 10 percent of the ration for 75 days prior to harvesting animals. Research is planned to test dry-rolled field pea in bison diets to determine effects on ribeye steaks. Concurrent beef trials will determine what component(s) of field pea trigger this response and if it occurs in all the muscles of the carcass.

**Grain Screenings**

Screenings of all kinds are popular in bison diets because they are competitively priced. However, screenings can vary widely in nutrient content, dictating an analysis of the carefully sampled product prior to use. Good quality, consistent screenings can be an excellent feed, but poor quality screenings should be minimized to less than 25 percent of the diet. Corn screenings often rival corn grain in energy and may contain more protein. Wheat screenings are much more variable with varying levels of green and yellow foxtail seed plus other weed seeds, chaff and foreign matter. Some field studies
with bison have observed good weight gains with combinations of grains, co-products, and/or screenings. Bison should respond well to low or no starch diets, so formulating rations with high proportions of co-products is biologically feasible, and no starch diets have been tested successfully in beef cattle. Bison should digest no or low starch diets very well. Raw screenings that are unprocessed can permit weed seeds to travel through the digestive tract and into the manure. Weed seeds in manure can have a 25 percent viability level. To increase utilization and prevent weed seed viability, raw screenings should be processed by grinding in a 1/8” screen or less or be fed in a pelleted form.

FEED PROCESSING
Processing grains is recommended for bison. Bison bulls fed a 75 percent concentrate diet with rolled corn gained faster (1.68 pounds/head/day) than bulls fed whole corn (1.46 pounds/head/day) with equal feed intake. However, particle size is critical, as bison tend to eat less of finely ground or mealy-textured feeds. Rolling is the preferred processing for all grains including barley, field peas, oats, and milo. Grinding with a hammer mill tends to produce more fines.

MOISTURE CONTENT OF THE RATION
Bison consumed moist diets more readily than totally dry rations, especially rations that were dusty or had fine particles of grain or chopped forage. Moisture was added by including corn silage, wet distillers grains, condensed distillers soluble (often referred to as corn syrup), or potato byproducts in the mixed rations. Besides enhancing palatability, these feeds also provided additional nutrients, especially energy, and in some cases, protein. The palatability of some of these moist feeds may contribute to improved intake. Water can also be added to mixed rations fed daily to reduce dust. Obviously, moist diets need to be mixed and fed daily and accurate bunk calls are critical to keeping feed fresh and intake stable.

FORAGES
All bison diets should include forage. Forage is essential for “rumination,” the physical stimulation of the rumen by long particles of hay, corncobs, or other fibrous feed products. Our recommendation is to feed no less than 20 percent of the total dry matter as forage. Forage can be fed chopped and mixed into the ration, offered free choice as hay in a separate feeder, or as grazing in a field-feeding scenario. When grass hay was offered free choice, bison fed high grain diets consumed about 25% of their dry matter as dry hay. Forage quality has not been compared but bison seem to accept and consume poor quality forage offered free choice at approximately 25 percent of the dry matter intake. In theory, better quality hay should support improved growth rate.

FEED ADDITIVES
Natural feed additives are becoming more popular and several new products have
been introduced. There is no comparative data for feeding these supplements to bison. Some of these products have been tested for the natural beef industry and have proven to be worthwhile to maintain competitive gains and good rumen function. These products may contain one or more of the following categories of products: yeasts, enzymes, fermentation extracts, saponins, organic minerals, palatability enhancers, and other naturally occurring ingredients. Ionophores (Rumensin®, Bovatec® etc.) are not allowed in most natural feeding programs, which cover virtually all bison meat-marketing programs.

**FEEDING SYSTEMS**

Bison feed intake varies, to some degree, with season of the year. In general, bison have more robust appetites in the spring (after winter mini-hibernation) and again in the fall (in preparation for winter). This remnant of survivalist behavior is more pronounced in regions with cold, snow, and short day length. In NDSU studies, bison gained 1.72, 1.30, 1.76, and .37 pounds, respectively, during 3-month periods of spring, summer, fall, and winter. In another trial, respective seasonal gains were 1.32, 1.85, 1.94, and .99 pounds/head/day. It may be possible to mitigate seasonal variation by offering high quality diets throughout the year. Lighting of feedyards may also mitigate reduced winter intake, but this concept has not been tested. Compensatory gains from offering high-energy feeds during periods of greater seasonal intake may improve bison performance for short periods of time. Getting bison to market weight during these windows of excellent feed intake and gain should increase overall efficiency. Finishing bison during the heat of the summer or during severe winters is difficult. Feed intake is usually depressed and maintenance requirements are greater. As a result, carcass quality traits vary considerably for animals marketed during these times of the year. The challenge to producers is to provide uniform size and quality of animals to terminal markets throughout the year.

There is no “best” answer for feeding strategies for bison calves from weaning to market. Some direct comparisons on forage feeding/grazing/grain feeding have been made with cooperating producers. Different combinations of grazing and forage or grain feeding produced surprisingly similar results. In one study we compared: 1) feeding calves a high-grain diet from weaning until market (more than 1 year on feed); 2) wintering weaned bison calves on forage, then full grain feeding in the spring until slaughter; 3) wintering calves on forage, grazing the following summer and fed grain in the fall until market, or 4) wintering on forage, summer grazing, wintering on forage again, and then grain fed until slaughter. The number of days on feed for the respective treatments, (488, 473, 492, and 502, was surprisingly similar. Gross returns were greatest for treatment 1 followed by treatment 3 and lowest for treatment 4 due primarily to carcass quality factors. Higher grain prices now should favor shorter grain feeding periods but forage and pasture costs have risen also. These scenarios
need more research to determine optimum performance and return under varying input costs and current bison carcass values.

In a second study, weaned bison calves were fed low quality forage (mature native grass hay) with no supplement, or 2, 4, or 6 pounds of energy/protein concentrate. Calves fed only low quality forage lost weight and never did achieve equal growth and carcass quality of the other treatments. As little as 2 pounds of supplement will keep calves gaining by improving forage digestibility and improve subsequent gains in the feed yard. Good to excellent quality forage may also support acceptable winter gains for newly weaned calves.

Feeding systems affect labor requirements, facility design, and equipment needs. Several observations indicate that self-feeding a homogenous concentrate (pellet or mixed grains), with free-choice hay offered separately, supports an equal or better growth rate compared with daily feeding of a totally-mixed ration in a fence-line feed bunk. We also tested an automatic feeder that delivered grain to the bunk at several preselected times per day in an effort to increase bunk visits, however, there was no benefit to feed intake or gain. There is risk in allowing any self-feeder to be empty for more than an hour or two. Subsequent gorging can potentially cause acidosis, bloat, and death. Self-feeders should allow 4 to 6 inches per head and be designed to eliminate blind spots so bison at the feeder are not ambushed from the side by dominant animals. Frequent inspection of the trough and cleaning of fines will encourage greater intake.

Totally mixed rations delivered to fence-line bunks are the norm in commercial feedlots, but require economies of scale to be successful. Commercial feeders require a minimum of 3,000 to 5,000 head to be economically viable unless the feed yard is associated with a farm that produces feed grains, forages, and has labor available.

A new concept that some producer testing proved to be worthwhile is field feeding, which involves offering grain in self-feeders to bison that are grazing modest-sized tracts of grass. The feeders should be movable and careful attention paid to the grass stand or significant damage could occur due to overgrazing. This management practice would eliminate the need for any runoff containment structures. Supplementing grazing bison with high energy/protein range cake would be a variation of the field feeding but requires daily or alternate-day feed deliver.

**IMPACT OF SOCIAL STRUCTURE**

It is nearly impossible to market a uniform pen of bison that have been on feed three months or more due to differences in individual animal performance, mature size, and to some extent, social behavior. Sorting feeder bison into uniform groups when they enter a pen is recommended, but there is still significant variation in end weights.
Confounding this is the challenge of topping pens, sorting the heaviest animals for market, a disruptive event for handlers and bison alike. Removing the larger bison from a pen, generally the dominant animals, causes disruption in the social order and reduced feed intake by the entire group for multiple days (Dr. Bruce Rutley, personal communication). The alternative is to simply market all the animals at the same time in a pen, but pen size and animal numbers vary dramatically from producer to producer. Similarly, adding new animals to a pen that has an established pecking order disrupts feed intake. Combining similar numbers of animals can be more chaotic than adding one or two to a larger group.

Feeding heifers and bulls together is not recommended, especially with yearlings and older animals. Wintering mixed sexes of calves is possible, since in many cases, these animals are herd mates and have established a social stratum already, and have not attained puberty.

**FACILITIES**
Following are some general observations on pen space per animal and number of animals per pen. Producer experiences are solicited to refine these recommendations. Bison are more active than other species, frequently moving around the pens in the mornings and evenings. A minimum of 250 square feet per head for feeder animals is recommended, preferably, 400 square feet, especially if the pens are not well drained and cleaned periodically. Bunk space for fence-line feeding for horned animals should be at least 2 feet, but dehorned animals may require only one foot. Fences should be solidly built and tall enough to prevent jumping, with 64-66 inches recommended. Crowding areas should be even more solidly built with 72-inch fences. Bison will typically not challenge what they cannot see through, so solid gates with canvas, plywood, or steel covered panels can help retard these challenges. Heavy bow gates, with an overhead frame, are generally more durable and longer lasting. Working facilities can be problematic for flow of bison. They need to be built solidly, with minimum noise during use, and operated by a minimum number of herdsmen. New concepts in low-stress handling may be useful for planning new facilities for both feedlots and cow/calf operations.

**FUTURE OF BISON FEEDING AND RESEARCH NEEDS**
This industry is experiencing slow and steady growth, to the net benefit of all involved. The challenges are finding profitable feeding scenarios, creating excellent and consistent quality meat products with our existing genetic base of animals, and the feed and management resources available. As the bison industry continues to grow, the need for research to understand the biology and physiology of these animals becomes more critical. Practical research and the basic understanding of rumen fermentation are needed. Research priorities may vary among segments of the industry, but should
include studying feed grains, co-products, and forages and improving their digestibility; determining bison mineral requirements; determining the optimal feeding systems for profitable production; and maintaining or improving meat quality and meat products. Producer comparisons are encouraged so all can learn from legitimate on-farm comparisons made across the country. Some lessons can be learned from managing other ruminants, but bison are unique in herd social structure, physiology, human interaction, and heritage. It is not the intent to change bison, but provide those eating bison with consistent, high quality, healthy meat products from humanely cared-for animals. It is our obligation to be good stewards of the earth and provide good husbandry and humane treatment to animals under our care.

FOR FURTHER READING:
North Dakota State University Bison Research Reports can be found at:
http://www.ag.ndsu.nodak.edu/carringt/livestock_research_program.htm

Saskatchewan Agriculture publications on bison production are available at:
http://www.agriculture.gov.sk.ca/bison

Vern Anderson is the Animal Scientist with a focus on Ruminant Nutrition at the North Dakota State University Carrington Research Extension Center. Murray Feist is the Ruminant Nutrition Specialist for the Ministry of Agriculture in Saskatchewan, Canada.

AUTHOR CONTACT INFORMATION:

Vern Anderson, Ph.D, P.A.S.
Carrington Research Extension Center
North Dakota State University
Box 219, Carrington, ND 58421
Phone: 1.701.652.2951
vern.anderson@ndsu.edu

Murray Feist, M.Sc., P.Ag.
Agriculture Knowledge Centre
Ministry of Agriculture
45 Thatcher Drive East
Moose Jaw, Saskatchewan S6J 1L8
Phone: 1.866.457.2377
murray.feist@gov.sk.ca
The Farmers’ Market Option for Selling Bison Meat

BY JACK & SANDY PLEASANT, SUNSET RIDGE BUFFALO FARM, ROXBORO, NC
www.SunsetRidgeBuffalo.com

We have been selling bison meat at our local farmers’ markets for ten years. Selling meat directly to the consumer is a way to increase margins and develop long-term relationships with customers, which may insulate your cash flow from the inevitable swings in market prices.

Having a specific time of the week when you market your product can also reduce the aggravation factor of selling from your farm store if you live off the beaten path, as customers inevitably show up to the farm expecting to always see animals from the road or just as you are heading down the road on the tractor toward the hayfield.

However, if you do not like getting up early every Saturday morning and tying up your weekends for most of the year, farmers’ markets may not be for you. Or, if you do not like dealing with a discriminating public, and do not feel comfortable educating people about how to cook the various cuts of buffalo, farmers’ markets may not be the way you want to get money out of your investment in animals.

We live in North Carolina at the end of a dirt road, seven miles from the small town of Roxboro (pop. 7,000). We are a few miles from state highways in two directions, so Sunset Ridge is not desolate and impossible for farm store customers to find, but most folks who visit our farm store make an intentional effort to find us.

We bought eight calves in late 2001. Through growth and acquisition our herd now totals 100-125 animals depending on the time of year. Production capacity is 25-35 prime animals per year. The first couple of years that we had meat to sell, we sold all we could by word of mouth to customers buying at the farm.
As we were evaluating getting into the buffalo business, an early question to answer was “What are we going to do with these critters once the herd size exceeds our pasture capacity?” So, the closer we came to transitioning from a hobby level to a small production level bison operation and when our crystal ball could see the day coming when we no longer would have sufficient pasture to keep growing the herd, we had to make a strategic decision. Did we just want to be in the live buffalo business or be vertically integrated and sell meat from the animals we raised, capturing the entire revenue stream?

Unlike 2015, cow/calf operations were losing money at the time and meat seemed to be selling well, so meat was the logical answer. We had been to some seminars at National Bison Association (NBA) and Eastern Bison Association meetings where the presenters talked about selling at farmers’ markets, one guy talked about selling $5,000 per week at a Boulder, Colorado market. That got our attention, though we knew we had neither the production capacity nor market size to achieve those results.

One of the first steps in determining whether the farmers’ market fits your enterprise is to analyze the area in which you will market.

We began to assess the farmers’ markets in our area to determine the best fit for our production capacity. In Roxboro, the incomes range from low to moderate, but when we draw a circle corresponding with an hour and a half drive of our farm (the maximum time we are willing to drive), there are three million people. So, we sought out those farmers’ markets closest to us with:

- Established clientele;
- highly educated populations with disposable income;
- proximity to medical centers and university populations;
- active local food, Slow Food, and farm tour organizations; and
- evidence that a number of restaurants in the market support the local food system by having their chefs shop the market every week.

We eliminated those markets which were too large and required a presence six or seven days a week, as well as brand new markets, and markets that were either not...
viable or marginal. After narrowing our list of desirable locations, we talked with some farmers who sold at those markets to see how well they thought our product would be received, then we targeted two markets that were each 45 minutes from the farm, one in Carrboro (adjacent to Chapel Hill) and the other in Durham. Because we could identify no markets where bison was sold from the farm that produced it, we thought the uniqueness of our product would give us an advantage in being admitted into markets that had few vendor openings.

A major change in the farmers’ market segment in the past 10 years is the number of new markets that opened. According to the USDA, nationally the number of farmers’ markets increased from 3,706 in 2004 to 8,284 in 2014. That’s 2.6 markets for every county in the USA. Those markets account for about one percent of produce sales nationwide. In our area the number of markets quadrupled in that same period, though growth has slowed since 2014. This explosion in markets has meant that many vendors now feel they have to attend two markets to sell the same amount of product they sold at one market in 2008. So, if you are just getting into the farmers’ market business, it is more important than ever that you do your homework and be selective in the market you choose to attend.

Many producers we have talked with believe we are in a phase where the total number of farmers’ market customers has not grown as fast as the number of markets. Normal economic theory would suggest that we will go through a period of shakeout and consolidation until the number of customers who choose to shop at farmers’ markets grows to justify more market locations. Positive indicators of future growth in this segment are the number of college students and young professionals who purchase from farmers’ markets, the continued growth in the local foods movement, development of programs to accept SNAP and EBT customers who were previously unable to purchase locally grown meat and produce, the increase in the number of farmers’ markets open year-round, and the number of new customers we see at farmers’ markets every week.

An important step is to research the rules and operating procedures for the potential markets you may want to serve as a vendor. Being novices to the farmers’ market
venue, we had no idea what was involved in becoming a vendor. First, we went to their websites and read about the market, who the vendors were and what product groups were represented. We found that each market in our area accepted new members once a year with applications due in January, an on-site review of the farm and its practices in February, and a decision by the board of directors in early March as to which applicants are admitted to membership beginning in April.

We applied to each market (application fee and membership fee, if accepted) for the Saturday morning session, with an alternate Wednesday afternoon if Saturday was not available. From some NBA workshops we had learned that every Saturday market has 3-4 times the sales of a midweek market in that same location, so we wanted Saturday. That first year we were accepted to the Wednesday Carrboro market (one of four accepted with 20 rejected), but rejected by the Durham market (2 accepted with 16 rejected). We knew that our sales would be less, but wanted to get our foot in the door and figure out how we could market our buffalo to what began 30 years earlier as a produce-based market for vegetarians and organic food buffs, but was now evolving to include all kinds of specialty meats.

To be admitted as a member of the farmers’ market, the vendor must agree to abide by the market rules, which have been established by the market’s board over the years. Each market has its own rules, so it is important for a potential vendor to read all the rules carefully before joining. To give you an idea of what you might expect to see, here are some of the rules with which one market’s meat purveyors must comply.

- All meat sellers must raise all animals sold at market on their farm for at least one year.
- Animals must be raised on land owned by the farmer or leased for a minimum period of time prior to selling meat produced on the leased land.
- All meat sellers must be licensed by the state as a meat handler, and comply with rules related to refrigeration, sanitation, transport of meat, etc.
- All meat sold at market must be raised within a certain number of miles of the market on farms reviewed by the Board as part of its due diligence.
- The farmer, spouse, son or daughter must be present at each market session (allowed two sessions per year with substitutes), and must sell a minimum of 17 weeks per year in order to retain the right to sell the following year. (Carrboro is the only market in NC which requires the farmer or immediate family member to be present. Rules like that are well-intentioned but prove to be an impediment to a successful farmer selling at multiple Saturday markets.)
- The Board has the right to inspect the farm at any time, including slaughter records, to assure that the farmer is producing as much as he is selling at market.
- All value-added products (snack sticks, bologna, summer sausage, etc.) must have 51 percent of its composition from the vendor’s production and the remainder (except spices) come from another market vendor or another producer within 45 miles of the market.
- In order to have meat processed out of state, the vendor must apply to the Board for an exception to the rule that all meat must be processed locally under state or federal inspection.
• Vendors will have a 10 x 10 space. New vendors must bring their own canopies and be assigned by the market manager to a space as available until their second year. A seniority system is used to determine the permanent space to which the vendor is assigned each year.

Different markets have different rules, so investigate thoroughly to make sure what you want to do and are capable of doing is compatible with the rules of the market where you intend to sell. We participated in a community-sponsored market for two years, which charged a flat fee for weekly space rental. When the Board voted to change the rental rate from a flat fee to a percentage of sales without first discussing the change with the vendors, we elected to leave that market. We understand that the trend among markets is to go to percentage based fees.

As a general rule, a market needs at least 15 vendors present to be viable. We have participated in two markets which had average vendor attendance of less than 25, and neither of those produced the sales necessary to generate the minimum average revenue we needed for the market to be viable. So we found that markets with 50-60 vendors and customer counts of 2000+ per half day market were required for our product to be viable.

Other variables to consider are the number of meat vendors, the mix of products offered, and the level of household income and population within a five mile radius of the market location. Markets that are controlled and operated by farmers have historically performed better than those markets designed to draw traffic to another business.

Some markets require the vendor to produce everything they sell and other markets allow re-sellers. So, again, investigate and check the rules and governance before agreeing to participate in a farmers’ market. And while you are investigating, check with your accountant on the rules in your state for collecting sales tax on farmers’ market sales.

The first 17 weeks of midweek sales in Carrboro was our “probationary period”, where we had to prove our dedication to coming to market every week, that we could.
adequately supply the demand, and that buffalo meat could be an asset to the market by bringing in additional customers who came to the market looking specifically for what we sell. The early weeks were slow, but once word got out and our customers started talking among themselves about the great taste and selection of cuts of our bison, it soon became worthwhile for us to be there. After that initial 17 week period we were invited to participate in the Saturday market on a “space available” basis throughout the fall and winter markets until the next spring market started. Our Saturday sales averaged double to triple our midweek sales.

In our second year we applied again to Durham and were accepted into their Saturday market (only 2 of 32 new applicants accepted). The uniqueness of our bison product and the way we proved our dedication to market participation in Carrboro helped pave the way for our acceptance in Durham. The Durham customers immediately embraced us. Durham sales are higher than Carrboro three out of four weeks of the month–we just can’t accurately predict which Saturday will be strongest at each market. We knew both of those communities well as we had offices in each town in another business, but would never have predicted these farmers’ market results. As we tried to figure out why Durham has been the stronger market for bison, here are some of our conclusions:

- **Parking** - Durham has adequate parking on multiple sides of the market whereas Carrboro is congested and customers have to search for a parking space. Because of rapid multi-family development surrounding the Durham market location, this dynamic is changing.

- **Location** - Durham’s location is downtown in an area close to high-end housing redevelopment whereas Carrboro is adjacent to the town hall and a lot of the housing within a mile circumference of the market is older and student occupied.

- **Customer Base** - Durham’s customers seem to have a better mix of business, medical, and private university clientele whereas Carrboro tends to draw lower level faculty and students from the public university.

- **Income** - Per capita income is higher in Durham than Carrboro.

- **Competition** - Carrboro had more meat vendors than Durham.

Once you are accepted into a market, logistics are the next major consideration. We started out loading a pop-up tent, coolers, signs, promotional materials, tables, etc. into our old Jeep. Loading up coolers out of three upright freezers at home took 30 minutes, then a 45-minute drive to market. Setup of tables and display took 30+ minutes, then a 4 hour market, 30 minute booth breakdown, 30 minute lunch, 45 minute return drive, and 30 more minutes to put the unsold meat back into the home freezers. We needed to sell enough meat to justify 8-16 hours of labor, fuel, and depreciation in addition to the cost we had in our meat just to break even.

Some meat vendors bring their product in vans packed with coolers, while others use cargo trailers with chest freezers inside. The advantage of the trailer with freezers is that the vendor does not have to spend the time loading and unloading meat before
each market session and can keep the freezers plugged in if electricity is available on-site. Many markets do not have electrical outlets readily accessible, something else for a new vendor to consider. Some urban markets have no vendor parking available, so you have to park blocks away and roll your set-up to the market. States have different refrigeration requirements for frozen and fresh product. Fresh will always outsell frozen, but may not be feasible for a small producer with limited production capacity.

The disadvantages of trailers are: 1) the vendor needs to arrive at market at least 15 minutes earlier in order to maneuver the trailer around other traffic; 2) it takes one more person to staff the booth if someone is having to walk back and forth to retrieve meat out of the freezers, and 3) some markets require that you disconnect the truck from the trailer during market, so an additional 30 minutes per session is consumed performing that task.

It is crucial to continually match our production and processing capacity to our market demand. Unfortunately, we do not have control over all the variables. If we plan to have a certain number of animals to harvest in a year and disease, drought, poor weight gains or unexpected mortality reduces our production, we must have a contingency strategy to take care of our customers. Our greatest challenge the past couple of years has been getting our animals processed on our schedule. On a half dozen occasions our local processor (the only processor in our state and within a five hour drive that would process bison) has abruptly stopped harvesting bison for three days to three months. Most of these stoppages have come near a holiday or during our busiest season. Sales lost because you did not have product available when the customer wanted to buy, may never be regained. If you have no meat to sell for the 4th of July, that customer will buy something else or find another source and that revenue is lost forever. When these instances occur a backup plan with another processor is essential, because loss of revenue during the primary selling season can cause cash flow issues which can bury your business if you are dependent upon your meat sales to pay your farm’s bills.

Once we were accepted into the second market and recognized the significant jump in sales going from a mid-week to Saturday market, efficiency became a bigger consideration. We installed an 8 x 12 walk-in freezer (capacity for 4 carcasses at a time) and carried 2-3 animals to the processor each trip rather than just one.

We purchased a used Sprinter van equipped with a lift which allowed us to store meat in coolers on rolling carts. The lifting of heavy coolers was eliminated and this system cut an hour and a half off our time each market as all we have to do is roll the carts out of the freezer onto the lift, push a button to lift the carts, then strap them in place and drive. Ditto the routine at market.
The Sprinter van offered other advantages as well. We could organize our load, walk inside without bending, and the fuel economy was almost twice as good as the Jeep. The greatest advantage was the visibility of our booth at market because the Sprinter is taller than most vehicles.

The $500 we spent decorating the “buff-mobile” with NBA provided meat pictures, etc. is the best advertising money we have ever spent. Almost every time we stop at a shopping center, gas station or restaurant, someone will ask for a business card or to buy meat if we have some with us. All the other vendors at market know our van, so if a customer asks “Where are the buffalo people?”, a quick point in our direction will make the connection. Later, we added a mini-van decorated like the Sprinter, with built-in organization for tables, tent, coolers, sign, etc. so that we can unpack and repack everything in the order needed without moving anything else until needed.

Marketing and merchandizing are important elements for a successful farmers market enterprise. Professional packaging and labeling convey an image of quality to your customers. Yesterday’s chalk board has been replaced by a magnetic menu board professionally lettered and easily changeable to suit our offerings as they change from week to week.

Prior to selling meat at the farmers’ markets, we developed a label and learned a few things about communicating with our processor to get the cuts we wanted. Every time we get together with other bison producers at local, regional or national meetings we get new ideas by talking about different ways to prepare, package, price and promote bison.

Ready to eat products like snack sticks and jerky can account for up to 25 percent of daily sales at the farmers’ market because people (especially kids) get hungry walking around looking at food, or because they are looking for a snack for the plane, school, or camping trip. These products should be displayed where they can be easily seen closest to the part of your space adjacent to the pedestrian traffic lanes. A convenience package with four individually separable burgers on a sheet, designed for one to two person households, will outsell a stack of three or four burgers by a 2-1 margin because...
the packaging is user friendly. As competition from grocery stores and buyer's clubs carrying ground bison has increased, we have increased our offerings of sausages to differentiate our product from that which our customers can easily acquire at a lower price elsewhere. Bratwurst, Hot Italian, and Chorizo are our most popular sausages. Most processors make sausages in minimum batches of 25 or 50 lbs. but will often package the batch in both links and pound bricks if you desire.

Customer feedback is an important tool in building your business. By listening to our customers, observing their buying patterns, experimenting with new products, and cooking all the cuts ourselves, we have been able to sell all our cuts. Most of our farmers' market customers have little freezer space, so they buy a pound or two at the time. Many of our customers do not bring sufficient cash to market to buy everything bison they would like to have. Card readers, which plug into a smart phone, have dramatically changed the buying behavior of our farmers' market customers in the past two years. Twenty to 50 percent of a day's sales are likely to be paid by credit or debit card today. A customer who has 20 dollars in cash left may buy 75 dollars worth if you have a card reader. We consider our acceptance of credit and debit cards to be a convenience for the customer, so we program the card reader to add the card fee back to the customer's charges so we do not absorb that cost. Of course, our menu board tells our customers in advance that we add the card fees to their purchase so there is no confusion. The money from card sales is deposited into our account before we would normally get to the bank on Monday following a Saturday market, so we are happy.

New customers who have not previously cooked bison usually start with some burger or a steak. Ten years ago we would spend half of our time at market educating customers about how to cook bison. Today we spend as much time listening to how our customers are cooking the bison we sold them previously as we do telling customers who are new to bison how to properly prepare it. If you know or suspect the customer has not cooked buffalo before, ask them “Have you cooked bison before?” If the answer is no, then tell them about “low, slow, and olive oil” and hand them a brochure or sheet with your recommended cooking instructions or a recipe.

A new customer who has a good experience cooking bison will tell their friends and will return to buy more. A customer who messes up dinner will blame your product as being tough or dry and will tell their friends how bad it was. If you have taken the time to educate new customers on the proper ways to cook bison and they still mess up dinner, they are more likely to acknowledge the problem may not have been the meat but how they prepared it. We want to turn our customers into fanatic advocates for our farm and for bison!

Sampling is the great tool in a farm marketer's bag of tricks. Four out of five people
who sample our jerky or meat sticks will buy that day and most will become repeat customers. Having someone as part of your market crew who knows how to cook, enjoys it and can explain how to prepare a particular cut is a real plus to sales.

An occasional cooking demonstration will boost sales, but requires additional manpower and takes up some limited space. Some markets allow cooking and onsite sales of cooked product, but most in our area only allow cooking samples that will be given away. The aroma of the meat cooking draws a crowd to your booth, and crowd psychology dictates that if there is a line at your booth, you must have something everyone wants, so the line gets bigger. Check local health department regulations before cooking at market as they vary from state to state.

Once the crowd experiences the taste of a properly prepared bison dish, they want to buy what you just cooked and would be happy to accept a written recipe to remind them when they get home just how you prepared that great dish. One day we were overstocked on London Broil, so we took our tailgating grill to market and cooked one piece of meat, gave out over 300 bite-sized samples, and sold 23 London Broils! The residual effect of that tasting lasted two more weeks until we were sold out of our backlog of that cut.

Our farmers’ markets have chef events, periodically, and Sunset Ridge bison is occasionally featured. So, if the best chefs in town think our bison is good and the customer has seen us cook up a tasty dish using simple techniques, buffalo must by association be pretty darn good. Customers come to the farmers’ market looking to create a new and exciting dish. We want them to come back to us with comments like, “We made the bison meatloaf from your brochure. It was so good, it almost made us cry!”
It is important to understand that customers’ buying habits shift with the seasons. Neither of us come from meat or grocery backgrounds and had never paid particular attention to seasonal changes in the meat business. Since both the farmers’ markets we serve are now year-round, we have had to pay attention to those changes. We are continually learning about seasonal variations in buying habits which influence how we have our meat cut and packaged.

Our pricing strategy is to keep our ground product priced slightly higher (10%) than local grocery stores because when we allowed our price to be lower we sold at a pace higher than our production capacity. Ground bison is more price sensitive than other cuts because supermarkets in our area rarely carry steaks, roasts, bison sausages, or offal. This does not mean that price is not important to our customers. Every time we raise prices we lose a few customers. The trick with pricing is to find the sweet spot where your customers’ demand and your meat supply are in balance, and where you are compensated fairly for your time and expense for choosing to sell at the farmers’ market rather than through another less time consuming channel.

We sell more burgers in patties during the grilling season and more 1 lb. packages of ground in the cooler months. Stew meat in the winter is the same as kabob meat in the summer. Bratwurst and hot Italian sausage sell well during the grilling season. Roasts of all types sell better in the cool season, and whole loins sell well around the holidays, but are in less demand throughout the remainder of the year.

Trust is the primary thing we sell at a farmers’ market. “Foodies”, “locavores”, and other labels for people who choose to shop at the local farmers’ market all want to know that they can trust the source of their nourishment. They want to know anything and everything about how the animal is raised and handled from birth through slaughter. Every time there is a news story about a food safety or animal welfare issue, expect questions about how that issue relates to your operation. The farmer/rancher at the market is the public face that helps bridge the ideological divide between what one would like to see happen and the constraints of the real world.
We think about 20 percent of our customers care whether or not our animals are grass-fed, and maybe five percent are hoping for organically raised. But 95 percent want to know our buffalo live happy lives in pastures (not feedlots) with the herd. The five percent who hope we field slaughter because that harvest method may be less stressful to the animal still buy when they find out that market rules would not allow us to sell uninspected meat. The customer wants to know the farmer’s story – why and how you do what you do. When the farmer is honest with the customer about how and why he raises, feeds, and processes the animal as he does, conditions are ripe for a lasting bond to develop between customer and farmer. This is the integrity link which the farmers’ market shopper seeks and motivates them to pay a premium price.

The local farmers’ market is the venue from which we have gotten the most exposure for our farm and buffalo. We cross promote our farm’s event venue business at farmers’ markets by having our Gazebo pictures on our vans and our venue brochures prominently displayed. Local TV stations often shoot footage at the market and because of our uniqueness and story of bison, we are often interviewed. Photographers come to market to take pictures of vegetables, see our booth, and see the potential for a story. What follows is a trip to the farm, a ride through the herd, and a story in another newspaper or magazine – free publicity that we could not afford to buy.

We have been in ads shot by our state Department of Agriculture (and run on TV stations across the state) to promote locally grown products – all because we choose to sell our locally grown bison through our local farmers’ markets. For the rancher who has enough volume to sustain a market, selling meat at the local farmers’ market is an avenue that should be considered as a viable option to generate a higher return on their bison investment.

Farmers’ markets add a new and immensely satisfying dimension to the buffalo game for those who have reasonable geographic proximity to populations with higher than average disposable income and a willingness to interact with the public. If you feel that all the work you do raising bison goes unappreciated, then tell your story and sell your buffalo meat at the local farmers’ market. Your customers will thank you for doing what you do not only by paying a premium for your product, but by their smiles, reports of delicious dishes, and many kind words.

Jack & Sandy Pleasant own and operate Sunset Ridge Buffalo Farm in Roxboro, NC. www.SunsetRidgeBuffalo.com
Selling Directly to Restaurants and Retail

BY BRUCE ANDERSON

The first thing you will need to market directly to restaurants and food service is confidence. Always remember you are selling some of the finest protein product North America has to offer. The second thing you will need is the desire to learn about how restaurants operate, their margins, how they manage sales and why they make the decisions they make. And lastly, you will need patience. Not everyone is going to see what a wonderful product bison meat is, to begin with anyway.

Selling buffalo meat to restaurants can be one of the best ways to promote the product and generate meat sales income. Hopefully, you already have a relationship with a meat processing facility. If not, you need to develop that relationship. The next thing is to learn about regulations and inspections. If you are using USDA inspection, you are good to go anywhere. Legally, you can ship state inspected buffalo meat interstate, as well. Be aware that some states require bison meat to be inspected and other states do not. Your meat processor will generally know what is required in your state and surrounding states. There are also resources from the National Bison Association (NBA) that can help you. Check with your insurance agent and make sure you have coverage for these types of sales.

Visit with your processor and find out what they know about these types of sales. They will have to have the necessary equipment to service the restaurant trade. It is extremely helpful if they have some experience selling to restaurants. You will get asked questions about fat percentages, portion control weights, vacuum packaging and box size. A quality meat processor can help you with all these questions and more. If you have more questions, once again, the NBA is a great resource.

Next, decide who you think can sell bison meat. I have my best luck with small,
family-owned restaurants. I find that this type of restaurateur is willing to take some risks. Brew pubs, restaurants that specialize in healthy foods, and resorts are all great candidates for bison meat as well. You should also talk to, and get to know the decision maker at each establishment. I always looked for restaurants that had a great amount of “high-end” customers and could charge what they needed for product. Every region I have ever been to has a number of these restaurants.

Establishing pricing is always a difficult, gray area. Restaurants generally won’t want to pay retail for their products. We have a special computer program to help with pricing, but if I didn’t have that I would use the USDA monthly bison price report as a beginning point. Keep in mind that most of those prices are not for direct-to-restaurant sales, but are more reflective of sales to distributors who then sell to restaurants. Most of those distributors will mark the product up, maybe as much as $1.25 per lb. If you sell direct to a restaurant, you should get that extra money. The NBA is a great resource for this type of sale, with the Commercial Marketers Committee specializing in wholesale bison business.

Ground buffalo was always the entry level product for me. It was the easiest to cook, the least expensive item to place on the menu and a way to get a restaurant started buying buffalo.

Sample, sample, sample. When I initially wanted to get a customer started, I always wanted them to try it. My goal was three-fold. Most restaurant owners are food people. What food person wouldn’t take the opportunity to try a new product? I knew they would like it and it showed that I had confidence in what I was selling.

Go into the restaurant with a plan. Make sure you know when and how you will deliver the product. You are going to have to make the sales call even after you have established your product in their operation. Be ready to call on the restaurant at the frequencies or times they want. You have to be consistent with this approach. Do not rely on them calling you. Restaurant owners have enough to worry about without having to keep track of how much product they have. All of their grocery suppliers make sure they
rarely run out of product. Take control of this process with timely sales calls and timely deliveries. Make sure your deliveries are made out of some kind of enclosure. The back of an open pick-up truck won’t cut it in today’s world.

The next step is actually getting the customer to use the product. My first goal was to make a sale and to get a spot on the menu. If the restaurant owner wasn’t quite convinced, my back-up plan was to sell him some product and put it on as a one-night special. If the owner was still interested, but not ready to buy, I would offer him five pounds of ground bison if he would run it on special. Keep in mind that you have already invested a great deal of time and effort into this restaurant. Giving $30-$50 worth of product to “push” a customer over the top is worthwhile.

Be ready to help the restaurant with pricing their product. Most restaurants in my area get $2-$3 more for a bison burger than they do for the same size beef burger. On the average they have about $1.50 per burger more in the bison than they do in the beef. All things being equal, they are making more every time their customers order the bison, which is a huge selling point. Let’s assume you have some success with getting the customer to place the item on his menu. First of all, be ready for anything. I have seen the product succeed beyond what I thought and I have seen the product fail. Initial orders can be deceiving as the purchaser doesn’t know what to expect either. Just because he buys 100 pounds, don’t assume he will order that much every time. Keep in touch through the beginning of this process. Typically the product takes off fast, but then settles into a fairly predictable pattern.

OK, now you have a success story. You have your bison meat selling on the menu in a restaurant. Where do you go from here? If you have enough product to take on more business, by all means do so. How bison worked for this restaurant 10 miles away makes for a great testimonial. Our first business here in the Black Hills of South Dakota was with the high-profile visitor-oriented restaurants. Wall Drug, Mount Rushmore and Custer State Park came on board early. It was great because none of them were too close to each other, so none of them thought I was diluting their business by selling to their neighbor. As the popularity of the product spread, it was easier and easier to get
others to put it on their menus. As the product caught on, customers began to look for
restaurants that had bison. Now it is rare to go into a restaurant in the seasonal part
of the Black Hills and not have bison on the menu.

Once we had one item on the menu that was successful it was time to sell more cuts.
Most of the time this was a steak item. We only sell the best steak cuts from young
animals. I learned it was better to be out of product than it was to sell inferior quality.
Restaurants generally use boneless steaks from 8 oz. to 14 oz. and bone-in steaks from
12 oz. to 18 oz. Once again, I would advise you to talk to your meat processor before
making any kind of deal with a restaurant. The processor should know about how
many animals you produce and how many steaks your animals produce. If I could, I
tried to get the restaurant to use up whatever quality steaks I had the most of. This is a
strategy we still use today. Be willing to help the restaurant with pricing. Quality bison
steaks generally are priced at about 20% more than their corresponding beef item.

So what do you do if you thought you had plenty of product, but you find yourself
running short? Do you have other bison producers that own animals that you could
purchase or is there other quality product out there that you can use to fill orders?
Either of these strategies can work, but you need to be careful. If you did not price your
product high enough to begin with, you may find yourself losing money by having to
pay too much for either of these options. Does your restaurant have the flexibility and
desire to switch to another steak item that you have? Do yourself a favor and research
all these possibilities.

Track your sales. It is critical to know what to produce and when to produce it.
Certain items have a much longer shelf life than others. The rule of thumb is that
the farther down the line you process an item, the shorter the shelf life. For instance,
cut New York steaks will suffer more from time in the freezer than leaving the New
York strip intact. Ground buffalo will freezer burn faster than leaving the trim
unground. If you only process certain times of the year, be careful. If you track sales,
you will have a good idea on how to manage this part of your business. Everybody
that sells product to restaurants gets stuck with unused inventory. You can minimize
this with a little planning.

FIGURE 16.3
Tracking sales, expenses and revenues are critical to
economic sustainability.
Be very careful with receivables. Make sure your terms are set forth early in the sales process. Most restaurant supply companies give their customers two weeks to pay their bills. If at all possible, get paid when you deliver. Don’t lose track of the receivables. Be especially careful of new restaurants, or old restaurants that have new ownership or new management.

Some random thoughts I would like to add:

- I tried to stay away from restaurants that were already selling buffalo meat, unless they contacted me. I never wanted to turn selling the product into a pricing game.
- You will get asked to guarantee pricing. I was willing to do that with a customer I knew and only for a set period of time, at most six months. This is another good reason to make sure your pricing is high enough to begin with.
- Be open to new suggestions. I had a customer who was convinced they could sell buffalo as a ground seasoned breakfast item. I had my doubts. It has turned into a great seller for us.
- The closer you are to a place where visitors can see bison, the better your sales will be.
- Whatever marketing tools you can use (grass fed, locally grown), by all means try to get the restaurant to put those terms on their menu.

Bruce Anderson is the owner and operator of Western Buffalo Co., in Rapid City, SD and is the President of the National Bison Association.
Commercial Marketing of Bison

BY BOB STIRLING

Commercial marketing of bison products for the end result is why we are involved in this great industry. Of course, bison make a beautiful sight on a prairie ranch, but the main reason bison are raised is for the purpose of harvesting the meat, hide, skull, and by-products from this majestic animal. A good commercial marketing plan that leads to the sale of these products for a profit will ensure a healthy enterprise that will continue to grow over subsequent years.

Going through with the commercial marketing definition, we can say that marketing is the process of creating, communicating, and delivering value to the customers in order to retain the benefit of the organization and stakeholders as a whole. In commercial marketing we generally focus on customer needs, wants, products and services.

For the past few decades, bison meat has continued to increase in popularity among consumers. At one time bison meat was difficult to find and was only available through specialty meat markets and butcher shops. It is now becoming more and more common to find in club stores, grocery stores, fine restaurants, tourist destinations, etc.

As opposed to retail marketing directly to the consumer such as farmers markets, website sales, etc., commercial marketing is much more broad in scope and focuses more on selling bison meat to food distributors, further processors, restaurant chains, grocery chains, etc. Large quantities of bison meat are sold through these channels that are then further distributed to the purveyors, distributors, or through retail channels to the consumer themselves.

Commercial marketers will need to develop and promote their brand. Developing brand identity and loyalty is crucial to being successful. It is also crucial to develop a
relationship of trust with the customer. Whether a grocery chain, restaurant chain, etc., the customer will need to be educated about the brand and be given the resources to pass this information on to the final consumer. The story might include details about production practices, the ranching family’s traditions, etc. If the product is locally raised, grain or grass-finished, etc., these claims should be passed on to educate the consumer. The consumer will need to be enlightened on the benefits they will receive from buying this nutritious, healthy, and delicious product.

The biggest benefit of commercial marketing is the ability to sell large quantities of meat for each order. The USDA Agricultural Marketing Service publishes a monthly report of bison carcass and cut pricing. This report is beneficial to commercial marketers to raise or lower prices according the market.

One of the common challenges of commercial marketing is the fact that pricing received for the individual cuts is less than other forms of marketing such as direct marketing, internet sales, retail, etc. Another challenge faced by commercial marketers is that seasonal harvests that are common in the bison industry, which makes it a difficult to promote year-round availability of a chilled (not frozen) product.

Marketing of bison products is typically done at food and trade shows and by making sales calls to potential customers. Another way to market your product is to invite new and current customers to visit the ranch and learn about production and management practices.

FIGURE 17.1
Trade shows, sales calls and other forms of “boots on the ground” marketing are vital in developing new markets for bison meat. (Photo: Dave Carter)

Any commercial bison marketer that has been in the industry for more than a few years will definitely be able to share experiences of the supply and demand for bison meat. Many marketers will relate the bison industry to a ‘roller coaster ride’ where we have seen the
ups and downs. At this time, in 2015, and for the previous two years, bison trim has been in very high demand. Combined with the recent record drought in the Midwest, many animals were sent to slaughter, which has affected our industry. We now see the effects of many ranchers holding on to their female animals in order to replenish their herd size and maximize their stocking density. In previous years, the steak cuts (middle meats) have been in very high demand and it was difficult to sell trim. With the current high demand of trim, we now see some processors whom are grinding chucks and rounds in order to meet the demand for ground bison. As the bison industry matures, this cyclical cycle will stabilize and the supply and demand will become more predictable.

Commercial marketers will sell the majority of the cuts through different avenues:

1. Middle meats (steak cuts)
   a. Foodservice
   b. Fine restaurants
2. Trim
   a. Grinders (ground bison chubs, patties, etc.)
   b. Cookers (hot dogs, sausage, etc.)
3. Chucks & Rounds
   a. Jerky processors
   b. Grinders (chucks & rounds will be ground when trim is in low supply)
4. Offal
   a. Pet treats
5. Hides & Skulls
   a. Sold in tourist venues, etc.

Another factor in being a successful commercial marketer is the essential tool of performing market research. Many bison meat customers are looking for a low-fat, high-protein product, and they will find that in bison. Demographics will need to be studied to find out who wants to purchase bison products. Market research will also determine how well the consumer is educated regarding bison meat. My research has indicated that the consumer will need to be taught that today’s bison meat comes from ranching operations and that the animals are harvested and the meat is cut in USDA inspected processing plants. It is very likely that many of your customers will believe that your bison meat came from game hunters in a national park!

In summary, commercial marketing involves finding out what the consumer wants and delivers what they want, when they want it, and in the way that they want it. It focuses on enlightening the individual on the benefits they will personally receive from consuming the product. The main goal of commercial marketing is to develop a relationship between the client and the product. This is achieved by creating a brand identity with which the consumer can relate.
As bison producers, we have a wonderful product to showcase, promote, and sell. More and more consumers are finding that bison meat is not only highly nutritious and healthy, but it is also delicious! We are part of a great industry that involves a great animal.

Bob Stirling is the General Manager of Intermountain Bison, Idaho Falls, ID. www.intermountainbison.com
Marketing your Bison Business on the Internet

BY SEAN LENIHAN

This topic could fill volumes, so if you intend on marketing on the internet, please do not stop with this brief summary on what you can do on the web with your business. Within the limited scope of this book, and particularly this marketing section, I hope to share some key insights and considerations as you explore marketing your bison business on the web.

Please keep in mind, even in 2015, we are still at the beginning of the internet. As technology advances and people adopt more and more connected tools into their lives, the web will become more and more ever-present.

Following up on that reality, the shift to using the internet on your mobile device has occurred and will continue to grow in the foreseeable future. Marketing your bison business online now really means marketing it on mobile devices.

The shift to a mobile internet
As you can see by the charts above the trends are clear; internet marketing is now mobile. Shopping online will become more mobile. In some cities ordering your groceries to be delivered to your front door from your phone is a reality. All of these trends present a great opportunity, but also require that you invest and learn more about the end user of your bison meat.

Understanding how your consumer uses their device to entertain themselves, communicate with others, discover new things and ultimately shop for products they want is paramount. Building upon that understanding includes two distinct parts of the equation; First your Brand, or more accurately, the emotional side of communicating what your bison business does. The second important factor includes all of the quantitative “math” behind reaching a desired audience.

Your brand should be clear and understandable. Investing in high quality creative that should include a professional logo, photography of your ranch, as well as an expert copywriter to create your brand, will go a long way in positioning your business to the ideal customer. Once your brand’s foundation is established, you can then begin to build out what kind of presence you need online. Your website will serve as a home to where people will go to learn more about what you offer and increasingly more about how you raise your bison. Another trend gaining popularity in food production is transparency. Our connected society has unprecedented access to information that enables consumers to learn just about everything they could possibly want to know, and more. Using your brand and website to be transparent will not only be looked upon favorably, but will also prevent potential negative public relations situations in the future.

When researching and hiring a web development team, be sure to understand each objective you want to accomplish. There are many different things you can do with your website and all of them require an investment in time and money. The most
important part will be making a plan and a budget and sticking to it to make sure you don’t end up with expensive, partially built web functions that fail to reach their intended objectives.

With your brand assets in place, along with a web development team hired, you can now focus on the functions that you have set to accomplish on the web. An important factor here is to understand and prepare for the need to test and track how people are finding your site (or content), what they are doing once they arrive at your site, and then, if they are engaging, consuming, and buying from your website. The number of tools you can and need to use on this is growing, so hiring experts with past success is again a necessity. Things like Google Analytics, Keywords, Search Engine Optimization, Google Adwords, and Competitive Analysis are just a few of the important subjects you’ll need your team to work on. Without addressing these factors you could end up with a website that is almost invisible to your intended audience. These factors all live on the “math” side of the website equation. Also, keep in mind that all of these factors will continue to evolve as web companies continue to refine and adjust search algorithms and display preferences (i.e., mobile optimized websites).

With any marketing and advertising effort you’ll need to accomplish the following:

- Gain the attention of your targeted audience
- Tell them your story
- Sell them your product

In doing this you will need to respect the time of the consumer, which requires copy and possibly video to be brief and impactful. Websites are inherently “content marketing”. The level in which you choose to develop content, of course, will be based upon budget and the objectives you seek to accomplish with your site. Content marketing is anything published on your site and your social media channels that can be viewed, read, watched, or listened to. Consumers are always looking for some kind of content, and as it relates to the bison business this can mean finding a bison ranch near them, discovering new recipes, learning about nutrition, or just watching videos about bison in general. Creating beautiful and valuable content has always been the best way to attract an audience. This has been true long before the internet came about and will continue as it evolves. I’m sure one of our most famous bison ranchers would agree, as Ted Turner knows a thing or two about content being king.

Social media should also be an important part of your web strategy. The options and opportunities to access diverse communities online are incredible. Your content should be designed to attract these audiences and enable your marketing team to engage with consumers asking questions, sharing facts, teaching basics of cooking bison and of course, directing them to places they can buy and eat bison. Social media is also a
formidable tool for marketers; it’s value lives in your ability to learn how to use each platform to reach and engage with worthwhile customers. As technology advances, social media will continue to evolve and shift. Generational differences should be identified as well as where specific communities are engaging. Keep up to date with trends in this area and do not be afraid to experiment.

Your need to engage with customers, vendors and stakeholders requires that email be a central part of your web marketing efforts. One killer fact will remain with email, and that is it remains a direct line of communication between you and the consumer. No social media channel will afford you this direct, unchanging method of communication. Building, maintaining and nurturing a quality email list is a valuable asset. Be sure to work with your web development team to make this tool efficient.

Marketing your bison business on the web can be challenging along with expensive. However, it can also be incredibly rewarding, as you will have a wonderfully creative stage on which to share all of your work within the industry. Sharing your first hand work with one of the most majestic animals on earth is a privilege and your customers will be able to share in celebrating your efforts. Staying flexible, investing each year, and embracing the new ways of reaching your customers will be rewarded. After all, the internet is pretty efficient at connecting people and enabling relationships. The relationship you build with your customers is one of, if not the most important, business relationship you will have.

Sean M. Lenihan, founder of The Honest Bison and can be reached at sean.m.lenihan@thehonestbison.com.
Social Media, The New Marketing Tool

BY CARRIE KOCIK

Much like running a ranch, social media is an ever-changing landscape that needs to be maintained, monitored and fine-tuned as the elements change. It can also be a lot of work, but is worth it.

Before embarking on social media, first determine what your goals are, with whom you want to interact, and what resources – time and money – you have to invest. This will help determine which platforms are right for you and who the best person or people are to take on the task of managing social media for your ranch.

GOAL SETTING:
While your goals might evolve over time, it’s good to have an idea in mind of why you’re online and how it can benefit you. Ask yourself these questions:

- What do you want to accomplish through social media?
- Are you looking to find more customers and sell more meat?
- How much of an increase in sales (increase of what?) will make an impact?
- Do you want to tell the story of your ranch and what you do to deepen relationships and loyalty among existing customers?
- Do you want to connect with influencers and others online to have a voice in the national conversation about meat production?

STAFFING:
You might have a person on staff who loves to take photographs or videos, for example. Maybe you have a budding chef who is willing to share recipes that you can post online. Most importantly, you will need someone who is available and able to monitor social media sites near daily or as frequently as possible to ensure consistency and responsiveness. You’ll want to post with some frequency – one to three times a week is a great place
to get started. Build from there once you figure out what works for you. It’s better to have fewer, more meaningful posts than a lot of content that doesn’t engage.

**FIGURE 19.1**
The public is fascinated with the imagery of bison. Capitalize on this attribute.

**STORY TELLING & CONTENT:**
Content has always been the most important element of social media. You must have something to say and, nowadays, you must have something to show. The good news is that you don’t need to be an excellent writer, as most people online don’t expect beautiful prose. Most of all, people on social media want to see something interesting. Try to not get too hung up on saying things perfectly, be authentic and be yourself.

Images and video greatly increase engagement and sharing of content. The good news is that you live on a bison ranch! Photos of animals and food are a great start and a wonderful way to tell your story and give followers a glimpse of life on a ranch. But remember that the images you share will give people who come to your pages an impression of your ranch, so make sure the quality is as good as possible. If you can afford high quality, professional photography by all means invest. But you can also get started using a digital camera or smartphone. Social media sites offer their own photo editing and filters before you post and you can find very inexpensive photo editing options online if you want to get creative and add quotes to images, or build simple graphics.

**USING THE RIGHT PLATFORMS FOR YOU:**
There are a lot of platforms available and it can be difficult to keep up with what’s new. Rather than getting overwhelmed with trying to be on all platforms, pick a few that you feel are best for you and focus your energy there.

**Facebook:** With more than one billion users, Facebook is the largest and most influential social media platform. Customers look for brands on Facebook to learn about them, engage with them and follow them. It’s a great platform for storytelling, creating a brand personality, gaining consumer feedback
and building loyalty. Content on your Facebook wall remains indefinitely and is easily searchable. Having a presence on Facebook is important so that people can find you and is a great place to brag a bit about your ranch. Share photos of animals, quick anecdotes about daily ranch life (a few sentences will do!), news about upcoming events you are participating in, etc.

**Instagram:** The most popular photo sharing platform, Instagram is linked to your Facebook account but much simpler to populate. Instagram is very popular with influencers, including media, bloggers and celebrities, so it’s a great place to expand your presence online. Because the focus is on photos, it takes less effort to post a quick snapshot of something interesting – bailing hay, a cute baby calf, a great looking grilled tenderloin, etc. Follow others you admire and engage with their content to build your follower base.

**Pinterest:** This platform allows you to link to other websites and pages you like. Some of the most popular content on Pinterest is recipe-driven, so if you have recipes on your site link to them, but also go out and pin others you like to begin to build a community. Pinterest is organized by themed pin boards that can highlight the different aspects of your ranch – meat products, recipes & cooking tips, ranch photos, conservation news. Be sure to create boards about things you like with things you’ve found elsewhere on the web.

**Twitter:** If you have opinions, Twitter is the place to share them. You can follow people you admire and share news and updates about things that you where you have expertise – ranching, conservation, sustainability, cooking, etc. A word of caution, however, when using Twitter to represent your brand be careful to keep in mind that everything you say will be associated with your brand, so try to stick to relevant topics. If you have a personal account it can still be tied back to your ranch as well.

**YouTube:** YouTube is the king, but there are several video platforms (i.e. Periscope) that are getting more popular as ways to share snippets. As with photos, even if you can’t afford a professional production, you can use a smartphone to capture a nice moment on the ranch that’s worth sharing.

**DISTRIBUTION:**
Content comes first and foremost, but getting your great content into newsfeeds and in front of the people you want to reach is also crucial to success on social media.

**Be Social:** You must follow others and engage with other people and brands online to show that you are truly social, not simply trying to broadcast your own messages. Find
people, bloggers, chefs, ranchers, farmers, and others that you are interested in and follow them to see what they’re talking about. Feel free to post, comment and engage with them. If you see something on their page that you like, ask them if you can share it. You’ll make friends and broaden your circles by being authentically interested in others online.

**Sponsored Content**: What has changed in recent years, is that in order to gain fans and get your content into Facebook newsfeeds, it is now important to plan to invest in sponsored posts if there is content you really want to get in front of people – this can be anywhere from $10 to one hundred or more per post, depending on how much reach you desire. Other platforms offer sponsored options as well that are worth considering as your audience grows.

**Influencers & Bloggers**: A very effective way to grow your online reach and find new followers is by aligning with people who already have a large fan base. There are many great bloggers posting about everything from BBQ to paleo diets. Try to find a few that share your values and reach out to let them know you admire them. Most bloggers are genuinely passionate about their topic and love to hear from fans. You might be able to arrange to send them some meat in exchange for a post, or offer them a tour of your ranch if they are nearby. Many bloggers charge fees for posts and that is something you can discuss with them on an individual basis.

**FIGURE 19.2**

“Mommie Bloggers” are playing an increasing role in shaping public opinion about food. This is a 2015 bloggers’ convention in Los Angeles (Photo: Dave Carter)

**RESPONDING TO DIFFICULT QUESTIONS**:

On rare occasions, you might get a tough question posed to you on social media. While a customer email is one-to-one, a challenging post online is public so you want to be sure to respond and address that person’s question, but also think about how others might perceive the response and be sure to give enough context that more questions aren’t raised. Use this as an opportunity to educate people about what’s involved in bison ranching. Occasionally, you might have a “troll” come to one of your pages to simply cause trouble. While it’s important to hear opinions of followers, if something has a very negative tone that’s not in line with other commenters, it’s okay to delete it from your page and block a user.

Carrie Kocik is a strategic communications and social media expert specializing in meaningful storytelling and connecting food brands with influencers. carriekocik@gmail.com.
Utilizing Specialized Marketing Claims

BY DAVE CARTER

We are marketing niche product, and one that is appealing directly to customers who are seeking an alternative to the generic commodity meats prevalent in many mainstream grocery stores and restaurants.

Those customers are label readers. They want to know the story behind the products they are purchasing, and they want assurance that they are receiving full value for the price they are paying.

Increasingly, bison and other meat producers are seeking to distinguish their products in the retail marketplace through a variety of other claims. Here are some of the rules surrounding the top claims:

NO GROWTH HORMONE/NO ANTIBIOTICS
Labeling for no added growth hormones is easy for bison because it is illegal to use hormones on our animals. Any label that claims “No added hormones” must—by law—also include an asterisk, with language nearby specifying “Federal regulations prohibit the use of growth hormones in bison.”

For a non-antibiotic claim, The USDA Food Safety and Inspection Service has allowed processors to accept signed affidavits from producers that they did not use any antibiotics during the animal’s life. However, there is an indication that the FSIS may work with its sister agency, the Agricultural Marketing Service, to require audit-based verification of these claims.

ORGANIC
The use of the word organic is the most tightly regulated voluntary claim in the food
marketplace. The modern organic labeling program was first authorized under the 1990 Farm Bill, and is now governed by a series of regulations administered by the USDA’s National Organic Program.

Producers can only use the term organic—and the USDA Organic Seal—on products that have been approved by an accredited certification agency to contain at least 95 percent organic ingredients. Foods containing at least 70 percent organic ingredients can be labeled as “Made with Organic (ingredient name)” but cannot carry the USDA seal.

For bison to be marketed as organic, they must graze exclusively on certified organic pasture and eat certified organic feed. Normal vaccines are allowed, but common parasiticides are prohibited. And the animal’s mother must have been managed under organic protocols from the last third of gestation. Any meat marketed as organic must also be slaughtered and processed in certified organic facilities.

Any company using the term organic without complying with the USDA regulations can be subject to an $11,000 fine per violation. Additional information on organic certification is available at www.ams.usda.gov/nop.

GRASS-FED
The grass-fed label has become increasingly attractive to consumers in recent years. That label claim is not as tightly regulated as organic, but there are two key voluntary systems for assuring the integrity of the claim.

USDA’s Agricultural Marketing Service has developed a voluntary grass-fed label for meat sourced from animals that are fed a diet exclusively grass (annual and perennial), forbs (e.g., legumes, Brassica), browse, or cereal grain crops in the vegetative (pre-grain) state. Animals cannot be fed grain or grain byproducts and must have continuous access to pasture during the growing season. Hay, haylage, baleage, silage, crop residue without grain, and other roughage sources may also be included as acceptable feed sources. More information on the USDA grass-fed label is available at www.ams.usda.gov.
Meanwhile, the American Grass-fed Association has developed a similar set of protocols for the AGA Grass-fed label. The AGA standards require that the livestock be on pasture at all times. AGA also offers a wide selection of agencies (including extension agents) to verify compliance.

**NON-GMO**

The Non-GMO labeling issue is being driven by a variety of growing consumer concerns about the use of Genetically Modified Organisms (GMOs) in the food production system. Non-GMO is the fastest growing claim in the food business today. The rules governing the use of the term Non-GMO are evolving in the midst of a legislative and regulatory firestorm.

Most of the Non-GMO labeling today is conducted through the Non GMO Project, a nonprofit organization that was founded by several of the leading companies in the natural food sector. To carry the Non GMO Project Verified seal, products must be tested and verified to contain less than 0.9% GMO material. In 2013, the USDA and FDA agreed that livestock products could carry the Non-GMO Project seal as long as the front panel contained language stating that the products were produced from animals exclusively fed a diet complying with the Non GMO Project protocols for the avoidance of genetically engineered material.

In 2015, the USDA implemented the protocols for companies to also be able to carry a Non GMO label claim by developing an approved Process Verified Program to verify that the products contain less than 0.9% GMO material. And, NSF International, a large third-party certification agency, announced its Non GMO certification program in September 2015.

At the time of this writing, though, Congress is getting involved in developing federal legislation governing non-GMO labeling. That action has been prompted largely by various state initiatives to require labeling of products containing and made from GMOs. Legislation approved by the U.S. House of Representatives would prohibit those types of state initiatives, and would establish a USDA voluntary non-GMO labeling program similar to the National Organic Program. The Senate has not developed its version of the bill, and is not likely to approve the House-passed version.

**HUMANELY RAISED**

The USDA does not have any specific labels addressing this issue, so a variety of non-
profit organizations have stepped in to provide consumers with assurance that animals were raised in a humane manner.

Among the label claims in the marketplace today are Certified Humane, administered by Humane Farm Animal Care; American Humane Certified, administered by the American Humane Association; and Animal Welfare Approved, administered by the Animal Welfare Association.

In addition, the Global Animal Partnership is in the process of developing a three-step program for bison in which producers are rated from Step One through Step Three (most stringent). GAP began as Whole Foods’ in-house humane husbandry ranking system, but has since been spun off into an independent organization. Whole Foods, however, continues to be the largest user of GAP.

The National Bison Association—and a working group of NBA members—have been working with officials from GAP as those officials develop the standards.

Meanwhile, a working group of producers within the National Bison Association are drafting a Best Practices manual that will encompass the association’s views on the appropriate handling practices for bison.

HEART HEALTHY

The Heart Healthy claim is a trademark owned by the American Heart Association. Anyone wanting to use that claim must pay the appropriate fees to the AHA, and submit samples to demonstrate that the product meets the association’s requirements for use of the label. http://www.heart.org/HEARTORG/GettingHealthy/NutritionCenter/HeartSmartShopping/Heart-Check-Food-Certification-Program-Nutrition-Requirements_UCM_300914_Article.jsp

Today’s customers—particularly those purchasing premium products—are increasingly interested in understanding the protocols used in raising animals, and in processing
the meat that they put on their families’ table. The growth in demand for these differentiated products brings new opportunities for producers, along with a variety of new headaches.

Information is key. Developing a good working relationship with the appropriate regulatory officials will go a long way in navigating the choppy waters of the labeling environment.

Dave Carter is the executive director of the National Bison Association, and the former chair of the USDA National Organic Standards Board.
Buffalo Field Harvest

BY DAN O’BRIEN

Some buffalo producers are either adverse to the feedlot and commercial slaughter model, or simply do not have the infrastructure to gather, load, and haul their animals to market. All agree that working animals through corrals and chutes is particularly stressful on buffalo and should be avoided wherever possible.

The recent popularity of truly grass-fed buffalo meat has caused a few in the industry to think creatively about just how such a product can be brought to market. The perceived necessity to plugging buffalo into the traditional cattle model of production has been a barrier for some to enter the buffalo industry. In 2005, as a remedy for these concerns, we set about devising a way to give producers an alternative to the “traditional” way buffalo have been slaughtered.

It is a little known fact that the Federal Meat Inspection Act allows for field slaughter. The authors of the act must have understood that factory slaughter is not always the best way to perform this least attractive phase of meat production. While factory slaughter is a highly efficient means of producing large quantities of safe meat, much of the spiritual pageantry and deep respect for the animals is compromised in the process. The tradition of “making meat” that many of us grew up with on our family farms and reservations is nearly gone. Field harvest is a way to revive that tradition and afford buffalo a special level of the reverence we owe to all animals. But building a field harvest system is not easy. The business model is not fully defined and will necessarily vary from state to state – region to region.

Before anyone launches a field harvest program they should check with their local, state, or federal inspection agency for the details of what is required for a given area in terms of humane handling, waste disposal, and facility design. A Hazard Analysis and Critical Control Point (HACCP) plan must be developed and accepted by the inspection agency.
Buffalo are not amenable according to the Federal Meat Inspection Act. All that statement really means is that, because buffalo were not included on original list of animals for which the federal government will supply free inspection, an inspection fee will be charged. If you are lucky enough to live in a state that supplies state inspection for its citizens, you should be able to field harvest your animals under state inspection and have equivalent certification of the final product that will allow the meat to be sold anywhere that USDA inspected meat can be sold.

Perhaps the biggest hurdle for a small buffalo producer is the cost of the equipment. In the northern Great Plains we operate two mobile harvest trailers. One is 36 feet long and the other is 53 feet long.

These trailers consist of three compartments: a skinning floor, a cooler, and a mechanical room complete with an industrial grade generator. The skinning floor is equipped with two overhead winches for hoisting the animals for skinning and eviscerating. An overhead rail connects the skinning room with the cooler room and after the carcasses are skinned, split, trimmed, and inspected, they are rolled into the cooler to be brought down to proper temperature. Both of our trailers are pulled by over-the-road semi tractors that must be driven by drivers with Commercial Driver’s Licenses. In addition, we use a ¾ ton pickup equipped with a modified, hydraulic, hay-bale mover. This pickup is used as a shooting platform and for moving the dead buffalo from where it is killed to the harvest trailer. The total cost for a tractor, trailer, and pickup is in the $250,000 to $300,000 range so it is necessary to have a supply of buffalo that will keep them on the road.

The stunning of the buffalo is done by the pickup driver with a rifle from the driver’s side window. We load our cartridges specially, with copper bullets, to penetrate to the atlas bone at the base of the skull but to not pass through the animal. While we insist that all animals that we harvest are truly grass-fed and in pastures of quarter section or more, some pastures can be too rough or too large for efficient harvesting.

Moving around the herd is not as difficult as the myths about buffalo wildness would lead you to believe. Everyone on the crew is highly skilled, but the shooter is the most skilled. He/she must not only be an excellent shot, but must understand buffalo, be patient, and cool as ice.

Shooting buffalo for a field harvest is not a hunt! There is no chasing, no long shots, no hurrying of any kind. The shooter must be able to move around buffalo without disturbing them, choose only the perfect shots (30-40 yards) make the shot, and load the buffalo without undo disturbance of the rest of the herd. Our test have shown that, when this part of the procedure is done properly, the stress hormones measured in the blood of
the harvested animal are far below identical animals slaughtered in an industrial plant.

At the end of the day the cooler is full of hanging half carcasses. They are secured on the rail for transport back to our processing plant where the plant rail can be extended, mated with the trailer rail and the carcasses rolled into the plant. At that point the cutting, further processing, and packaging takes place like in any other plant.

The entire procedure, from grass feeding to packaged meat, takes more time and is more expensive than the industrial model. But it can be worth it. Some people will gladly pay a little more for buffalo meat that has been treated with a little higher level of care and respect.

Dan and Jill O'Brien are the founders and operators of Wild Ideas Buffalo Marketing Co. in Rapid City, SC. Dan is also a best-selling author, with books including Buffalo for the Broken Heart and Wild Ideas.
Value Added
Bison Products

THERESA, RON AND CECIL MISKIN

Most all of what was set out in the 2010 version of this chapter is still applicable to the concept of Value Added in bison products. For that reason, the original chapter is set forth as previously published below this “update”. However, in the five years since that writing, there have been three significant developments that impact the use of bison by-products for commercial (read that “value added”) products.

First, people not usually associated with the bison industry have found bison. Pet food manufacturers, exporters and foreign importers are taking the heart, tongues, livers and more into European and Asian markets that have long appreciated, and devoured, these same leftovers from other livestock; now they find bison to be an even greater delicacy.

Leather producers in Mexico, India, China and more in the US are putting bison hides into more regular production.

All this results in tighter supply.

Second, while market interest and pricing on bison for meat is still at an all time high, with no sign of backing down, the supply is tighter than at any time in 20 plus years. There is nowhere for the packers to go to gain more animals to process. As goes the meat side, so does the remainder.

This, too, means supply has tightened.

Thirdly, imitation in some areas of bison byproduct production (copycat manufacturing of existing bison products) has split the supply between two, three or even a dozen factions - all vying for the same “stuff” that used to be just left over.
Guess what this means to supply? You guessed correctly. There is less fiber, less hide, less skull and bone to go around to those of us who use and value it.

None of this is said to discourage innovation, creativity or the continuing search for more and better products; products that will increase the “added value” of each head of bison at some point. It is intended to call attention to the increased awareness of the “value” of bison and the competition for these products.

So what to do?

First, think through the concepts set forth below as to which (if any) may apply to your particular bison operation.

Second, use whatever search tools are available; the internet, Bison World magazine, NBA and state and regional meetings to talk to the people who are active in “added value” production. Do not try and re-invent an already spinning wheel. Learn and join or learn and improve, but take advantage of the mistakes and successes of others already out there.

Next, hone your particular ideas on your friends, associates and family. Make them tell you their impressions of your ideas. Good ideas can be strengthened… and not so good ones changed or discarded. No reason to waste time and resources, when lots of good information is already available.

Put together as detailed and complete a “business plan” as you possibly can. Does all of this sound very much like any other successful startup? Sure does. The only difference is that there are very few places to go to get bison parts and increasingly, those parts are already spoken for in the commercial sense.

Over the roughly 20 years we as a family have been “playing” with bison fiber, we have learned a few things that may be helpful to those of you who have enough interest to have read this far, and are specifically interested in how the bison fiber market has developed into its current state.

First: the end products can be very beautiful, very useful, very durable and very pricey. But that said, it has added a reasonable amount of money to the bottom line of each animal that gets into the process.

Second: the only really commercially usable fiber is the winter insulating undercoat, which we call bison “down”. While it is on the bison and growing in October and November, when bison are typically rounded up and worked, it is too short and
needs to continue growing until early/mid-January.

**Third:** the amount of usable fiber per animal (i.e., the “down”), averages less than a pound. However, a pound of usable down, when blended with other compatible fibers, can yield 3 to 5 pounds of yarn. At five pair of socks or four hats per pound, you can get into manufacturing if you only have access to a relatively small number of animals.

**Lastly:** live animal harvesting instead of shearing the hide after the bison is no longer using it, is possible under certain circumstances. You need to have a ranch that works the animals in late winter or early spring. You need to be able to have sufficient numbers of bison coming through to harvest a useable amount of fiber. Here, you pull or curry comb (or shear) the fiber off as you run them through the squeeze chute for de-worming or preg checking, but only after the chance of the bison needing the undercoat has pretty well passed, and only after the fiber has long ago turned loose of the hair follicle and is actually shedding.

As to the hide and leather side of bison by-products, some competitors have come and some gone. Hide prices have increased rather nicely over these 20 years, though the uses seem to vary from year to year and continue to develop. Shoes, upholstery, dog chews and treats, leather wallets and purses are just a few of the products that have adopted bison. More US production of these products has bloomed as well, in spite of strict EPA and other governmental regulation of tanneries.

**FIGURE 22.1**
Bison fiber is beautiful, useful, durable…and pricey. (NBA file photo)

**FIGURE 22.2**
Preparing hides for tanning is extremely labor-intensive. (Photo: Dave Carter)

Hair-on tanning for decorative robes, rugs, garments and shearling bison products continues to grow at a strong pace. Though do be careful to understand that once you get into January the undercoat is actually starting to shed. October, November and December hides are best for this use.)
However, the days of a glut of cheap hides are long gone…again.

Also much harder to find are large -- 10-15 year-old -- bison bull skulls for decorative, ceremonial and artistic use. Same reason: fewer “big guys” in the meat chain as more animals get processed at the 30 +/- month-old mark.

But do not be discouraged. Bison production historically has been about overcoming challenges. Hey, if it was easy, it may not have caught your interest. So build on what has already been done and look to the future with a creative eye. Become one of “us” who have helped move this true American forward. All of our best wishes in your adventure with adding value to bison by-products!

Cecil Miskin formed Buffalo Gold Premium Fibers in 2007 after already having spent close to 10 years trying to assist some of the early “modern” bison fiber enthusiasts. Cecil’s son, Ron, joined him the next year and in 2012 Ron and wife Theresa formed the Buffalo Wool Company to do both more retail show selling and bison/wool blend yarns and products. Father and son continue to innovate and expand the use of American bison fiber worldwide. The Miskins have been raising bison of their own since 1989.

FIGURE 22.3
Skulls from mature bison are hard to source, but can be transformed into valuable art items. (NBA file photos)
Agritourism in the Bison Industry: A Growing Opportunity

BY JIM MATHESON

As a bison producer, you have the ability to add value to your operation. This can be done in a multitude of ways that range from harvesting bison wool, to utilizing its offal for high quality pet food products, to selling ornately decorated bison skulls. Another great value added opportunity derived from bison is agritourism. With the animal’s storied and uniquely American history, incredible survival and restoration, and unmistakable silhouette, people around the world have a genuine curiosity of our continent’s largest land mammal, the bison. Many consider agritourism to be the fastest-growing sector of tourism in the United States today.

As such, you’ll see that today’s bison producers educate consumers about this magnificent animal in a myriad of ways, most of which constitute some form of agritourism. Feeding this curiosity can include the obvious, such as bison field tours, but can also include providing photography opportunities, hunts of trophy animals, special events approximate to bison herds, and much more. If you have the will and the means to provide this service, the demand is ever-present and can be a consistent source of revenue for your farm or ranch. It also has the added benefit of educating consumers about how and where their food comes from, and developing loyal customers in the process.

FIGURE 23.1
Agritourism is a growing opportunity for additional income for bison producers. (NBA file photo)
Agritourism is among the fastest growing trends in tourism today. So what is agritourism? At its core, agritourism is simply agriculture-based tourism. What constitutes agritourism is a little more complicated. Basically, any hands-on, value added opportunity you can offer to tourists and customers that generates income to your operation would be considered agritourism. From bird watching to farm/ranch sleeping accommodations, agritourism is very diverse. Some examples of bison-themed agritourism include:

- Overnight stays on a farm or ranch;
- Ranch tours and education activities;
- Farm and ranch dinners;
- Bison-themed festivals;
- Harvest festivals;
- Trophy hunts;
- Photography tours;
- Wildlife viewing;
- Weddings/special events;
- Farm direct sales.

So how much money is in agritourism? According to the 2012 U.S. Department of Agriculture (USDA) Ag Census, nationally 31,161 farms and ranches provided agritourism opportunities, which generated over $713 million in revenue.27 Further, you do not need a tremendous amount of land to offer agritourism opportunities. According to the the USDA's 2012 Agricultural Resource Management Survey, 20% of farms and ranches providing agritourism operated on 50 acres or less.28 The same study cites, on average, agritourism farms obtained 20 percent of their gross farm income from niche activities, including 7.1 percent from agritourism. Another recent study from Virginia Tech University found their state's agritourism industry found that 42 percent of operators surveyed stated that agritourism contributed between 76 and 100 percent of their farm income. The study also found that in 2013 almost all of the operations surveyed claimed that the average agritourism visitor spent between $31 and $40 on property per visit.29

See the growth of agritourism in the map on the following page, provided by Colorado State University.

So what is the push behind this growth in agritourism? Nostalgia is one of the key

---

drivers in the growth in farm and ranch vacations. Consider that in North America in
1900, the urban population was 40 percent and farm population was 39 percent, with
the “non-farm rural” population making up the remaining 21 percent. Jump ahead
90 years and those statistics are drastically different. In 1990, the urban population
swelled to 75% with the farm population dwindling to just two percent and the non-
farm rural population making up 23 percent.

We are now in age in which many folks still have fond memories of spending time on
the farm, and they want to share that rich experience with their families in the form
of tourism. According to Dawn Thilmany, an agricultural economist at Colorado State
University, “Public interest is just continuing to not wane on wanting to be reconnected,
so some of it is demand driven.”

Today’s tourists want heritage and history, and bison offers just that. Marketers of
niche foods often emphasize the importance of telling the story behind your product,
and bison has quite the story to tell. Brought to near extinction only 150 years ago,
from a population of over 40 million to less than 1,000, it was the efforts of forward
thinking ranchers and conservationists that began restoring this magnificent animal
to the North American landscape. Today, the bison population exceeds 400,000 and
provides consumers with a natural, humanely raised, low-fat, nutrient dense food
source that evolved with the American landscape.

Small, diversified farms and ranches are well situated to offer agritourism activities.
Unlike a feedlot, or a giant field of soybeans, the bison producer has something that
the public wants, an authentic farm and ranch experience that will educate tourists
about where their food comes from and, more so, the history of the bison.
This is also a great way to build your customer base. Marketers spend millions of dollars to get a sample of their product in the hands of potential customers. Agritourism offers this opportunity to anyone serving jerky or bison burgers on their ranch, thereby generating revenue in the process. Word of mouth is a powerful means of attracting new customers, so care should be taken to have your buffalo burgers cooked to perfection in a sanitary setting.

Many in the bison industry offer agritourism on their farms and ranches with great success. If you are considering agritourism on your bison operation, you are encouraged to visit with these progressive entrepreneurs by visiting their farm or ranch and participating as a tourist. You can find bison agritourism opportunities on the National Bison Association website’s online buyer’s guide at www.bisoncentral.com/bison-buyers-guide. You should also attend the many conferences hosted by regional bison associations, and the National Bison Association, as these conferences provide unbeatable networking opportunities where you’re bound to find a producer, or even a presenter, who offers agritourism on their bison operation.

According to the National Sustainable Agriculture Information Service, there are three things to keep in mind as you develop your agritourism plan:

• Have something for visitors to see;
• Something for them to do;
• Something for them to buy.

As to what to charge for, many farmers and ranchers charge for tours with varying rates based on age, group size, etc. Remember that you’re providing a great service to the public when you’re educating school kids about bison, for example, and that should not necessarily be given gratis, nor should the price be exorbitant. There is also money to be made by selling products to those visitors that can range from souvenirs to food. Research shows that tourists buy mainly food, beverages, and souvenirs.30

Producers also need to do their homework regarding the liability associated with offering agritourism, as farms, and particularly bison ranches, can be dangerous places. Ten years ago, producers were leery of the public spending time on their farms and ranches for this reason. However, more states are working to be more agritourism-friendly by limiting that liability. Again, Thilmany says, “You see a lot of policies coming into play where they’re going to encourage and try to make it as easy as it can be for farmers and ranchers to do this and I think that’ll be a win for everybody.”

So, is agritourism for you? Bison producers should think long and hard to determine whether agritourism is right for you. Yes, there is money to be made, but do you enjoy having complete strangers poking around your farm or ranch? Do you enjoy meeting folks from all sorts of backgrounds? If you answered “no” to either of these questions, then agritourism may not be for you. With agritourism, you, or a member of your family or staff, have to be the gracious host at all times. That is not to say that visiting customers will have reign on your property. Rules need to be established, hours set and posted visibly for your customers to see, but you will have to tolerate the masses.

This section on agritourism just scratches the surface of this value added opportunity. Most state departments of agriculture today have a dedicated staff person, and in some cases entire departments, focused on agritourism that offer a variety of resources to assist farmers and ranchers in this growing sector, including workshops and field days on the subject. There are also associations in various states that focus entirely on agritourism that a quick internet search could yield.

Jim Matheson is Assistant Director of the National Bison Association.

---

Gate to Plate Bison Operation

BY STACY TAMERIUS, JANE AND RANDY MILLER

I have been in the bison business since 1995 when I bought my first heifer calves from Custer State Park. Like many bison owners, my operation began as a hobby, raising the herd at my Adams, Nebraska ranch. I began having the bison meat packaged for family and friends and eventually began selling the meat to a local gourmet grocer and high-end chefs.

In 2011, we saw that the demand for bison meat was only continuing to grow, leading us to launch a brand and strategy for our business: NebraskaBison.com, a way we could bring our bison meat directly to the consumer – full gate to plate, farm to fork.

CARE OF THE ANIMALS

With our niche market of bison, consumers are looking for a higher quality meat, raised to higher standards. There are some things that all of us, as members of the National Bison Association, are required to adhere to such as no use of antibiotics or growth hormones. But more and more, we’ve found that consumers are looking for certain claims on a growing number of the products they buy: such as “organic” and “no GMOs”. As producers of a niche product, we feel it is important that we take these considerations into account when determining how to raise our animals to provide the consumer with what they are looking for.

In our own operation, we work to make sure the herd has strong grass, plenty of room, and plenty of fresh water, fostering healthy, happy animals. We work to manage the land to make sure we make the best use of it. We work hard to create a sustainable environment with strong soil and grasses that will allow us to eventually move away from the use of sprays and chemicals in our fields.

We provide our bison herd open spaces where they can roam freely – 26 of our pastures have access to fresh water, and we create a rotation schedule that best utilizes the land, soil and grass for our animals and our sustainability.
SELLING TO CONSUMERS
Of course, in a gate to plate operation, caring for the animals and maintaining the herd is only one side of the business. This venture into a full-fledged e-commerce business brought about several issues and problems to solve including: supply and demand, fulfillment, marketing and sales avenues.

Supply and Demand
We knew right off the bat that in order to best manage supply and demand and maintain the availability of product for our customers, we would have to have ownership of the bison. This led to the purchase of a second ranch near Springfield, Missouri, allowing us to greatly expand our herd.

In managing supply and demand, we have learned a number of lessons.

1. Pricing should reflect the value of the item to the consumer and our business – what someone is willing to pay for the product to best balance it with the rest of our products. This is the best way for us to manage an inventory system where product is produced ahead of time in order to prevent overstocking on one item.

2. The creation of value-added products helps us to move product that sells slower or is more plentiful. The creation of our hot dog and summer sausage products are a few examples of this. By creating a higher quality and unique item, we are more quickly able to move through trim.

3. Managing and predicting inventory is tough. The best way we’ve been able to help offset the unpredictability of e-commerce demand is through pricing strategy.

Fulfillment
Fulfillment is a massive undertaking for an e-commerce business. The first decision we made was to limit ourselves to shipping only within the United States, which, although there is demand outside of the country, immediately allows us to manage our focus and keep the process as simple as possible.

The second decision we made was to find a fulfillment center to team with. Although working with a fulfillment center comes with challenges (i.e. they’re not your employees, there will always be other, larger accounts and they don’t have to pour their heart and soul into your product like you do), the benefits certainly outweigh them:

1. Working with a large and established fulfillment center means we don’t have to worry about the best way to pack our orders for shipping. They’ve already figured that out and apply their knowledge directly to our orders.

2. We don’t have to keep an inventory of shipping materials, which can take up a lot of space and capital.

3. We are able to devote our time to the things we do best: raising bison and selling the product, rather than taking up our own time packing the orders and getting them out.

4. We can gain lower shipping rates by working with a center that ships truckloads out every day. High shipping rates seem to be one of the biggest deterrents to our online customers in a world where free shipping is becoming more and more
commonplace. Doing everything we can to keep our shipping costs low helps us to pass those savings on to our customers.

**Marketing**

We’ve found that the marketing of our product can easily be a full time position. Not only do we need a way to help our customers find us, we need to convince them why they should buy from us once they do. With a niche market like bison, that’s often a two-pronged approach:

1. Selling bison as a better protein choice and
2. Selling NebraskaBison.com as a reputable, high quality, trustworthy source.

To help our customers find us (and to remind them about us), we’ve utilized a variety of resources with some success: Google AdWords, catalog mailings, email marketing, Facebook advertising and trade shows are some common examples.

Although e-commerce business booms across seemingly all avenues, when it comes to a niche food market, it has been important to us to create a brand of honesty and transparency, doing everything we can to make our customers feel like they know us. In this way, we can partially make up for the lack of face-to-face communication that we feel is so important in the purchasing process.

We work to achieve this through social media, blogging and video marketing, as well as being available to our customers by phone call. However, because we are online, we only have three means to convey the goodness of the product since our customer is not able to pick it up and hold it in person: images, copy and video. To utilize these to the best of our ability, we contract a photographer to do all of our product photography to make the food look appealing and to keep the style consistent throughout our marketing efforts. We utilize photo and video to not only show what the product looks like, but to also show what you can create with the product.

**Sales Avenues**

We’ve experimented with other sales channels over the past several years since launching
the NebraskaBison.com brand as well. Some we keep in the mix, while others we find just shift our focus away from where we want to be.

We have a handful of trusted retail partners who we offer wholesale selling of selected case ready product, which helps extend our reach in the local community.

We utilize two farmers’ markets in the summer season – one in Nebraska and one in Missouri near the location of each of our ranches. This outlet allows us to let the local area know about our operation and our business and meet and talk with us face to face on a weekly basis. Selling bison meat at farmers’ markets can even be looked at as another branch of our e-commerce marketing strategy.

For the most part, when considering a new sales channel or opportunity, the questions we consider are:

- Will this be a long-term, mutually beneficial relationship?
- Will this pull our focus from what we are trying to accomplish?
- Will this help to spread the reach of the NebraskaBison.com brand?

It is easy to fall into the trap of trying to please every request that comes through your door, but it’s important to keep your focus on the brand and foundation you are trying to build.

**FIGURE 24.2**
Randy and Jane Miller at their Missouri farm. (Photo: Dave Carter)

**SUCCESS**
NebraskaBison.com was launched in 2011, and in the years since we have learned a lot of lessons: we’ve re-done most of what we’ve created at least once to better adapt our focus or make use of our resources. We’re optimistic that we’ve seen growth in our industry, our customers, and our sales each year that we’ve been at it, and we look forward to continue playing a part in the growth of bison in America.

Jane and Randy Miller are owners of NebraskaBison.com
Cow-Calf Bison Production

BY LANCE KUCK

The cow-calf producer is the backbone of the bison industry. The ability to produce calves of good quality in an economical manner is what keeps everyone in the bison business profitable. Today, more than ever, we have available to us high quality seed stock and resources that allow us to utilize this quality. For the sake of clarity, this chapter will focus simply on that aspect of our business.

GETTING STARTED

The general consensus has always been that the new producer should start with calves and grow them into a cow herd. If you have the patience to wait 3 years to start producing calves, this is a fine option. You must also be willing to forego income for quite sometime while your calves grow to become cows.

The upside is that these animals are generally easier to keep in and they will have a defined pecking order by the time they start breeding. Another option is to buy yearlings and breed them the following summer. This direction will get you animals that are one year closer to producing a calf but are still relatively manageable. It is also much easier to determine if a heifer is going to fit your criteria as a breeding animal as a yearling versus a calf.

For immediate results a producer can buy bred 2-year old heifers or cows. The benefits include calves in a relatively short time and with the animals having grown to the size...
they will ultimately be, this allows you the ability to choose what you want in a cow. However, acclimating mature animals to new surroundings and different herd mates can be a big problem, and getting animals to breed back in a new setting is sometimes a big issue.

Regardless of what direction is chosen always try to buy from producers in your general region with similar forages and climates. This doesn’t have to be someone next door or even the same state but animals raised in Missouri may not like Alberta too well.

When starting with calves it is important to buy from reputable ranches with established cow herds. This will give the producer at least some idea of what the calves might grow to look like as there are no guarantees of what kind of cow the calf may end up being. Because of this uncertainty, you need to determine how many cows you will be able to carry as adults and buy at least double that many calves. This number is by no means any kind of hard and fast rule but something I have found helpful through the years when buying large lots of heifer calves.

If starting costs are an issue then you wouldn’t need to over compensate this much, but the flip side is that there will be plenty of cull animals to finish or sell as feeder animals. Every pound that is put on an animal is translated into revenue and selling yearlings can really help with cash flow in the early years. Also note that you can carry between 2 and 3 times the number of calves as cow-calf pairs. So if you have the space, use it. Yearlings are a great way to start but this direction can have some pitfalls as well. These animals are less than a year from breeding so size and condition is very important to ensure they will become bred.

A heifer that is too small may not be sexually mature enough to breed as a 2 year old or may get bred late which will just adds to the time required to becoming a mature, producing cow. A heifer that is too big may not be able to maintain that size or condition as a 2 and fail to get bred. A large heifer may also get bred as a yearling and

![FIGURE 25.2](image)
some people have claimed to have had success at breeding yearlings. We’ve had an occasional animal breed a yearling without supplemental feed and generally they do fine. However, I had a group of nice heifer calves that got fed a lot of corn when corn was cheap and they grew to be very large yearlings. A large number of these heifers got bred as yearlings and had decent calves as 2 year olds. The problem was that they never fully grew to normal cow weights after calving and I had very few get bred back.

My yearling breeding program was a costly train wreck so I would not recommend trying this. A good replacement yearling heifer for me is an animal that has had little or no supplemental feed, and weighed 700-800 lbs. in the winter before breeding. Also note that bison are starting to develop their personalities as yearlings, so try to purchase animals that you can manage. A group of animals from a large ranch that haven’t been handled much may not fit in on a small hobby farm and conversely, animals with a lot of human interaction can become “pets” and not do well at all in large herds.

I’ve brought in a lot of 2 year old bred heifers with generally good luck. Starting with this type of animal can work well and you will have a calf the following spring. Also, these heifers are generally at or very close to the size and frame they will have as an adult animal giving a producer the opportunity to decide on what they want their cow herd to look like. As these animals are bred, it is a good idea to at least try and determine what type of bull or bulls they have been bred to.

A producer that puts a lot of time and money into their bulls will produce better calves than someone who just uses whatever bull they can get cheap. This class of animal has had almost 3 years worth of time input along with bull costs and everything else that goes with raising them. As a result, a 2 year old bred heifer is the most expensive animal to purchase with the exception of good quality breeding bulls.

Another issue that needs to be considered is that these heifers can be difficult to breed back after the first calf. It is not uncommon to hear of 50% or less getting bred. Don’t be alarmed, just be prepared to have some fall off the following year and don’t go crazy culling a bunch of good animals just because they skipped a year.

Starting with bred cows can be a real crapshoot. If this is a direction a producer wants to take then the best route is to try and bring in animals from one herd. The social structure of mature cows is very well defined and anything that upsets the pecking order can be a real disaster. Cows don’t breed when they spend all of their time fighting with and bullying other cows. I’ve seen situations when an older, mature cow doesn’t like a younger bull, thus completely screwing up the breeding process.

Personality issues sometimes aren’t limited to other bison. Cows can be just mean in
general and hard to keep in if you don’t have good fences, so be careful to not inherit someone else’s problems. This doesn’t mean you can’t make this work. If a producer is willing except these problems as well as the issues you never see coming, good quality bred cows can generally be bought at reasonable prices. My rule has been to determine what the calf will bring the next year, figure weigh up price for the cow, and take pasture costs and freight into account to determine a purchase price. This methodology should cover everything and assumes the worst case scenario of weaning the calf and selling the cow for meat.

THE COW CALF PROCESS
Now we have good quality animals and are a full-fledged bison ranch. Like anything in life, you can make raising bison as easy of difficult as you want. The simplest management strategy, and one I try to adhere to, is to work your animals once a year and sell all the calves with the exception of what you want as replacements.

In the central part of the country where I’m located (Nebraska), finding a buyer for private treaty sales is not difficult. There is also the option of live animal auctions of which there are many sales throughout the country. As far as replacement calves, I assume I will have roughly 10%, +/- fallout from aged cows so I base replacements on 10% the total number cows I have at the time. My number of calves is based on 10% but I will keep somewhere around 1.2 to 1.5 calves per cull cow knowing that there will be calves that don’t turn out to be breeding animals.

These numbers are for heifer replacements only and can vary significantly with range conditions, and the age structure of the cowherd. If space is an issue it may be a better option to buy older animals to expedite the process but keeping heifer calves is far and away the best option for long term productivity. These animals have already been accepted into the social structure of the herd so they will not experience any of the issues associated with the process.

WEANING
I wean my calves when I can get help lined up. This is usually over Christmas break when kids aren’t in school. Most producers in my area wean calves anywhere from October until February depending on management goals. When I had more pasture space than animals I would occasionally leave a fair number of calves on the cows and let them wean on their own.

This usually worked pretty well, but it was easier to put weight on in a background lot when corn was cheap. Also, we grew straight grass fed calves for a while and we would wean these on good alfalfa hay and pellets. This produced very nice calves as well. It is important to figure out a plan for your calves before you wean the calves as
having them sit for too long is not good, but I don’t like selling them right off the cow either. Schedule accordingly.

**Bulls**
A good bull is by far the best money spent when looking at the productivity of a cow herd. We will keep back a really good bull calf sometimes to see how it turns out but generally, betting on a calf to become a good breeding bull is a crapshoot. I used to always buy a bull calf or 2 at a show and sale with the hope of a great animal turning out but they were usually good animals, not great. With the different show and sales, as well as the producers that specialize in breeding bull production, it is a far safer bet to buy a tested, yearling or two year old bull.

The quality of bulls available now compared to the past is phenomenal. Even bulls that may appear to be on the lower end of the animals produced from a reputable herd can be outstanding breeding bulls. It is hard sometimes to spend the money necessary on the front end for a great bull but it will pay off tremendously in the long run. With the high salvage value of bulls from selling as butcher animals or as hunts, paying for a good young bull doesn’t sting too much anymore.

**Culling**
Knowing which animals to cull can be a tricky issue. Obviously available forage and space is a very big factor on deciding which animals to keep. Drought can be disastrous and hard choices have to be made to maintain financial viability. During our last drought I did everything I could to maintain my established herd.

We didn’t keep replacements and I culled the oldest animals first. While the older animals are usually well acclimated and solid producers, they will be the first skip a calf. Also, it goes without saying that any death loss you may experience is probably going to come from the oldest animals. Our normal routine is to cull a cow after it is pregnancy checked open twice or she doesn’t bring in a calf twice.

We end up investing a lot of money and time to get our cows to consistently produce a calf so some level of tolerance is necessary. Calves can be lost for a lot of reasons or pregnancy can run into issues beyond the cows control. Once again it is up to each producer to formulate what works for them. I have kept cows way too long and there were plenty that went down the road that were a huge mistake. Don’t fall in love with your pets if you can help it but at the same time, the old cow that skips a year or two but leads the herd everywhere you want her to has value as well.

Culling bulls can be tricky. We all love having around that giant, 10 year old bull as a showpiece but if he isn’t breeding or he’s getting out all the time get rid of him.
your ranch is more tourist oriented I can understand keeping a big one around but in my experience they just eat a lot and make my neighbors mad. I have a friend with a large ranch that cycles all bulls out at 8 years old. I try to keep my bulls on the younger side and we will see 7 or 8 year old bulls getting pushed out so we sell or hunt them. Cull bull prices are terrific right now so don’t keep a headache that is also a money pit.

SUMMARY
The views expressed here are just my opinions after raising bison for 20 years. Bison producers aren’t afforded the same opportunities as other livestock producers when it comes to research and support. However, there are plenty of producers willing to help and I learn something new all the time. We do things on my ranch that have resulted in huge train wrecks for others while working extremely well for us. A new producer needs to be prepared for a learning curve but that curve can be minimized by talking to other producers and attending the conferences that the different producer organizations offer. There has never been a better time to be a bison rancher than now.

Lance and Tahma Kuck own and operate Laughing Water Ranch near Basset, NE
Case Studies
I am first and foremost a successful product of the National Bison Association. Without the NBA and several of the regional associations, there is no doubt I would not be raising bison.

I didn’t grow up around livestock or agriculture, nor did I have any family that did. I didn’t inherit any animals or land. I didn’t go to an agricultural school and didn’t have any specific education or training to help me. Really, I had no advantage over anyone else, nor any particular reason why I should be successful. But what I did find within the NBA was an outstanding group of people who were willing to share and help new folks like me get started. My journey into raising bison has been an amazing adventure that still continues today and has taken my family through three different states.

I grew up a city boy more or less in southern California and later, the suburbs of St. Louis, MO, where I attended junior high and high school. I always liked outdoor activities and nature, but I really had a passion for cars. I wanted to be in the car...
business so after graduating from high school, I headed to the University of Southern California to major in mechanical engineering. After about two years of that, it was looking like a guy with a mechanical engineering degree would end up in a cubicle designing some boring suspension nut or dashboard retainer.

That wasn't going to work for me. As a result, I took a semester off and worked a job at a car dealership in Denver where my folks now lived. I got a little taste of the real world, but decided to change my major to business administration once I went back to USC. That change turned me into a new student and I was on track to graduate and maybe one day, I hoped, own a car dealership. Once I graduated from USC, I moved to Denver and started working at car dealerships in various roles to learn the business. After about eight years, the events of 2001, the recession and the auto makers’ financial troubles, being in the car business did not look so rosy anymore. I started to wonder, “What would I do if I changed careers?”

One habit I picked up while in college was reading the newspaper every day. This was in the second half of the 90’s and the internet was still a baby, while newspapers were still good. I read it just to know what was going on, and continued this habit after college. One day in 2008, I saw an article in The Denver Post about raising bison and it referred to the National Bison Association wanting to get more producers in the business. At the time, buffalo were best known to me as the mascot of the University of Colorado at Boulder. My wife and I were “living the dream” in the suburbs of Denver on our massive one tenth of an acre plot in a cookie cutter neighborhood. We both were working full time and making it work. However, that article sparked something in me and I started to see the possibilities of making a career transition to raising bison.

I went to the NBA website and started clicking and reading. I was reading everything I could. Then I started making cold calls. To my delight, these people who I was calling totally blind were happy to talk to me. This was a surprise to me since the car business, in my experience, was very cut-throat and somewhat resistant to questions. Normally, you wouldn't see another employee sharing customers or teaching someone else what they know. On the other hand, the bison people were happy to be asked questions and talk about what they were doing. Some invited me, a complete stranger, out to their operations and homes and gave me tours and showed me around. Then they fed me lunch! I never felt so welcome in my life. The passion they had for not only the animals, but what they were doing could not be contained and it started to rub off on me. In that first year of researching and learning what I could, my wife and I visited ranches in eastern Colorado, western Kansas, southern Wyoming and southwest South Dakota. It wasn't easy to do with work and a baby, but we found a way and the hosts were fantastic.
As I was learning about bison and the bison business, I was starting to realize that this could be a desirable new career direction for me. It would offer me a chance to use my business education; marketing, strategy, analytics, do something I was really excited about and not confine me to an office or even the same location every day. I liked the idea of being outside working part of the time with a good balance of using my hands and head. One of the ranchers I had gotten to know suggested at one point that I get a job on a bison ranch to get some experience and education. The reasoning being that it would be less expensive than going all out on my own and making mistakes. Taking his suggestion to heart, I looked for and got a job on a large ranch in Nebraska.

It was a big step for my wife and me to go from the city to the great unknown, literally in the middle of nowhere and in a new state. Now instead of being surrounded by people, we were in Cherry County, NE where the ratio of cattle to people was thousands to one. We figured it was a manageable level of risk though and went for it. What was the worst that could happen? If it didn't work and we hated it, we could go back to Denver and get jobs again.

So there we were, not just in the middle of nowhere, but past that. The ranch was over 100,000 acres, had probably 5,000 bison and seven employees. If you added spouses and children, there were about a dozen people on the ranch. But I was learning. I learned a lot about building fences, the animals, the pastures, the water requirements and especially handling the animals.

It wasn't all positive, there were some things I learned not to do and some things that I thought shouldn't be done at all. Living that remotely was both awesome and hard at the same time. I was seeing many new things I had never seen before and getting a lot of experience handling the animals and learning their behaviors and tendencies. However, it was far enough out there that if we got home from the grocery store and realized we forgot something, it could be pretty discouraging.

It was pretty exciting to see a few thousand bison at a time. How many people ever get to see that? For the most part, we let the bison be bison. We moved them from pasture to pasture, vaccinated and dewormed them once a year and checked the cows for pregnancy status. Other than that, they were on their own. We did do a little supplemental feeding in the winter, but as I remember, that was mostly for the weaned calves and not the cows.

What I really wanted to know at that point was, ‘Is letting bison be bison the best way to run a business?’ I slowly discovered that wasn’t really something I needed to know, meaning it wasn’t part of my job description. I didn’t anticipate the corporate culture that was present on a ranch of 12 people, but it was there and there was a definite
hierarchy. All I wanted to do was learn the most I could both on and off the ranch, but I found it to be more difficult than I expected being the new guy. It was just not on their list of priorities to let the new guy (without seniority or accrued vacation time) attend NBA events. Regardless of that, I took the initiative on my own and attended a Bison Advantage workshop in Rapid City in the fall of 2010. It included a great lineup of speakers and it was there that I was able to connect with Ray and Debbie Thieman again.

Ray was one of the people who had given me a tour of his operation in eastern CO when I was first thinking about bison. We had a chance to update each other on what we were doing while at the Bison Advantage workshop that fall. A few weeks after that, I received an e-mail from another bison producer telling me that Ray wanted to reach me. It turns out he had found out about an available lease in southern CO. He thought it was too far for him to look after and it needed someone there and thought of me. We set up another meeting and discussed the opportunity and how it might take shape and both came away optimistic. Ray still had to get the lease though as the property owner was considering a few offers.

The way Ray and I had imagined this would work is that I would be able to have my own bison among the herd and therefore, have a real vested interest in the success of the whole outfit. This suited me just fine and I was excited. Best of all, I was going to have a partner who knew the ins and outs of the bison business and network. Ray would have the majority of the animals as it was his lease and he had more animals anyway, I was just getting started. In February of 2011, the move to southern CO with my wife and two boys to manage this newly leased land became a reality.

Once I was down there and somewhat settled in, I began to work on fences and infrastructure prior to animals getting there. We needed to have a certain level of confidence that we could contain the animals and hold them. There were some working facilities already there that I would describe as barely adequate for cattle, but we thought that could wait. I also had to work on buying animals and getting financing. We managed to source 225 heifers that spring that were becoming two year olds. This would work because we could breed them right away and sell the open females to generate some cash flow towards the end of the year.

I went to the Farm Service Agency for my financing. This is a lending program through the USDA and of course, a government operation. I encountered a little resistance there initially as the loan operator didn’t think they would do a loan for bison. They actually would, but they weren’t quite as comfortable because the price reports are not as easy to come by. They also didn’t have the past experience they did with cattle loans. Another obstacle, although slight, was this was a beginning farmer loan and the idea
was that this program would help people get loans who wouldn’t otherwise qualify. This had to be verified by going to a conventional lender and getting turned down.

The trick here is that you have to get denied for the loan project, not necessarily as a person unworthy of lending. Basically, you go into your traditional lender and tell them you want to borrow to purchase some animals. They’ll ask how much, how long, how much are you putting down? My response was, “I want to finance 100% of the animal purchase,” and the ensuing response is typically being shown the door. Please understand the FSA isn’t exactly a walk in the park.

The amount of forms to fill out is tremendous and the file they keep on you is inches thick, but it’s worth it. I believe our first loan was at 2.25% and we later refinanced it under two percent. It was a lot of work to do the refinance, but just the change in rate was going to save us several thousand dollars per year, and was definitely worth the time it took.

Things on this property didn’t look great for very long. We had a decent business plan and Ray and I really believed that we could make it work, but things started to fall apart pretty fast due to circumstances outside our control. The first major problem was the ranch depended heavily on flood irrigation from mountain snow melt. Much of that heavy wet snow typically falls in the spring, which was after the contract was signed for that calendar year. In 2011, very little snow fell and resulted in no irrigating water that year. None, not a drop and this being a high altitude desert, not much rain to speak of either. I believe it was a seven to eight inch average rainfall area, but I know it was much less than that while I was there. Needless to say, it was pretty hard to grow grass without water and Ray and I were thinking about moving animals out almost as fast as they got there.

The second big challenge was the fact that the property sold within six months of us starting the lease there. One of the terms of the lease was that if the property sold, the new owner could terminate the contract and that’s exactly what they did.

At first, we thought this might be a blessing as we were told the new owners just weren’t comfortable with the ten year term of the contract, but they wanted to work with us and renegotiate. So in short order, there was no water, no contract, barely any grass and not too many animals. We started paying by the head per month, as given the circumstances, that seemed fair to both parties and some negotiations took place on a new contract. The property was part of a good sized potato farm though, and it was pretty apparent that’s where most of the money was moving around and the grass portions of the property were not first priority. So to say negotiations moved at a snail’s pace would be an understatement.
After the first full year and just barely hanging on, Ray and I decided we needed to rework our arrangements. He still kept some animals down there, but for the most part, only my animals remained. This seemed to work better until the contract was ironed out and there was water to speak of. It certainly wasn’t what either Ray or I had envisioned or hoped for, but it wasn’t the end of the world either.

I was watching the snowpack levels pretty closely going into the second winter and to be honest, that didn’t help it snow. Even in February, there was still ample time that it could go either way and turn into a wet or dry spring. It turned out to be another dry one, although not quite as bad. After begging and pleading with the water districts reminding them that the property had water rights, we finally got some water that spring. It wasn’t enough to cover everything and it certainly wasn’t for long enough, but it helped.

In the spring, I heard that the potato farm, which was the upper level company for the property, had brought in a new manager. Little did I know what an impact that one person was about to have on my business and family. Our meeting in early July of that year didn’t go as you would expect a first meeting to go. The first thing out of his mouth after introducing himself was, “You and your animals need to vacate the property immediately.” And by immediately, he meant, more or less, two weeks. Anyone who has been around bison at all knows that bringing bison into the pens and trucking them with little bitty calves is pretty much the last thing any sane person would do. It was impossible for me to move in two weeks. I had a wife, two kids, a household, about 140 bison cows, most with calves and about 90 beef cows, again most with calves.

This new situation caused a lot of stress in the house and raised many questions and uncertainty. Where would we go? Where would the animals go? I waited for the manager to contact me again and he did so by having an eviction notice placed on our door. I ended up hiring an attorney, who helped calm some of the waters for the time being while I came up with a new plan.

This is in the middle of 2012 mind you, one of the worst years most of us can remember in terms of drought. The chances of me finding a place to move these cattle and bison to in that summer were about zero. Maybe not even that good. In fact, I knew of other bison producers that were destocking their own places and were heartbroken about it. My wife and I contacted everyone we knew looking for options. We even offered a reward for the person that got us in touch with someone who we could make a deal with. It helped, but there weren’t many leads as everyone and their brother was looking for pasture that year.

Having bison, in this case, didn’t help. Seasoned bison producers will tell you that people
that don’t have or know bison are, shall we say, afraid of them. There are perceptions that bison destroy fences, corrals, water tanks, ponds, equipment, people, you name it. That isn’t the reality, but the perception is there. So even if I did run into someone with some grass, the conversation didn’t go much further once I mentioned I was looking for a home for bison.

I tried here and there, but sometimes you can’t convince them. One day that fall, I was visiting another bison producer, Ken Klemm. After a good visit, I’m driving home with nothing but time and pavement in front of me, and it occurs to me that I have to sell the bison. I thought about it for a good half hour and then just had to call Ken back and said “Ken, I’m driving along daydreaming and realized that even if I find some grass, the odds the lessor will want or be okay with buffalo seems pretty remote. I think I need to sell my bison first and see if I can’t find a home for the cattle.” He basically agreed and said he had come to the same conclusion. It wasn’t good, but it was what I had to do.

The next morning I told my wife in a matter of fact way that I needed to sell the bison. She was surprised because bison was what I wanted to do. Was it really time to give up on it? It took relatively little convincing and she said okay. Again, I turned to the NBA and its members trying to figure out if anyone was buying, who was buying, where were they, and how good of a buyer were they. I also posted an ad on the NBA classifieds. It turns out there was a good buyer that some other producers had sold animals to. I can’t stress enough the importance of the NBA network because they were able to tell me “yes his money is good” and they were able to tell him “yes, the animals are good quality and in good shape.”

The buyer was pretty far away so we made a deal sight unseen based in part, I’m sure, on the testimony of other producers. I told the buyer and gave him my word that I would sell him everything except those that I didn’t think were a good animal for him. That November, five trucks came one morning and I loaded them all up, except for a handful I kept behind. Just like that, I was nearly out of the bison business. I had five animals left and they were all going to the processor in a matter of time. I held on to the cattle and by then, the lawyers had worked out a deal where I could stay until the end of January. However, I knew after the first of the year, the cattle had to go too.

While in southern Colorado, I had gone from herd building to almost overnight, herd dismantling. This is significant because you do different things based on your goals and time period available to work with. All this time, I’m trying desperately to find a place to keep my animals. I did have one option nearby in southern Colorado but it wasn’t complete. No working facilities at all and the price wasn’t right.
Then, one person that had received my reward posting was able to get me in touch with a land owner/rancher in southeastern Kansas. He was primarily a custom grazer, experiencing a bad drought and had discharged his manager. Less rain means less grass, which means less livestock, which means less revenue, which means less money to pay employees. But he was interested in getting back to animal ownership and perhaps bison. He had land available and I had bison experience, it was a good start.

My wife and I went out to visit him in December of 2012 and our bison were already gone. He kind of took that to mean the timing may not be right, but I explained how I had to do it. We had a good visit and connected on many levels. To me, the ranch looked like a feast of grass while he was discouraged about only getting 24” of rain. Compared to 4.90” at home in CO, that seemed like enough to me. But when you’re used to getting 37” annually and get 24” instead, that is quite a reduction.

I told him about bison and how I felt most of the perceptions weren’t true and that the animals were good to work with, the meat was good, the market was good, and the people were even better. I really stressed the networking and marketing. You have to know other producers, and you can’t just haul animals to the sale barn any week of the year.

We had several conversations after the visit and determined another visit was necessary to present him with a business plan as he was still not convinced. By the end of January, most of my beef cows were down the road. I kept just 20 cows and 20 calves knowing that my brother had a little bit of grass I could put them on if nothing else came up. We had another good visit and after seeing the business plan for the bison and cattle, he wanted in.

All of a sudden, I’m back to looking for animals and moving yet again, the third move in less than 4 years. It was a good opportunity and I was relieved to have another shot at it. I had about two months to get the house in order and packed as well as find animals to start rebuilding a herd. I got some cattle bought and sent them out there prior to my arrival knowing that he could take care of them. With the bison however, I didn’t want to be a desperate buyer and wanted to shop around. I ended up going to the Peak to Peak sale in Denver in March and got one bull, two yearling heifers and two heifer calves. I was back baby. Ray Thieman was able to host them for me at his place until I could pick them up. Then, I found about 20 yearling heifers and 20 bred heifers in South Dakota. The timing of that worked out pretty well and my family and I arrived in KS on April 2nd and the bison arrived the next day. A couple of weeks later, I found a couple more bulls and picked up the five head at Ray’s and there we were with almost fifty head. Later that May, we added another 100 heifer calves from Wyoming and we were in the bison business once again. We also added some more yearling heifers that fall.
My new partner and I set up a new company called High Point Prairie, LLC with ownership split 60%/40%. We have a pretty good operating agreement that might be more than we need, but it gives us both some security. Also, this way, there is no individual ownership of animals. This is the best situation in case one dies or doesn’t breed since you don’t want one person’s animals performing differently than the other person’s.

Whenever I went to meetings or seminars people always said to start with young animals and I think this is good advice. The young animals handle the transition to a new property easier than older animals. Southeast Kansas is a lot different than Wyoming or South Dakota. They need that time to acclimate and grow in their new environment before they start producing. In fact, nearly all of the bred heifers did not rebreed the first summer and I believe that’s in large part due to the adaptation. The flip side is that young animals present a totally different cash flow picture. That’s why we bought bred cattle as well; as they generate a saleable product in the first year.

There are lots of ways to finance the growth of your bison enterprise, but I would start with young bison again. We are now in our third summer in Kansas and most of those calves we bought our first year are having their first calves so we finally have a significant calf crop. I’m hoping that we can keep many of those heifer calves and grow them into cows. However, it’s a matter of growth strategy. The faster we want to grow, the longer we must wait until the herd distributes proceeds to the owners. The sooner we want distributions, the slower it must grow. The most important things are to have a good business plan, take care of your animals and take care of your prairies if that’s where your animals are. Also know that your business plan won’t happen exactly like you plan it, you’ll need to make adjustments along the way so contingencies and flexibility are important.
As you can tell, my journey hasn't been void of challenges and usually no journey is, but I love what I do. I choose to keep learning and adapting to whatever is thrown at me. All the experiences and places along the way have grown me, taught me and brought me to the place where I am today. We have been in KS now longer than either of the last two places and that is encouraging and promising. My journey raising bison continues and now we really are “living the dream!” For those of you who are considering this industry for the first time, I say, “Join us!” If I can do it, you certainly can too. Do your homework. Use the resources available. Find the right location and property. Don’t give up. Keep pursuing and fighting for your dream. It’s possible. For all those who have helped me along the way, I am grateful and I thank you. My family thanks you. We wouldn’t be where we are without you.

David Easton is the founder and proprietor of High Point Prairie, LLC near Beaumont, KS. He can be reached at dceaston@hotmail.com.

FIGURE 26.3
Our herd provides real energy. (Photo: David Easton)
A New York State of Mind

BY BRIAN GRUBB AND SUSAN GOLEMBESKI

The title of the article read "For Rent: Cheap Grazing Land." The subtitle of the article published in the Cornell University Small Farm Quarterly, read "With over 3 million idle acres in New York, maybe there’s some out there for you." Actually, the word cheap is not entirely accurate. In many cases it’s rent free. Landowners want farmers and ranchers to utilize their property so they pay less in property tax, through agricultural exemptions. Well, we found our little slice of heaven in upstate New York. That article proclaiming the opportunities in New York was four years too late for us, but it confirmed what we already knew.

New York is not exactly known for its bison production. Many people say to me skeptically; “Bison in New York?” If you look at the maps that show the historical extent of bison range, you will see that the buffalo roamed as far east as the Adirondack and Catskill mountains. Our ranch is near that eastern boundary of their historic habitat, sandwiched between the Adirondacks and Catskills.

The Empire State is known better for dairy farms and New York Cheddar. An educated guess tells me that there are probably less than 2,000 head of bison in the entire state.

Small dairy farms have been struggling and going out of business for the past 40 years. The land is not attractive to large farming operations because of the terrain and small fields. No one seems to know what to do with the land to make a profit. Well, we had an idea.

In 2009 I was living in Buffalo, Wyoming and had spent the past 26 years living, working, climbing, and skiing in Colorado and Wyoming. If someone had told me then that by the fall of 2011 I would be remarried and raising bison in upstate New York, I would have either laughed uncontrollably or looked at them like they just stepped off a flying saucer. Well, here it is 2015 and we are almost four full years into our startup.

That article about cheap grazing land came out in July, 2015. We had no knowledge of this information when we started. We stumbled upon this fact by accident. Our story begins in Chicago. In August, 2011, my wife, Susie, was attending a conference in Chicago, so I tagged along. One evening we went to dinner at Harry Caray’s restaurant downtown. Susie ordered the bison filet, black and blue. When she bit into the steak, a look of total satisfaction bordering on bliss came over her face. The kind of look you like to see on your wife’s face, but not necessarily while eating a steak. She thought it was the most delicious cut of meat she had ever eaten.

Two days later, we took the opportunity to visit my father at his farm 110 miles southwest of Chicago. I mentioned to Susie that Dad had some buffalo. She insisted on seeing them. I took her out to the pasture. She immediately fell in love with the animals and suggested that we should raise bison. I told her that land was too expensive and we wouldn’t be able to make it work.

Little did I know, two weeks later we were visiting Susie’s father near Cooperstown,
NY. It was a day that the rain kept us inside and I was bored. I picked up a real estate publication and started looking at properties. What I found was cheap land. New York agricultural land is arguably the best value in the nation according to the USDA. (See Figure 1 – pg. 7 of USDA Land Value Report). Not just cheap, but land that would support a cow/calf pair on one acre of pasture if managed properly.

Low land prices are not the only advantage that New York offers. There are low numbers of bison available and a high number of wallets in the population centers of the east coast. Most producers in the Eastern US are small producers and hobby producers, so supply is short and the developable markets are large and mostly untapped. I have observed that bison meat prices are generally higher by 10% or more in the east than west of the Mississippi.

Not everything is roses in upstate New York though. Comparatively small tracts of land, neighbors, old dilapidated buildings, soil conditions, a short supply of breeding stock, parasites, an uninformed public and tough winters are just a few of the challenges.

It is also more difficult to put together a large tract of contiguous land to operate on. Many of the dairy farms were sold off piece by piece to people from New York City and New Jersey for summer homes or weekend getaways. We were able to find two dairy farms within two miles of each other. The first farm was 280 acres. We bought 172 acres from that farm which we call Bison Island. (There is no island. It’s a state of mind and a marketing tool.) In hindsight, we should have bought all 280 acres. The second farm is 160 acres with a house and a barn, which has been historically known as “West Creek Farm”. We “rent” for free 70 acres adjacent to West Creek Farm, 80 acres three miles away and 70 acres six miles away. So, it is a lot like farming islands, hence Bison Island.

Small parcels equal more neighbors, and neighbors of widely differing types. We have neighbors that received their deed to the land from the King of England. That’s how long their family has owned the property. On the other end of the spectrum we have neighbors that purchased their property in the last 20 years and are seasonal snowbirds, weekenders that are urban escapees from New York City and New Jersey. We also have commuters to the state capitol of Albany, which is the closest urban center. I grew up on a confinement hog farm. We raised 4,000 head per year. That’s a whole lot of odor. So I know from my youth about dealing with neighbors and their complaints.

We have some of the best neighbors imaginable. We have been welcomed and well received. People are happy that we are using the land for agricultural purposes and it’s not being subdivided into “ranchettes”. But, with neighbors there is always going
to be a small percent that give you problems. We have experienced that. They say that
good fences make good neighbors. We have good fences.

Finding land without dilapidated buildings is also a challenge. Both dairy farms we
bought had houses, barns and silos. Most of the farm houses and dairy barns were
neglected because as small dairies struggled to exist, less and less capital was invested
in maintaining the properties. We did not buy the land that included the barn and
house at Bison Island because we figured they were beyond repair. We did buy the house
and barns at the West Creek Farm. The house at West Creek is 160 years old but, the
previous buyer from New York City had invested a large amount in restoring the home.

Buildings are not the only things that need investment. The Northeast has been farmed
since the pilgrims landed at Plymouth Rock. And small dairies have been under
duress for more than 40 years. Both of these facts have an impact on soil quality and
productivity. There are two types of land in Upstate New York, land that has been idle
and land that has been abused. The idle land needs some re-clearing of shrubs and trees
and fertilization of the soil. Drainage tile in certain locations is probably going to be
necessary as well. The abused land did not get anything put back into it for the past 40
years because of the decline of the dairy business. Just grazing bison on the land alone
will help. Bison are pretty good stewards, but it takes sound land management as well.

Having small numbers of animals in the East is great when you go to sell them. Not so
great if you are trying to purchase breeding stock. We have purchased animals from
Wisconsin, Ohio, Virginia and West Virginia. You have to be willing to travel to get
good breeding stock, and even then it’s still a challenge. We even trailered two bulls
36 hours straight through from Denver to New York in the winter.

The Northeast is a wet climate. We receive over 40 inches of rainfall per year. This means
that bison producers in the Northeast need a sound parasite management program.
Liver flukes have been a problem for some producers in recent years. We get heavy
dews in the mornings. That means that those parasites can migrate one to two feet
above the ground on the stem of that blade of grass. Susie has trained herself to analyze
fecal samples under a microscope and we do so frequently. If you have fecal samples
in the fridge next to the mayonnaise, you might be a bison producer in the Northeast.

An uninformed public affects producers in many ways. Most people in the Midwest
and West have at least seen a bison and are aware of them. Many people in the East
are shocked that we sell bison because they think they are a protected species. There
is one Ted’s Montana Grill in New York for a population of 19 million. There are nine
locations in Colorado with a population of 5 million people. You get the gist.
The down side of having large untapped markets is that there is much to be done to market our products. There is a lot of face-to-face education to be done through farmers’ markets, fairs and special events. We participate in local farmers’ markets and recently decided to participate in the county’s annual Family Farm Day. The Family Farm Day should bring more than 1,200 people to view and learn about our herd and bison in general. Education and public outreach is part of the job, and it’s not just through social media.

When bison get loose, people in general and law enforcement officials don’t seem to know what to do, and the higher the population density the greater chance that something could go wrong. This past spring there were two small herds that got loose in New York. Both herds were euthanized within 24 hours of getting loose. In the East, if beef cows get out they are herded back. If bison get out they will likely be shot (not necessarily). We have extended a special invitation to the county sheriff’s office to attend the Family Farm Day to familiarize them with bison. The more we can educate the public and public safety officers, the better.

The winters in the Northeast can also be a challenge. There are areas where the grazing season is less than five months. Our grazing season is less than six months, but with stockpiled forage we can stretch it out to seven, maybe eight months. There are areas that receive lake effect snow where it is common to get three feet or more of heavy wet snow from one storm. This is not the dry climate of Colorado or even South Dakota.

Despite these challenges, New York and the Northeast are great places to raise bison. Bison are uniquely equipped to survive and thrive in the winter. I would like to think that we did a good job of site selection when we started this business. Truth is, in many ways we just got lucky because we didn’t really know what to look for. I jokingly tell people that our land is so steep we go uphill both ways. Fortunately, the characteristics of the land that make it difficult to farm with large modern equipment also makes the land highly desirable for bison production. Bison are also well equipped to handle the hills. I don’t know if they appreciate the pastoral landscape of upstate New York like we do, but they sure like to lounge at the top of a hill.

Our perception when coming to New York was that you could not be a large bison producer or even a mid-sized producer that focused on cow/calf and finishing animals. Most of the producers we met had a relatively small number of animals and sold the meat by direct marketing. We thought we couldn’t have a successful business without direct marketing. Well, it turns out that’s not the case. While we continue to sell meat directly to consumers, we are moving more toward animal production. With the acreage that we own and rent, which is more than 500 acres, and with proper management, we can supply enough pasture and produce enough forage for a 100 cow herd and
finishing animals. That’s a nice mid-sized operation. In some areas of the country it would take 5,000 acres to do what we do. It will take us a few more years to get to the 100 cow herd level because we are growing the herd mostly from within, but we’ll get there and it’s nice to know that the markets are out there when needed.

My father always said “If you do something you love then you never have to go to work.” I can honestly say I haven’t had to go to work for four years. We love the animals, the land and the landscape of upstate New York. I miss Colorado and Wyoming at times, but thanks to the NBA Winter Conference and Gold Trophy Show and Sale in Denver, our trips to the land that I also love in are a deductible expense. Raising these majestic creatures is a privilege anywhere on the planet.

Brian Grubb and Susie Golembeski, Ph.D., are the founders and proprietors of Bison Island Farm near Cobleskill, NY. Their business email address is bisonisland@rocketmail.com
Red Gate Ranch is now officially one-year old! “Happy birthday to us, happy birthday to us …”. We are a small bison ranch on about 200 acres of gently rolling pasture land outside Poplarville, in the Gulf Coast Region of Southern Mississippi. Our business is organized as an LLC co-owned by family and friends, with the ranch decisions primarily made by Andre and Beth Toups and Michele Roach – “The Leadership Team”. The one year milestone of having bison on our property provided a great opportunity for reflection over the past year.

Like any other new venture in life, we experienced joys, setbacks, affirmations, heartaches, giddiness, sleeplessness, excitement, anxiety – you know, the roller-coaster of emotions that come with trying anything new. Knowing what we all know now, would we do it all over again? Yes, in a heartbeat! Would we do it the same? Absolutely not!
a very expensive hobby. In order to understand where we would need to spend money efficiently, we had to have the right numbers for making estimates. Land purchase and development, animal purchase and health maintenance, equipment needs, supplies, insurance, processing and labels, and marketing all had to be calculated using a valid set of numbers. Where in the world do you begin?

**STARTING FROM SCRATCH**
For us, starting a ranch from scratch, with no ranching experience even though we had done lots of research, spoken to lots of producers, and visited several different types of ranches, was a bit overwhelming. Consistently, the most challenging task was to decide where to spend the limited resources of time or money at any point in time to be sure the decision was moving us ultimately toward our shared vision of what we wanted in the ranch. What was the highest priority? It wasn’t until we were well into our first year that we came to understand the value of the Holistic Management Program – the books and courses are offered through Holistic Management International, or specifically through bison-knowledge of Crossroads Ranch Consulting LLC. We are now using these tools as a Leadership Team to make decisions for the growth of the ranch. This would be the first major change we would make if the “Do-Over Clock” were activated – attend a Holistic Management Course together as a Leadership Team before buying land or the first animal. It would have provided the framework for all the other decision-making we were about to undertake and we would have all been on the same page with the same language for communication.

We began our search for land near home – southeast Louisiana. Our love of the culture, desire to stay close to family and long-time friends, and the close proximity of three potential market regions made this an obvious choice. What we didn’t realize until after six unsuccessful months of searching, was that post-Hurricane Katrina, many of the cattle farmers had sub-divided their pastures and sold estate-lots to those who were relocating out of New Orleans and could afford the inflated land prices on the North shore of Lake Pontchartrain. We simply could not find any pastures of 200 or more acres for sale in southeast Louisiana.

Exactly how many acres we would need to buy depended on how many bison we wanted in our herd. That number depended on how many we wanted to process each year, which depended on what we thought our local niche market would support. Then we had to consider how many bison our pastures could support, which depended on the levels of soil nutrients, pH, and the productivity of the grasses. “For Sale” listings don’t come with any of this information, but do come through soil and forage testing for relatively small fees considering the information they provide. Thank goodness, Mississippi still had larger parcels of land for sale, but the ones for sale were usually old ranches that had not been grazed in years and were being sold by descendants not
THE DIFFERENCE BETWEEN A VERY EXPENSIVE HOBBY AND A BUSINESS

FORTY YEARS IN THE MAKING

Now, that being said, it’s not like we didn’t do our homework. Oh, quite the contrary. This ranch was 40 years in the making. Four decades ago, Andre saw buffalo in Northern New Mexico at Philmont Scout Ranch. He was a teenager and was so impressed with their majesty and natural beauty that he and his best friend decided right then and there that they wanted to have a buffalo farm one day. For the next 40 years, the buffalo farm was discussed numerous times, usually after a particularly challenging day in our healthcare jobs.

The idea of living in the country with these magnificent creatures was very romantic and served as an escape at times from the craziness of our urban lives in southeast Louisiana. We were both raised in New Orleans and had moved to our capital city more than 30 years ago. We raised our children and had wonderful, urban healthcare careers. As retirement neared, we started seriously discussing and researching the idea of a buffalo farm, or bison ranch, as we came to refer to it. Every aspect of ranching was new to us. We became members of the National Bison Association (NBA) and completed their on-line courses, Bison 101 and 201. The NBA staff and members were our greatest resource and we picked their brains for three years before jumping into our bison ranch venture.

FIRST STEPS

As we spoke with producers from all over the country, one key fact became very clear – there were a hundred ways to do everything and whoever we were speaking with thought their way was the best. Everything from the price to pay per acre for pastureland, what type of fencing to put up, how to pasture your herd, and whether to rotate them or let them graze large areas as they desired had varied opinions. What we came to realize is that we had to take into account the unique needs of our terrain, pastures, water sources, climate, parasite loads, availability of state versus federal inspections for slaughtering and packaging, markets, local materials that could be used for fencing, and the list goes on, as we made every decision for our ranch.

We had to figure out what was the principle behind the particular need we were addressing for our ranch, and then determine the best of several possible choices given our unique situation. We toured eight ranches in five states – not too many bison ranches were to be found in southern Louisiana or Mississippi. We took photos of gate hinges, crimps on high-tensile fences, floats in watering systems, and asked hundreds of questions. But through the entire information gathering process, we started seeing why different methods were used in specific parts of the country and came to choose those that would work for us in the sub-tropical, Gulf Coastal ranching environment. We started putting together a business plan by synthesizing all the information we had obtained in our research. We asked a couple other producers to read it over to see...
if we were on the right track. Mind you, neither of us was blessed to be born into a ranching family, or own property in rural America, nor had any friends with ranches that we had helped work on. Never having worked on a ranch before, it was challenging to know what to put on almost every line of the business plan financials. It was like learning a foreign language!

We tapped into local, state, and federal resources for information. Fortunately, our hometown is also the location for our state’s flagship university with its Agriculture Center and Veterinary School. Both had an abundance of educational programs for farmers and ranchers. There’s a forage and soil-testing lab on campus, as well as ongoing cattle research at the Vet School. While they are not bison experienced, their knowledge of cattle would certainly help our herd and we made our initial contacts by e-mail. The responses from the AgCenter and Vet School were both receptive to our cause and we received pledges of assistance as our dream moved toward reality. The large animal vet we were in contact with suggested an aggressive parasite program initially, as he felt this would probably be our biggest potential health risk for bison in our sub-tropical climate. We certainly appreciated their interest and support.

Other resources we tapped in Louisiana, were the state offices of our Department of Agriculture to start understanding laws related to bison in our state, meat inspection and processing, and any special requirements for retail sales. We spoke with the State Veterinarian regarding the paperwork and health certificates necessary to transport our new herd into the state. We also contacted the local offices of the USDA Farm Service Agency (FSA) and the Natural Resource Conservation Service (NRCS). They sat down and explained in detail the types of programs they would have to offer beginners like us and were very excited that we were bringing retail sales of buffalo meat to Louisiana. All their assistance would be coordinated through the office in the parish (county) where we ultimately would buy our property. The State Directors were on board and waiting to start putting writing plans to assist us in using best practices and possibly putting us into cost-sharing programs. There was even talk of assistance with land purchase guarantee loans and low-interest operational loans. We were very encouraged that we could do this and left to work with the Small Business Association-LSU-MBA Program personnel to continue working on the business plan. As we neared a final draft of the Business Plan, we were ready for some real world feedback.

Thank goodness bison producers are mostly a group of kind-hearted people who want you to succeed and are willing to let you know when you are way off base. A couple of the NBA member producers, who we asked to review our business plan, gave us some tough feedback, but it put us on a path with the accurate numbers we needed, in order to have results with more realistic expectations. Business success is all in the numbers. Work with the wrong set of numbers and you don’t have a business, you have
interested in agricultural pursuits. Leaving Louisiana for land in Mississippi meant that instead of an hour or so commute from our Baton Rouge home, our ranch in Mississippi was now 2.5 hours one-way – much more challenging.

Changing states also brought other challenges we had not anticipated. As the FSA and NRCS Programs are federal programs, we anticipated the same level of support and encouragement we had received in Louisiana for qualifying for technical and cost-sharing assistance in starting our ranch would follow us to Mississippi. This has not been the case. While these programs are federal, each state is allowed to “interpret” their implementation within their state, and even within each county, how they choose. We were told that there had never been a bison operation in our county and it was not going to be supported. The letter of every law and rule has been used to block our qualification for any assistance. Not understanding how the same laws, policies, guidelines, and rules could be applied so differently across a state line for a federally funded program, we appealed to the Washington, D.C. office and were told each state is in fact allowed to make their own decisions. So much for our tax dollars at work for us!

PASTURE CHALLENGES

Another piece of land knowledge that would have been very helpful probably five years earlier was that buying inactive land years before placing your own herd on it allows you the time to get the soils into both pH and nitrogen balance, work on weed control, and address brush eradication and drainage challenges, while planting warm and cool season grasses and legumes. All the while, we could have been leasing the land to neighboring cattle ranchers to graze their herds, exercise our pastures and fertilize them with their cattle’s manure while we could have been receiving lease payments to pay for livestock-irrigation or fencing improvements. By the time our bison herd arrived, our grasses could have been nearing full productivity, livestock irrigation and cross-fencing could all have been in place for rotational grazing, and what a decrease in stress level we could have enjoyed our first year. The second major change we would make were the “Do-Over Clock” activated – buy the land a few years earlier and get to work on soil and exterior fencing, then grasses, then livestock irrigation and cross-fencing.

We began to learn to improve soil quality by using soil testing as our guide. There is a wealth of information available on the internet from university programs, the NRCS, and state extension offices that help explain components of soil health. Our experience in looking for guidance for our ranch became the seed and fertilizer store clerks, which were very quick to recommend that our ranch needed whatever they were selling that month, without coming out to the ranch, or asking to see the first soil report. Armed with a fundamental understanding of soil requirements necessary for productive forage, we turned to the local extension office. Our local Cooperative Extension Office
was a wonderful resource for soil testing and in interpreting the results. Before our animals were delivered, we spread 220 tons of lime on about 150 acres to correct the pH in an effort to reduce the growth of Broomsedge and allow the native Bahia grass to grow. During the course of the year, our nitrogen-poor soil also needed assistance from legumes as we were pulling the Crotalaria by hand whenever noted (toxic to our calves) and applied 6,700 pounds of urea followed by 20,000 pounds of ammonia nitrate. These corrective measures for the soil, all based on the reports we got back from our soil sampling, began to improve the quality of our forage grasses.

**FIGURE 28.2**
Healthy soil is the foundation for healthy bison.
(Photo: Beth Toups)

**GRASS PROTEIN**
As we learned about soil and the costs associated with improving its quality, we also started learning about grass. The 200-acre pasture we decided to purchase had been fallow for over 30 years, but we had lots of beautiful green grasses. How could we fail? Come to find out, our two more prolific grasses, Cogangrass and Broomsedge, were not edible (razor-sharp edges) nor high in nutritional quality. Oh, and those beautiful yellow flowers that came up in all our pastures were toxic Crotalaria – ingestion of two mature seed pods by our cute little calves would be deadly.

We are blessed to be far enough south, that we are able to graze our herd year-round. With the addition of hay baled from a pasture the herd had not grazed and the seeding of winter rye, we thought we would be able to provide the 20% protein requirements for our herd, but the early cold weather delayed the rye grass growth our first winter. Then forage reports from the LSU Ag Center Cooperative Extension Service – Soil Test and Plant Analysis Lab on the baled hay showed the crude protein was much lower than needed by our animals (a mere 5-6%). One of the NBA producers sat with me at an NBA conference and written the formula for calculating crude protein supplementation on a napkin for me. I whipped out that napkin and began calculating how much supplementation our herd was going to need.

Against our original plan to raise 100% grass-fed bison from the beginning of our ranch, but in the face of a protein-deficient diet, we had to supplement our herd’s
first winter with 20% protein pellets. This was very costly, not in our original budget, and might have been avoided had we tested the hay earlier to know we needed to purchase quality hay from another source as our grass production was not yet up to its nutritional potential. We now test and label hay by pasture and cutting to assure we will provide the necessary mixture to meet the 20% crude protein needs of our herd during the winter. The third major change we would make were the “Do-Over Clock” activated – cut or buy hay earlier to have the highest crude protein value & test to verify, therefore avoiding surprises.

WATER SOURCES
When we put in a pond, we found that we spent about as much as when we put in a well, but the pond decreased the number of acres available for grazing. Well, that wasn’t very clever, but we had put in two ponds before we figured that out.” The pond water also becomes contaminated with excrement and is another source for parasite transmission. Clean well water is more palatable, healthier, doesn’t take up valuable pasture, and one well can be used to fill water troughs in several pastures through pressurized irrigation lines. Really, a much smarter investment!

Our 200-acre purchase minus the lake, the treed areas, and the two ponds we put in now provides about 150 acres of actual pasture. That makes a big difference in the number of animals we can now support on this property! The cattlemen in our area, stock at a 1:1 ratio without rotational grazing and a 1:2-3 ratio with rotational grazing. Instead of the 100 breeding cows or Animal Units (AU) we were planning on stocking, our current land will probably only support 60-75 AUs. This number will be confirmed through soil and forage testing as the quality of our soil and grasses improves, and through production numbers by monitoring conception rates and weight gain in our herd. The fourth major change we would make were the “Do-Over Clock” activated – not put in ponds and more strategically place the wells.

PERSONNEL CHALLENGES
Hiring ranch assistance has been challenging. Several things to consider when deciding
to hire are the costs, both the obvious and the hidden. Their pay and benefits (healthcare, dental, housing, utilities, whatever else you provide) are the obvious. Then there is the hidden expense of Worker’s Compensation Insurance – don’t hire someone without it! One employee was in the Emergency Room four times in his first six weeks because he refused to use safety equipment. Initial drug testing before anyone is promised a position on our ranch is now a condition of all future employees. Small businesses bear the greatest burden of substance abusers. It doesn’t matter if they have a prescription, or are using recreational drugs, legal or illegal – if they are high on your ranch, you are going to be the one who pays for it! Worker’s Compensation statistics show that employees on drugs/alcohol are four times more likely to be injured, six times more likely to be involved in a workplace accident, and five times more likely to file a Worker’s Compensation Claim. We were not willing to lose our ranch because of their poor choices. Additionally, Worker’s Compensation statistics also show that 80% of substance abusers steal from their employers, are 33% less productive in their jobs, and substance abuse is the third leading cause of workplace violence. Hidden costs come in the form of breakage, poor public relations—as your high employee represents your ranch to the community or steals from other contractors coming onto your ranch to complete work. These can be very high costs that may take months, or even years to rectify.

PRICING CONSIDERATIONS
We started to explore local markets for our meat, even before our herd was delivered. As we spoke with chefs and directors of farmers’ markets, one question always came up, “How much will you be selling your meat for?” Gee, that was a good question. Now came a crash course in fixed vs. variable costs. We understood the idea that you took how much the animal actually cost to purchase and added the butchering costs to figure how much you needed to make off each pound to make some money. But, how much money was a fair amount to make? Dr. Tim Woods, from the University of Kentucky, who spoke at a free one-day seminar offered thru the LSU Ag Center, broke down the determination of setting your prices to include so much more. That pound of ground buffalo also had to cover the electric bill to run the well for the water troughs, and a depreciating amount of the cost of crimps used to put up the fence. So we had to figure out what our fixed cost per head was before we even had a year of operation under our belt, and then figure our variable costs per head.

Another whole issue came with understanding how to use the cutout Excel worksheets to determine how much meat we would have to sell. The terminology used for the different stages of processing was confusing as there can be various terms used for the same stage depending on whom you are talking to within the industry. Based on a 1,000-pound live weight animal, we understood there would be 51-54% loss in head, hides and bone. We kept seeing this same number in ranges with terms not clearly defined, so we figured we could conservatively estimate 450 pounds of meat
THE DIFFERENCE BETWEEN A VERY EXPENSIVE HOBBY AND A BUSINESS

for retail sales. So, where does almost 200 pounds of meat go when you process your first animal? You are going to lose 51-54% going from live weight to hot rail weight (or carcass weight) and lose another 51-54% moving from carcass weight to cut weight (packaged meat). The more bone-in meat cuts, the less % loss and the more boneless cuts, the higher the % loss. Basically, figure about a 28% return of packaged meat for sale on your carcass depending on the weight of your live animal. That was a big difference from the numbers we first worked with on our first pass at a business plan!

Well, we’re probably a little off on all our numbers, so we’ll make adjustments as we develop better ones, but as least we are considering so much more as we are calculating our pricing. Dr. Woods also explained the concept of margins - how much a grocery or restaurant needed to make over what they paid for our meat. National average bison pricing is now available through the USDA Agricultural Marketing Service, but individual markets may have unique additional needs. Ours was a developing market, not one that had a strong base of support where customers are used to paying more for buffalo meat. We provided education and watched a bit of a learning curve as our clients came to appreciate the health benefits of eating bison and became more comfortable with the subtle differences in preparation of this leaner meat. Our labels and marketing materials offer a Quick-Response scan bar directing clients to cooking tips and recipes, as well as nutritional information and protein source comparison charts.

Courses like Annie’s Project are becoming available in most states through the Natural Resource Conservation Service (NRCS) or Resource Conservation and Development Council (RC&D) offices to assist in understanding and managing the risks inherent in farming/ranching operations. These courses are low cost and provide so much information. Other government agencies have programs for “Beginner Rancher/Farmer Programs”, but keep in mind, they require three years of experience before you are eligible for most programs. True beginners (like us) may not find the support they desire, but these programs could help those who were blessed to be born into a ranch family, or already own the land and have filed Schedule Fs with their tax returns. You don’t need a degree in agriculture, but you do need to be willing to learn as much as you can. You must be willing to learn whatever you don’t know through independent reading (Greg Judy, Holistic Resource Management, NRCS materials), attending your local ag-sponsored offerings (universities, extension offices), on-line courses offered through the National Bison Association for bison-specific knowledge and other course topics (Alison.com – Excel, accounting, marketing, finance), enrolling in Small Business Association seminars or a Holistic Management course to understand a more integrated way of making decisions in your new business venture, and attending state/regional/national bison conferences.

So many times at these bison conferences we would hear someone toss out a nugget of
knowledge that we didn’t even know enough to have asked. After-session networking in the hotel bar filled several notebooks of information we will be referring to for years to come. We wouldn’t have learned so many of these practical fundamentals had we not attended the conferences. You really can’t afford not to attend these conferences if you are running your ranch as a business.

So, the decision is simple. The fact is everything will take longer than you plan and cost more than you plan, no matter how well you plan. So, are you buying a few head of bison as an expensive hobby? Or are you willing to put in the research time, begin to know your numbers, and give yourself a chance to generate a positive income— to actually run a bison business? We’re having a blast—we recommend taking the time to know your numbers!

Andre & Beth Toups and Michele Roach pioneered the establishment of Red Gate Ranch in Poplarville, MS.
The numbers just weren’t adding up.

The bison business had improved dramatically in 2013, but production expenses were still eating into the profitability of Kentucky Bison Co.’s Woodland Farm outside of Louisville, KY.

Steve Wilson, and his wife, Laura Lee Brown first brought bison to Woodland Farm in 1996, shortly after they were married. The couple weathered the crash in the early 2000’s. And Steve had helped lead the National Bison Association’s new efforts to focus on meat marketing when he served as the association President in 2004-2005. Woodland Farm is situated on 1,000 acres along the Ohio River. Since the 1990’s, the farm operated primarily as a cow-calf operation.

The farm maintained three separate herds of about 50 cows and six bulls each. During the growing season, each herd rotationally grazed through five and nine separate pastures. Calves weaned in the fall were moved to different pastures with free feeders, before eventually being sent to a finishing facility adjacent to Kentucky Bison’s company-owned processing plant in Memphis, IN. The cow herds were each moved to sacrifice pastures for the winter, and fed a diet of hay, supplemented with about five pounds of grain per animal per day.

Steve's nephew, Kristopher Kelley had taken on the daily management of Woodland Farm in 2010, and was focusing on improving the operation’s bottom line. Despite
a steadily improving market for bison meat, the farm’s operating numbers were still suffering.

“We tried a lot of different little things, but they were on the wrong scale,” Kelly said during a recent tour of the farm. “Finally, we realized that we needed to make a big change. This is was the biggest change we could make, so we started doing our homework.”

“I went to several grazing conferences, and had some grassfed cattle producers come and look at the farm.” In 2014, Lee and Mary Graese of Northstar Bison Co. in Rice Lake, WI came to Woodland Farm. Kelley said that consultation was a breakthrough. “I had lots of information from cattle producers, but the Graeses said, ‘This will absolutely work with bison.’ They told us to make a plan and give it time. The changes you want to see in your soil and herd will take multiple growing seasons.”

Kelley began to look closely at the pastures, and to focus on building the health of the soil. Kelley said, “Our winter sacrifice pastures were part of the problem. We would rotate our sacrifice pastures each year, so that each one got used about once every five years. The following spring or fall we would till the seed the pasture. This practice, combined with having too few separate pastures, resulted in our pastures degrading from year to year. Lee pointed out that we were growing grass, but not building turf. He said it takes a minimum of five years to really begin building turf, and we were inadvertently disrupting that process.

Kelley consolidated the three herds into one, and reduced the number of mother cows to 115. Now, the herd rotates through 21 pastures (200 acres total) spending from one to three days in each pasture, depending on the time of year, rainfall, and grass available. A herd of about 80 heifers are in four other pastures, and 105 finishing bulls are rotated through nine paddocks (160 acres total) on a neighboring farm.
Kelley said that an immediate priority is to fence more ground and subdivide existing pastures for rotating the finishing heifers.

Meanwhile, the finishing facility neighboring the Memphis Meat processing plant has been vacated.

“We’ll be doing all our finishing of everything on grass right here,” Kelley noted.

The Woodland Farm herd has served as the primary source of animals for the Kentucky Bison Co. branded products, but the company also relies on additional animals from other producers as well. Kelley said that the new business plan calls for a Woodland Farm label of strictly grass-finished bison, with Kentucky Bison Co. used as the label for the traditional grain-finished meat.

Kelley began planning the conversion in 2013, but the switch to all-grass production began with the 2014 calf crop, so he said that’s its early to judge the impact on the meat quality. He anticipates that the animals will be ready for harvest at about 26 to 30 months, although some of the yearling bulls already appear to be approaching 900 lbs. Since bison finish more slowly than cattle, the transition to slower grass finishing is not as drastic a change for bison producers.

One impact already being felt is on the cost of inputs.

Back in his office, Kelley pulled up the production records that chart the farm’s operating income and expenses.

“Woodland Farm had been raising its own grain and putting up its own hay, so it was easy not see the true cost of our inputs. When we converted pounds of feed to dollars using average market prices, we could see the full story,” Kelly said.

In 2013, he fed 478,900 lbs. of grain here at the farm. At $175/ton, that equaled $41,904 in grain costs. He also fed 1,115 5x5 rolls of hay. At $55 a bale, that was $50,175. Then, he had another $3,570 in corn stalks and $9,845 in diatomaceous earth (used for fly control).

In 2014, when the transition to grass-fed began, he cut back the grain to 189,350 lbs., which dropped the grain expense to $16,568, but continued to feed the equivalent of 867 5x5 rolls of hay, with an expense of $39,000. He didn’t feed any corn stocks in 2014, but the cost of the diatomaceous earth was $14,465.

“This year to date (2015), we had some miscellaneous pounds of grain (under 100 lbs.), and 455 5x5 rolls of hay ($20,484). As a result of our increased pasture rotation, we
also stopped using diatomaceous earth,” he said.

He noted that Lee Graese stressed that hay fed during the winter should be rolled out so that the bison distribute manure more evenly across the pastures. “Seventy percent of the nutrients go back into the soil to build the turf, so it’s important to have those nutrients spread evenly,” he said.

Jeremy Suter, the herd manager at Woodland Farm, noted that the transition to grass-finished production also accentuates the anabolic and catabolic cycle in bison, in which the cows reach maximum weight in the fall, and then lose about 10 percent of that weight through the winter.

“That natural cycle really seems to help the calving rate,” he said. This spring, the 116 cow herd produced 105 calves.

Suter added that one of the farm’s goals is to genetically select for animals that perform best on grass.

“I’m keeping some good conformation records to see which animals do best,” he said. Kelley and Suter both noted that one nagging problem at this stage in the transition is the proliferation of weeds. The farm previously mowed to keep weeds down, and to maintain a fresh-groomed appearance. Now, weeds have given the pastures a somewhat ragged appearance.

“Lee (Graese) told us to be patient,” Kelley said. “He said that, as we build healthy turf, the grasses will out-compete the weeds. But it’s tough right now, particularly for Steve. He likes a well-groomed farm.”

The lesson of patience was reinforced for Kelley during a week-long Ranching for Profit school he attended in Boise, ID, last year. “They stressed that when you bush-hog the weeds, you are really only putting a Band-Aid® on the problem. It’s better to deal with the source of the problem.”

He said that the school re-framed how he looked at the farm’s entire operation. “They teach that a lot of issues with a given farm operation that can feel like problems, aren’t inherently positive or negative; they are just facts that have to be planned for and addressed,” he said.

Woodland Farm is a long way from completing the transition to a grass-fed operation, but Kelley is pleased with the initial results. The lower cost of inputs is encouraging, and that doesn’t include the labor involved in putting up the hay, and putting feed out through the winter.”
“The time is right for us. Our customers want more grass-finished meat, so we have a chance to make changes on our farm that will build the soil, improve our bottom line, and meet customer demand.

“Our ultimate goal is to build the soil on this farm, and to make the best use of our resources. We think we’re headed in the right direction.”

Kelley offered this advice for any producer considering conversion to grass-finish production:

1. Do your homework. As Lee Graese stresses, there is a big difference in grass-fed and quality grass-finished animals. It’s important to learn from those with experience.
2. Be patient. There’s a tendency for some disruption to the land, and the animals during the conversation. Be willing to take the time to work through that.
3. It’s all about the soil. Building healthy turf, not just good grass, is key to long term sustainability.
4. Mimic nature. Respect the animals’ natural cycle. And, use some fencing pressure to maintain grazing density.

Kristopher Kelley manages Woodland Farm near Goshen, KY. Woodland Farm is part of Kentucky Bison Co., owned and managed by Steve Wilson and Laura Lee Brown of Louisville, KY. The website is www.wodlandfarm.com.
Finding Your Place in the Bison Business

BY BOB DINEEN

Bison producers have a variety of options when it comes to selling production stock. Every option has its upside and downside. It is up to the producer to identify his or her goals and form a plan that meets those goals.

Times of oversupply in this industry have forced some producers to use multiple marketing options to move production and maintain cash flow. As the retail and foodservice markets have developed, the industry has developed a good balance between supply and demand. At the time of this writing, carcass prices are at all time highs and consumer demand has remained steady through the economic downturn of late 2008 and 2009.

We are in a “sweet spot” that has many other agricultural businesses looking at the bison industry with envy. There is no guarantee that we will remain in this desirable situation forever. However, all indications are that consumers nationwide, having discovered bison, will continue to vote with their dollar for this delicious product.

MARKETING OPTIONS
Producers have the option of marketing their production in a variety of ways. The basic options are listed below. Some opt for the first option and sell calves. Others incorporate a mix of several in an attempt to spread out their risk and increase gross margins.

Options

Sell calves after weaning

Pros

- Maximize land base for breeding stock.
- This option requires the fewest inputs, and is the simplest in terms of management.
**Cons**

- Lower gross margins possible.

**Sell feeders (Carry calves through spring/summer)**

**Pros**

- Higher price per head should mean better margins.
- This is also relatively simple from a management standpoint.

**Cons**

- Larger land base is required, as the animals will require more grass than in Option A.

**Sell fed animals live (Retained Ownership)**

**Pros**

- This option lowers potential transportation costs.
- Producers have more flexibility as to timing of the sale.

**Cons**

- Potential lower volume as you will probably sell less than semi-loads.
- The producer receives no reliable carcass data back to the ranch.

**Sell fed animals in carcass form on the rail (Retained Ownership)**

**Pros**

- Retained ownership offers the producer the opportunity to receive full market price for the animals.
- Eliminates the cost of direct marketing.
- Allows producer to focus on production of quality animals.

**Cons**

- Retained ownership requires more extensive handling facilities, higher inputs (feed), and higher overhead (capital, interest and payroll).
- Requires producer to arrange sale with a carcass buyer (or buyers) ahead of time.

---

**FIGURE 30.1**

Pricing “on the rail” is the baseline for pricing bison in the commercial marketplace. (NBA file photo)
Sell processed meat direct to distributors (Boxed Meat)

*Pros*
- Higher gross margins.
- Ability to buy excess cuts from other packers to supplement supplies.

*Cons*
- Possible inventory control issues as distributors do not buy all of the cuts from a carcass, which could leave the producer with a large amount of low demand cuts.
- Cold storage costs.
- Must have access to a custom slaughter and fabrication plant.
- Must manage multiple receivables from multiple customers.
- Higher overhead costs.
- Difficulty collecting payment.

Sell processed meat direct to grocers/restaurants (Further Processed)

*Pros*
- Higher gross margins.
- Ability to buy excess cuts from other packers to supplement supplies.

*Cons*
- Possible inventory control issues (storage, long inventory).
- Custom slaughter, fabrication and further processing plant(s) necessary.
- Multiple receivables from multiple customers.
- Higher overhead costs.
- Difficulty collecting payment

Sell processed meat direct to consumers (Farm Gate Marketing)

*Pros*
- Higher gross margins.
- Ability to buy excess cuts from other packers to supplement supplies.

*Cons*
- Highest labor inputs.
• Possible inventory control issues (storage, long inventory).
• Custom slaughter, fabrication and further processing plant(s) necessary.
• Personal checks from customers and collection of bad debt.

Other segments of this handbook provide detail on some of these options, such as farm-gate marketing, on-farm finishing and cow-calf enterprises.

As a commercial marketer for the past 28 years, I want to focus on Option D: Carcass sales.

CARCASS SALES TODAY
The vast majority of medium to large cow/calf operations now market their production in carcass form to the major packers.

Carcasses are typically sold at a price for hot hanging weight FOB (free on board) at the slaughter plant. The producer is responsible for freight costs of getting the animals to the plant. Usually the buyer pays all slaughter costs. Today many buyers also reimburse freight costs back to the producer. Most buyers have carcass criteria (weight, age, fat cover, fat color) that must be met and a discounted price for carcasses that fall outside the specifications.

Purchases are usually made on either gooseneck trailer loads (10-15 head) or semi loads (45-50 head). Prices reflect the supply-demand situation in the marketplace. In 2015, prices reached a 30-year high. This confirms how strong our industry has become as consumers have embraced the great qualities of bison meat.

BISON INDUSTRY VS. BEEF INDUSTRY CONSIDERATIONS
The bison industry is very different from the beef industry.

Although the major buyers of slaughter ready beef cattle are the big packers that slaughter thousands of head per day, most of these cattle are purchased from entities that did not produce the feeder (i.e. do not own the cow).

In the bison industry most of the carcasses purchased are from either the cow/calf producer in a retained ownership program or from a feeder that purchased the feeder animal from the cow/calf producer. This means there are fewer entities between the cow/calf producer and the consumer.

The beef industry uses a USDA grading system to determine the value of each carcass. The bison industry has 2 grades – yes and no. A bison carcass is either good enough to be considered high quality or the whole carcass is utilized in ground bison. Thus, the difference in carcass value between the good carcass and the carcass that did not make the grade can be significant.
PROTOCOLS
Producers need to be aware of any requirements that the packer may require due to label claims or customer requirements downstream.

First of all, the use of added growth hormones in bison, which fall under the jurisdiction of the FDA, are illegal. Thus, all bison can be marketed as free of added growth hormones. However, USDA labeling regulations require that we also specify on the label that these hormones are not allowed in bison production.

Antibiotic Free (ABF) is a basic requirement that many grocers demand today. This means that the producer cannot utilize any antibiotics in production animals at any time. If you plan to market your cull cows on the rail they must be managed the same way.

Proper, targeted and timely vaccination programs can eliminate much of the need for antibiotics. Animals that are treated due to injury or disease must be ear tagged or marked so that they can go a different direction when the time comes to sell that animal for meat.

Traceability is another important part of a producer’s management program. If you buy calves from a neighbor or other producer, the ability to identify those animals through the system and on to slaughter is very important.

TIMING THE MARKET
Historically, supplies of market ready bison are highest in late winter and early spring. Demand is highest in summer and fall. This creates a problem for both the producer and the packer as the market demands fresh product verses the “good old days” when frozen bison meat was the industry standard.

Producers can capitalize on this trend by backgrounding calves or yearlings on grass in order to have them ready later in the year. By spreading production animals out through the summer and fall, the producer may benefit from price increases that might occur due to seasonal shortages in supply and assist the packer in supplying a year-round market.

ALWAYS HAVE PLAN B IN YOUR BACK POCKET
Any well formed plan will have provisions for changes in demand, price or other factors. Today’s market is very strong and in all likelihood will stay steady or grow stronger in the near term.

This does not mean that one should not play the devil’s advocate and think about a “Plan B” marketing scenario. What if a plant you utilize closes down? What if your
customer gets out of the business? What if regulatory changes make it more difficult to do what you are doing?

There are many scenarios that can have a negative impact on you business plan.

“Plans are nothing, planning is everything.”
– Dwight D. Eisenhower

Bob Dineen is the founder, owner and operator of Rocky Mountain Natural Meats.

www.greatrangebison.com
Building Your Business
It Starts with a Business Plan

BY TERRY KREMENIUK

WHAT IS A BUSINESS PLAN?
A business plan is a written summary of what you hope to accomplish with your bison operation. It is a road map for starting or operating your business and measuring progress along the way. The plan specifies where your business is today, where you want it to be five to ten years from now and how you plan to get there. The plan describes your bison operation, what it produces, the customers, the suppliers, the competition, the production and the marketing plans, the management, the financing and anything that relates to the operation of your present or proposed bison operation.

A business plan is essential whether you are expanding your existing bison operation or considering a new venture. It may seem complex but it can be kept very simple - contributing to what you would like to achieve while minimizing the risks. Your business plan commits to paper ideas you have for building a new business or expanding the present one. The business planning process allows you to create a bison operation on paper without running the risk of financial failure. At the planning stage, the only time and money you risk is the hours spent planning and the relatively small costs of compiling the plan.

WHY PLAN?
Preparing a business plan improves the chances of success.

Expanding operations use business plans to demonstrate that careful consideration has been given to the businesses development. For start-up operations, it shows that the entrepreneurs have done their homework. Within your plan, you will be able to evaluate alternative scenarios and make appropriate adjustments without the risk of business failure. You will be able to forecast returns and compare options from focusing on one link in the bison value chain to establishing a fully integrated operation from the cow-calf operation to branding and marketing your own bison products.
Some business plans are developed for internal purposes as well as for external use. Internally, the business plan is used as a business development map. It provides details on how you plan to reach your goals and objectives. The plan exposes opportunities and risks involved.

It allows you to evaluate your operation over the next few years and make mid-course adjustments if required. Without it, you will depend on luck and good fortune instead of business management skills and common sense. Financial institutions, business partners, investors and anybody else interested in your business affairs generally require you to develop a business plan. The plan explains to outsiders exactly what your objectives are, how you plan to achieve them and how their interests will be met. There is no substitute for a thorough, well-developed business-planning document. Farm and ranch business managers should invest the time to develop and regularly update their business plan.

HOW TO DEVELOP A FARM BUSINESS PLAN
Many farmers and ranchers and those investors interested in developing a bison business have the elements of a business plan in their minds but need to get it down on paper and flesh out the details. Putting plans on paper is often the difficult part. It is important to first understand what you want to accomplish and then to employ sound writing skills to get your plan in a format that is useful for you as well as your banker, your feed sales agent, your trucker and others who may be supporting your business venture.

The benefit you receive from your plan will only be as good as the effort you put into it. Extension agents, consultants, financial institutions, and industry associations offer many resources to assist you with your plans. Whatever resources you employ, remember it is your business and you must understand the plan completely. Working with professionals who can assist to develop your business plan can make planning more effective. However to obtain maximum value from the professional consultant, preparation before your first meeting is essential.

GOOD RECORDS ARE THE FOUNDATION OF GOOD BUSINESS PLANS
Successful farm and ranch managers understand the importance of good records. Not only is this true in times of tight profit margins, good records are essential when margins are strong. With a good record keeping system, understanding what is happening to your business financially allows you to take corrective action as soon as it is required. Also if a particular strategy contributes significantly to profitability, similar strategies could potentially be transferred to other parts of the business.

Most farmers and ranchers do a good job of record keeping for income tax purposes. These records may, however, not contain sufficient information that will allow for a
complete business analysis. The weak link in the record-keeping chain often relates to
the failure to record non-cash information such as inventories, physical information
such as feed consumption, keeping track of payables, receivables, and credit and loan
balances. Completing a year-end inventory is necessary for any meaningful business
analysis.

Farm and ranch business managers must get into the habit of taking inventories at the
end of each year. Having inventory information is important for a number of non-tax
reasons including business analysis and participation in agriculture programs, which
vary by jurisdiction.

Good farm records are also of great value when it comes time to prepare a farm
business plan. Historical records, both physical and financial, provide a foundation
for the business plan and give the plan credibility. A business plan builds on the past
experience and projects forward the planned business activity. Having the projected
results consistent with the past experience gives the business plan a higher degree of
certainty and a better chance of success. In cases where there are no historical records,
such as a new bison enterprise, projections should be based on fairly conservative
budget estimates and/or industry standards. Developing the projections for a bison
start-up business requires much more work and research.

To develop your business projections, look to some benchmarks that have been
developed by the industry over the past five years. Key performance measures that
should be considered are:

---

**Cow-calf Enterprises**

- Weaning Rate % . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . >85%
- Weaning Weights Bulls . . . . . . . . . . . . . . . . . . . . . . . . >450 lbs.
- Weaning Rate Heifers . . . . . . . . . . . . . . . . . . . . . . . . >400 lbs.
- Weaning timeframes . . . . . . . . . . . . . . . . . . . . . . December – March
- Mortality rate in Cow Herd . . . . . . . . . . . . . . . . . . . . . . . . . . 2.5%

**Back-grounding**

- Beginning Weight of Bulls . . . . . . . . . . . . . . . . . . . . 450 lbs.
- Beginning Weight of Heifers . . . . . . . . . . . . . . . . . . 400 lbs.
- Days of Back-grounding Bulls . . . . . . . . . . . . . . . . 225 days
- Days of Back-grounding Heifers . . . . . . . . . . . . . . . 245 days
- Average Daily Gain Bulls . . . . . . . . . . . . . . . . . . . . . 1.5 lbs.
- Average Daily Gain Heifers . . . . . . . . . . . . . . . . . . . 1.2 lbs.
- Mortality Rate % . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 0.3 – 0.4%
Finishing

- Beginning Weight Bulls: 800 lbs.
- Beginning Weight Heifers: 710 lbs.
- Shipping Weight - Bulls: 1,100 lbs.
- Shipping Weight - Heifers: 930 lbs.
- Average Daily Gain - Bulls: +1.80 lbs.
- Average Daily Gains – Heifers: +1.3 lbs.
- Days on Feed – Bulls: 170 days.
- Days on Feed Heifers: 190 days
- Mortality Rates: 0.3 – 0.5%
- Shrinkage: 5 – 7.0%
- Dressing Percentage: 58 – 62%

Note that this data is based on bison that are grain finished. Bulls would be marketed at about 20 months of age with heifers being marketed at 22 – 24 months of age.

PREPARING TO PLAN

Developing a bison business plan starts with assembling relevant information. If you are a new producer, start by building a good understanding of the bison industry. Although producers expanding their operations may have substantial detail on the bison business, such may not be the case for the start-up operator or investor. To get this information requires research. One place to start is to contact one of the regional or national bison associations in North America. They have useful information that they can share about the bison industry, and they can put you in contact with many producers who can discuss the many facets of the bison business. Bison associations also organize field days and conventions with speakers with expertise from production to animal welfare to marketing and understanding the consumer. Extension agents, veterinarians, bison industry suppliers will also provide helpful information to develop your business plan.

Take the time to learn about the characteristics of bison products and the marketplace for bison and bison products. Obtain information from marketers who supply consumers through retail stores, the local butcher shop, or the farmers’ markets. Knowing the characteristics of bison products and what is important for consumers will assist in developing the plan to address your consumers’ needs.

Learn about production including items like understanding bison, bison breeding, handling, pasturing, feeding, watering, slaughtering, and marketing. Know the costs of doing business.

Once you have a good understanding of the industry and have compiled research on
the markets, production, and the cost of raising bison, there are a number of other components required for your plan. These include:

Information relevant to the business structure you plan to create – corporation, partnership, sole proprietorship, or becoming part of a cooperative.
A list of people and suppliers who are going to be involved in the farm/ranch business – lawyer, accountant, veterinarian, feed supplier etc. Information on the skills of people who will be directly involved in the business is important.
Financial information on the past three years of business including balance sheets, income statements, and cash flow statements. This information will not be available for a new business, but the assumptions on which to develop cash flow statements must be available. Much of that will be obtained from researching the industry and the markets. Make sure you validate your assumptions with those already in the industry.
Information on trademarks, brands and any other information that distinguishes your business and products.

DEVELOPING THE PLAN
If this is a new bison operation, the industry and market research assist you in identifying the type of bison business that you would like to develop. Questions like:

• Will the operation be based only on bison or will it be part of a more diversified?
• How many bison do you plan to raise the first year and five years later?
• Will your business operate by raising bison from “gate to plate”?
• If you do not manage the total value chain, what will be your focus in the value chain – cow-calf, backgrounder, or finisher?
• Will you focus on grass-fed or grain fed markets?
• What assumptions will you use for the product(s) you expect to sell and at what margin? Current prices may not be the best indicators of prices expected over the long term. Historical prices and longer-term trends are a good guide.
• What strategies will you employ to mitigate risks – production and market?
• Are there regional, national, and international regulations that may directly or indirectly have on your bison operation – trucking restriction, tagging requirements, health certificates, export permit requirements etc.?

Based on the answers to the above questions, you must use this information to develop sales projections. Do not be overly optimistic with respect to high prices and low costs resulting in high profit margins. Always develop scenarios that demonstrate the consequences of price reductions of 25 percent and comparable cost increases. We hope events like this do not happen but if they do, we will have given thought to strategies used in such circumstances.

WHAT IS INCLUDED IN A PLAN
Many organizations have developed business plan guides that can be used by farmers
and ranchers. Because no two businesses are alike, no two business plans are alike. For example, a bison operation that focuses on marketing bison meat to national restaurant or retail chains may have a highly developed marketing plan while the farmer or rancher producing feeder bison may have more information on bison production and a very condensed section on marketing.

The detail in a business plan is often dictated by the complexity of the business and the target audience for the plan. The more detailed explanations that follow are intended to assist farmers and ranchers and their supporting professionals to prepare a business plan. The detail within each section of the plan depends on the nature and complexity of the farm or ranch. The plan should address all the points applicable to your farm or ranch.

**BUSINESS PLAN GUIDELINES**

1. **Cover Page**
   Include the farm/ranch name, address, and phone and fax numbers and addresses of key farm or ranch contacts. Also include the time period of the plan; the date of issue and a copy number if it is important for the farm/ranch operator to control plan circulation.

2. **Table of Contents**
   Major headings with corresponding page numbers for reader convenience and reference.

3. **Executive Summary**
   This is a one to two-page summary of your farm or ranch. The summary should be convincing, attract the readers’ interest and motivate them to read the plan detail and take the required action. It is best to complete the summary when the plan is complete.

   The summary should include:
   - The purpose and primary goal of your bison business
   - Your business structure and the people involved, and their strengths
   - The purpose of the plan
   - A description of your products
   - Your clientele or market
   - Your marketing strategy and any unique advantages
   - A summary of the sales, income projections and the financial return
   - Project timeframes
   - If financing is required, amount, security and terms required

4. **Business Description**
   As part of the business description, information on the farm’s or ranch’s mission, vision, goals and objectives is important, as it is the strategic plan that sets the foundation for the business plan. This is the foundation for you business. It need not be complex.
THE "STRATEGIC" PART OF A BUSINESS PLAN

A strategic plan is the game plan for the future. It begins with having a good understanding of your business strengths and weaknesses. Knowing where the business opportunities are and what external factors could have a negative impact on the performance of your operation is very important. This SWOT (strengths, weaknesses, opportunities, threats) analysis equips the farm or ranch managers to establish a mission, vision, strategies, goals, and objectives for their business.

Although a strategic plan for most farm or ranches will be two to three pages in length, this part of the plan requires much discussion amongst the family members and/or business partners as they are establishing a long-term direction for their operation. The process of having the participation of those involved in the farm or ranch is very powerful in making sure all understand where the business is going and how it is going to get there.

The Mission: The mission statement outlines the business you are in today. It should be brief, clear, and understandable to everyone. A bison cow-calf operator’s mission may be “to produce and market 150 calves yearly and produce all the feed required.”

The Vision: The vision statement for your farm or ranch presents a picture of what you want your business to look like in terms of size, activities, and profitability five to ten years from now. It should be reasonable and achievable. For a bison cow-calf operator the vision could be “In ten years double the size of the bison operation and provide employment for all family members.”

The Strategies: These are the plans and activities required to achieve your mission. One of the strategies for the bison cow-calf producer could be “to acquire lease land upon which to grow the herd.”

The Goals: These are long-term outcomes you expect the farm or ranch to achieve. They reflect what you expect to achieve in three to five years. For the bison cow-calf operator, the goal may be “to increase herd size by 50% within five years.”

You should also have personal and family goals. Discuss and decide the type of lifestyle you want so that you are able to manage conflicting pressures of business and family goals. Also discuss your future needs with respect to leisure, education of family members, and retirement.

The Objectives: Your business objectives state the results you want to achieve in the next year. In addition to profit objectives the bison cow-calf operator may have an objective of “increasing weaning weights by 10 percent.”
Objectives should state what you are trying to achieve, the target date, should be realistic and be measurable.

Core Values: Your values reflect how you conduct business, how you treat your clients, how you treat your employees, and how you relate to your family and your community.

The Business: In addition to your mission, vision, and goals, provide a snapshot of your farm or ranching operation. Include:

- The legal structure of the business - sole proprietorship, partnership, or corporation.
- History of established business and any major events that have had an impact on the present status of the business.
- Location, acreage base, building descriptions information on physical assets and other resources available to the business.
- Type and size of enterprise.
- The management team including family members, partners, and employees.
- List of professionals such as lawyers and accountants who assist the business.

5. The Market and Industry Analysis
This section of the business plan analyzes the environment in which the farm/ranch will compete. This is a critical component of a business plan should be continually updated throughout the life of the business as new opportunities and challenges surface on a regular basis. The market analysis will indicate the market size for the farm/ranch products being produced and if the market will be profitable now and into the future. Again, it is important to remember, the complexity of the plan is governed by the complexity of the business.

In developing the industry description provide information on the following:

- Industry history, size and its major players.
- Key short, intermediate and long-term trends, and anticipated changes in the industry.
- Customer needs and those needs not being met.
- Implications for the industry of economic change, social change, new technologies, new products, and environmental and policy and regulatory change.
- Critical success factors for your industry.
- Significant barriers to industry entrance such as skilled people, regulations, level of investment.
- Any global industry threats.

6. The Marketing Plan
The marketing plan describes the strategies you plan to use to sell your bison products. In some instances, a detailed marketing plan is developed outside the business plan with highlights included in the business plan. Your marketing plan should build on information included in the industry and market analysis, target market, and
competition components of your plan. It should address the products you offer, your sales and distribution process, and your advertising and promotion activities, and the prices you charge. The marketing plan should include everything you do to get customers to buy your product or service. The marketing plan for a bison producer who markets in international markets will be more complex than that of the bison cow-calf producer who markets their calves.

TARGET MARKET
Within the industry, your farm or ranch will focus its marketing strategies on a particular part of the market. To understand the target market the following questions should be addressed.

- Who buys the products and services you produce?
- What is the size of the target market? Is it growing? Contracting?
- What is the geographic area of the target market? Regional, local or global?
- What are key trends and anticipated changes within this market?
- How do you segment your customers?
- What factors affect purchasers’ decisions to buy what you produce?

COMPETITION
Many farmers and ranchers do not see other producers as competition. Knowing your competition and how they operate may help you develop strategies that contribute to business success. Your business plan should address the following questions:

- The number of competitors and who are they?
- What are the competitors’ strengths and weaknesses? Evaluate factors such as customer loyalty, price, credit program, location, quality, and experience.
- How will the competition react to your entry into the market?
- Are there barriers that will discourage additional competitors from entering the market?
- What gives you the competitive edge?
- What are your contingency plans should other competitors enter the market?

PRODUCTS
Although outlining the products that your bison operation offers is straight forward, there are questions that need to be addressed, particularly for agribusinesses. Include:

- A clear, concise description of your product
- The selling features of the product you are marketing.
- What differentiates your product from that of the competitors?

DISTRIBUTION
Distribution plans are straightforward for many farmers and ranchers. For others, particularly those marketing globally, there is a need to outline the people and the
processes involved in getting the bison products to the customer. The distribution plan should cover:

- How will the product be distributed? Direct Marketing? Wholesaler?
- Website? Sales representative?
- How will customers pay for the product? Credit terms? Cash discounts?
- What after-sales support is provided?
- Is your packaging appealing and complementary to the product being sold?
- Does packaging meet regulatory requirements?
- Where is the product stored?
- Are there delivery time guarantees?
- Do you have a return policy?

**ADVERTISING AND PROMOTION**

This part of your marketing plan details how your bison operation is going to communicate with your customers and prospects. Your advertising and promotions plan should cover the following:

- How you will advertise the product?
- What will be the price of advertising?
- Where will you advertise – newspapers, trade magazines?
- How are you going to generate press for your business?
- What kind of marketing material will you produce? Brochures? Business cards? Flyers?
- Will you have a website?
- Will you utilize trade shows, telemarketing? Etc.

**PRICING STRATEGY**

The market sets the price for many commodities. However, there are many bison farm/ranches that have the flexibility to set a competitive price while making a profit. In setting a product price, you must cover the following:

- What is the consumer acceptance price range for this product?
- What is your base price and how was it established?
- What price do competitors charge?
- Is your variable and fixed cost estimate realistic?
- What is your contribution margin and break-even price?
- If your price is lower than competitors are you still profitable?
- What do your costs include?
- Are you achieving expected returns?

Many producers have difficulty asking higher prices for quality product. Remember, profitability is vital if the business is to grow and survive. Consumers are willing to pay a premium for products that are differentiated in the marketplace. For the bison
cow-calf operator, higher weaning weights and fewer days to finish are valuable traits and will normally attract a price premium.

7. The Operational Plan
This section should prepare a brief outline of the operations of your bison operation. Operational plans will be specific to the enterprise and the scale and type of project. Although the plans are obvious to you, they may not be obvious to the reader. Consider including:

• Steps to accomplish this year’s objectives.
• Actions to be take by whom and by when.
• A production or construction timetable.
• List of materials and supplies required.
• Supplier relationships, purchasing plans, and inputs required.
• Production targets.
• Information on government regulations and their consideration.

This section of the business plan is detailed and relates closely to the financial plan. For a start-up bison cow-calf operation fencing and handling facilities may be an important part of the operational plan – including requirements and how they will be financed.

8. The Human Resources Plan
This section of the plan details your management team and your staff requirements. A strong team is essential for a successful business. The team should have a balance of marketing, technical, operational, and financial skills and experience. The skills required are driven by the complexity of the business. Included in the plans would be:

• Identification of the management and their special skills.
• An outline of the organizational structure, key positions and who occupies those positions.
• Identification of the number of people, full-time and part-time, required to run the business.
• For each position, an outline of the responsibilities and the training and experience required.
• An outline of compensation plans including salary and any benefits provided.
• Identify contingency plans should a key employee leave.
• Identification of weaknesses in the team and how they are addressed.

9. The Environmental Plan
Businesses that do not address environmental issues could face litigation and significant costs that could result in failure. An environmental plan identifies the environmental concerns and strategies to deal with these concerns. Water and soil contamination can be caused by runoff from areas of improper manure management. Sound business
practices will minimize their effects.

In most cases, informing the community of your farm/ranch activities can prevent opposition to planned projects including increasing the size of your operation. Sound environmental practices protect your business from potential liability. To prepare your environmental plan, address the following questions:

- Recognizing the type of production - is this the best location for this facility?
- Have all environmental approvals been obtained with supporting documentation?
- Do you have a disaster plan should there be an environmental disaster?
- Is everything possible being done to prevent ground water, surface water and soil contamination, air and noise pollution?
- Have you communicated sufficiently with the community in which this business is being built?

Note: Different jurisdictions continue to implement improved environmental planning. In some circumstances, an environmental specialist may be required to develop an environmental plan for a farm or ranch.

10. The Financial Plan
The financial plan is a key component of your business plan. It includes the past, present, and projected financial statements for the farm/ranch business. The projected financial statements are based on key assumptions about your business. As you work through the projected financial statements, refine your assumptions about revenues and expenses. State your final assumptions clearly and provide supporting information where available.

Also include information on capital sales and purchases and financing plans.

To assist in completing the financial plan, include the following schedules:

- Statement of assets and liabilities – simply a statement of what you owe and what you own. Assets include cash, investments, land, buildings, equipment, livestock etc. Liabilities include a list and sum of all your loans and mortgages.
- Income and expense statements for past, current and forecasts for future years.
- Cash flow statements
- A breakeven analysis, which indicates how, much income is required in order to cover fixed and variable costs.
- A sensitivity analysis to indicate the impact of different income and expense scenarios.
- Capital expenditure budget and projected timing
- Financing schedule.

Most financial institutions provide templates to develop financial statements. Many
of these are also provided electronically.

11. The Risk Assessment
Every business has some degree of risk. If you outline the risks, you can make allowances for them and/or develop strategies to mitigate the risks. Categorizing risks into production, marketing, human resources, legal, financial, and policy-related issues assists in developing risk-mitigating strategies. Consider the following:

- What are the possible risks in the sector in which you operate – weather, production, legal, human resource, competition, recession?
- What will happen if business revenues fall by 20 percent or expenses are 20 percent higher than anticipated or both?
- What will happen if a government program is terminated or new environmental regulations are established?
- What happens if the number of competitors increases?
- What happens to cash flow if a drought forces you to buy all your feed?
- How will you manage if a long-term employee leaves the operation?
- What risks do you face if you or an employee is seriously injured on the job?
- Will you be able to recover from a pollution accident on your farm?
- Do you have bio-security protocols in place?
- What are your alternatives if the feed supplier goes out of business?
- What options do you have if you run out of cash to complete your project?
- What contingency plans or risk management strategies have you employed to deal with the risks identified?

12. Next Steps
Customize the next steps to the requirements of the business plan. If it is financing that is required, outline the amount, security available, terms and conditions required, and time frames. Outline who will be doing what and when. Keep it simple and clearly identify the next steps for action.

13. Supporting Documents
Supporting documents should be included in such a way that they are recognized as significant components to the business plan. Documents that could be included are:

- Owners and partners resumes that include training, experience, credit background, and personal net worth.
- Job descriptions and resumes of key employees.
- Credit reports and letters of reference.
- Names of professional advisors.
- Contracts of leases, agreements, and patents,
- Detailed list of inventory.
- Property appraisals and insurance documents
- Professional references
• Product and equipment specifications
• Reports or articles that support statements made in plan
• Drawings
• Feasibility analysis or specific research

USING THE PLAN
Having completed your bison farm or ranch business plan is a great step for your business, but only if you use the plan on a continuous basis. Many operations develop an extensive plan, and then fail to implement it.

Remember that the business planning process is dynamic. You will receive new information during each step of implementing the plan. Incorporate this new information into the plan. As the business environment changes so will components of the plan. Review progress relative to your business targets at least quarterly. Adjust your operations as required.

Update the plan at least annually. Share updated information with major partners in your bison farm or ranch – particularly your banker.

Terry Kremeniuk is the executive director of the Canadian Bison Association.
www.canadianbison.ca
United States Department of Agriculture (USDA) 
Farm Service Agency (FSA) 
Loan Programs

BY CASEY TOYNE, FARM SERVICE AGENCY

Due to the niche nature of bison ranching, it can sometimes be more difficult to obtain credit through commercial lending institutions than it would be for other livestock enterprises. Fortunately, the USDA’s Farm Service Agency offers several different alternatives for obtaining financing.

DIRECT LOAN PROGRAM
First among FSA’s loan offerings is the Direct Loan Program. Direct loans are made and serviced directly by FSA using government money. FSA has the responsibility of providing credit counseling and supervision to its direct borrowers by helping applicants evaluate the adequacy of their real estate and facilities, machinery and equipment, financial and production management, and goals.

LOAN PURPOSES
FSA’s Direct Farm Ownership (FO) loans provide farmers and ranchers the opportunity to purchase farmland, construct or repair buildings and fixtures, develop farmland to promote soil and water conservation, or to refinance debt. Direct Operating (OL) loans may be used to purchase livestock, farm equipment, feed, seed, fuel, farm chemicals, insurance, and other operating expenses. Operating loans can also be used to pay for minor improvements to buildings, cost associated with land and water development, family living expenses, and to refinance debts under certain conditions. FSA loans cannot be used to refinance personal debts, buy personal vehicles, or start and operate ineligible enterprises.
MAXIMUM LOAN SIZE
Currently, eligible applicants may obtain direct loans up to a maximum indebtedness of $300,000 for each type of loan (FO or OL).

BORROWER ELIGIBILITY
To qualify for a FSA Direct Loan, the applicant must:

- Be a family farmer;
- Have a satisfactory history of meeting credit obligations;
- For direct OL loans, have sufficient education, training, or at least one year’s experience in managing or operating a farm or ranch within the last five years;
- For direct FO loans, all applicants must have participated in the business operations of a farm for at least three years out of the 10 years prior to the date the application is submitted;
- Be a citizen of the United States, including Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, Commonwealth of the Northern Mariana Islands, Republic of Palau, Federated States of Micronesia and the Republic of Marshall Islands, a U.S. non-citizen national, or a qualified alien under federal immigration law;
- Be unable to obtain credit elsewhere at reasonable rates and terms to meet actual needs;
- Possess legal capacity to incur loan obligations;
- Not be delinquent on a federal debt;
- Not have caused FSA a loss by receiving debt forgiveness (certain exceptions apply) and;
- Be within the time restrictions as to the number of years they can receive FSA assistance.

In the case of an entity, certain eligibility requirements apply. The entity must:

- Meet applicant eligibility requirements;
- Be authorized to operate a farm in the state where the actual operation is located, and;
- Be owned by U.S. citizens, U.S. non-citizen nationals or qualified aliens.

If the individuals holding a majority interest in the entity are related by blood or marriage, at least one member must operate the family farm. If they are not related by blood or marriage, the member(s) holding a majority interest must operate the farm.

APPLICATION PROCESS
Those interested in applying for a loan should contact their local FSA office. FSA employees determine loan eligibility and approval. FSA employees at the local office can explain what information is needed and how to obtain it. In some areas, FSA can arrange for an outside organization to help the applicant gather the information and complete the forms. If available, this help is provided at no cost to the applicant. Providing all of the information that is requested will help the loan application process flow smoothly. (Please note that other information may be required as the process moves along, depending on each individual situation).
In addition to various forms that will be required, an applicant must provide FSA the following information as part of the loan process (Note: If the applicant is already an FSA borrower, this information should be on file with the FSA):

- Proof that the applicant cannot obtain credit from private sources at reasonable rates and terms. A referral letter from a bank or other local lending institution serves as proof and may or may not be necessary depending on the applicant’s financial situation.
- Three years of federal income tax returns.
- Copies of any leases, contracts or agreements.
- Documentation showing compliance with regulations governing certain environmental programs. The local FSA office can assist the applicant with meeting this requirement.

After a loan application is submitted, FSA reviews the application and determines if the applicant is eligible for the requested loan. The applicant will receive written notification of each step in the process, such as when the application is received, when more information is needed, when an eligibility determination is made, and when a final decision is made. If the application is approved, FSA makes the loan and funds are distributed as needed. If the application is denied, the applicant is notified in writing of the specific reasons for the denial, and provided reconsideration and appeal rights.

**LOAN TERMS & RATES**

All Direct Loan interest rates are fixed for the life of the loan. Interest rates are based on agency borrowing costs and are re-evaluated on a monthly basis. Generally, the rates are very favorable when compared to the commercial market. Direct FO loans have a term of up to 40 years while Direct OLs have terms from one to seven years.

The Direct Loan Program is intended to assist those producers who are unable to obtain other financing. Because of this, all direct loans have a “Graduation Clause” that requires the borrower to refinance the loan with a commercial lender when they are financially able.

**SECURITY**

Each loan must be adequately secured. Collateral for OLs typically consists of a first lien on crops to be produced and on livestock and equipment purchased or refinanced with loan funds. A lien may be taken on certain other chattel and real estate property, and an assignment usually will be taken on income such as government payments. Collateral for FO loans consists of real estate only or a combination of real estate and chattels.

**LOAN RESPONSIBILITY**

FSA loan officers are responsible for every aspect of the loan application process as well as servicing.
DIRECT LOAN FEES
There are no fees for making direct loans, however, there will likely be administrative fees related to credit reports, document filings and other loan related actions that occur on a case-by-case basis.

SPECIAL DIRECT LOAN PROGRAMS

Emergency Loans
Emergency (EM) loans help cover production and physical losses for producers in counties declared as disaster or quarantine areas. Loans are limited to actual losses incurred by the disaster. Emergency loan funds may be used to restore or replace essential property, pay all or part of production costs associated with the disaster year, pay essential family living expenses, reorganize the farming operation, and refinance certain debts, excluding real estate. The interest rate is based on the regular Direct OL rate plus 1%. Available terms are from one to seven years for non-real estate purposes and up to 40 years for physical losses on real estate. The maximum loan amount is $500,000. As with all other direct loans, applicants must be able to show that they cannot obtain other financing.

Microloans
FSA developed the Microloan (ML) program to better serve the unique financial operating needs of beginning, niche and the smallest of family farm operations by modifying its Operating Loan (OL) application, eligibility and security requirements. The program offers more flexible access to credit and serves as an attractive loan alternative for smaller farming operations such as specialty crop producers and operators of community supported agriculture (CSA). Microloans can be used for all of the same approved operating expenses as authorized by the Operating Loan Program mentioned previously. Rates and terms are the same as with the regular Direct OL Program. The application process is simpler, requiring less paperwork to fill out. The maximum loan amount is currently $50,000.

Direct Farm Ownership Participation
For the Direct FO Participation program, use of proceeds is the same as with a regular direct FO, but financing is shared between a commercial lender and FSA. So long as the commercial lender finances at least 50% of the loan amount, the interest rate is the direct FO rate less 2% with a floor of 2.5%. The term on the FSA portion of the loan is up to 40 years with a maximum loan amount of $300,000 for the FSA portion of the loan.

Direct Down Payment Farm Ownership Program
The Direct Down Payment FO Program use of proceeds is for the purchase of a farm by a beginning or socially disadvantaged farmer as defined by the agency. Beginning farmers generally include those who have been operating their own farm or ranch.
for less than 10 years and directly or indirectly own real farm property in which the aggregate acreage does not exceed 30 percent of the average acreage of the farms in the county where the property is located. Socially Disadvantaged farmers are individuals or entities who are members of a socially disadvantaged group consisting of: American Indians or Alaskan Natives, Asians, Blacks or African Americans, Native Hawaiians, or other Pacific Islanders, Hispanics, and women. This program requires a down payment of at least 5%. The rate is the regular Direct FO rate less 4% with a floor of 1.5%. The term is up to 20 years and the maximum loan amount is the lesser of: 45% of the purchase price, 45% of the appraised value, or $300,000.

Guaranteed Loan Program
FSA’s other loan offerings are under the Guaranteed Loan Program. Guaranteed loans are those loans made and serviced by a local agricultural lender who participates in FSA’s Guaranteed Lending Program. FSA guaranteed loans provide lenders (e.g. banks, Farm Credit System institutions, credit unions) with a guarantee of up to 95 percent of the loss of principal and interest on a loan. Farmers and ranchers apply to an agricultural lender, which then arranges for the guarantee. The FSA guarantee permits lenders to make agricultural credit available to farmers who do not meet the lender’s normal underwriting criteria.

LOAN PURPOSES
The types of loans available include Farm Ownership (FO) and Operating Loans (OL). Guaranteed FO loans may be made to purchase farmland, construct or repair buildings and fixtures, develop farmland to promote soil and water conservation, or to refinance debt. Guaranteed OL loans may be used to purchase livestock, farm equipment, feed, seed, fuel, farm chemicals, insurance, and other operating expenses. Operating loans can also be used to pay for minor improvements to buildings, cost associated with land and water development, family living expenses, and to refinance debts under certain conditions. FSA loans cannot be used to refinance personal debts, buy personal vehicles, or start and operate ineligible enterprises.

MAXIMUM LOAN SIZE
Currently, FSA can guarantee OLs or FO loans up to $1,392,000 (amount adjusted annually based on inflation).

BORROWER ELIGIBILITY
To qualify for an FSA Guarantee, a loan applicant must:

- Be a citizen of the United States (or legal resident alien), which includes Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and certain former Pacific Trust Territories.
- Have an acceptable credit history as determined by the lender.
• Have the legal capacity to incur the obligations of the loan.
• Be unable to obtain a loan without a guarantee.
• Not have caused FSA a loss by receiving debt forgiveness on more than three occasions on or prior to April 4, 1996; or any occasion after April 4, 1996.
• Be the owner or tenant operator of a family farm after the loan is closed. For an OL, the producer must be the operator of a family farm after the loan is closed. For an FO Loan, the producer needs to also own the farm.
• Not be delinquent on any federal debt.

Entities (corporations, cooperatives, joint operations, partnerships, trusts, and limited liability companies) and their members/stockholders must meet these same eligibility requirements. The entity must also be authorized to operate a farm or ranch in the state where the land is located.

OTHER CRITERIA
In addition to meeting the eligibility criteria, the loan applicant must have a satisfactory credit history, demonstrate repayment ability, and provide sufficient security for the loan.

APPLICATION PROCESS
The following actions are usually taken as part of the application process:

• The producer and lender complete the guaranteed application and submit it to FSA (FSA will assist if needed.)
• FSA reviews the application for eligibility, repayment ability, security, and compliance with other regulations.
• FSA approves and obligates the loan.
• The lender receives a conditional commitment indicating funds have been set aside, and the loan may be closed.
• The lender closes the loan and advances funds to the producer.
• FSA issues the guarantee.

LOAN TERMS AND INTEREST RATES
Repayment terms vary according to the type of loan made, the collateral securing the loan, and the producer’s ability to repay. OLs are normally repaid within seven years and FO loans cannot exceed 40 years. The Guaranteed loan interest rate and payment terms are negotiated between the lender and the borrower within certain allowable benchmarks. In addition, under the *Interest Assistance Program, FSA will subsidize four percent of the interest rate on loans to qualifying borrowers.

*Note: At this time there is no funding for Interest Assistance.

SECURITY
Each loan must be adequately secured. Collateral for OLs typically consists of a first lien on crops to be produced and on livestock and equipment purchased or refinanced with loan funds. A lien may be taken on certain other chattel and real estate property,
and an assignment will usually be taken on income such as government payments. Collateral for FO loans consists of real estate only or a combination of real estate and chattels. FSA staff determines whether the collateral proposed by the lender is adequate.

**LOAN RESPONSIBILITY**

Guaranteed loans are the property and responsibility of the lender. The lender makes the loan and services it to conclusion. If successful, the borrower is able to repay the loan and no taxpayer money will be used except for administrative expenses. If a loan fails, and the lender suffers a loss, FSA will reimburse the lender with federal funds according to the terms and conditions specified in the guarantee.

**GUARANTEED LOAN FEES**

For most loans, FSA charges a guarantee fee of 1.5 percent of the guaranteed portion of the loan. This fee may be passed on to the borrower. The guarantee fee is waived for:

- Interest assistance loans.
- Loans where more than 50% of the loan funds are used to pay off direct FSA loan debt.
- Loans in conjunction with a Down Payment Farm Ownership Loan program for beginning farmers or a qualifying state beginning farmer program. This fee waiver does not extend to all beginning farmers.

**FARM BUSINESS PLAN**

Before you apply for a loan, you need to ensure that you have a solid business plan in place. Your business plan is like a road map that shows how you will move from where you are now to where you want your operation to be in the future. A good business plan that describes your financial and lifestyle goals will help you to evaluate your progress as you establish your new operation or continue your farm or ranch in the future. Your business plan is very important. It shows that you have seriously thought about your goals and plans for the future and that you understand all parts of your operation.

In order to get an FSA loan or a guarantee on a loan made by a commercial lender you need to create a detailed business plan that describes:

- Your mission, vision, and goals for your farm or ranch.
- Your current assets (property or investments you own) and liabilities (debts, loans, or payments you owe).
- What your operation will produce, and how and where you will market and sell your products. This is sometimes referred to as a marketing plan.
- Whether the amount of income your operation will generate will be enough to pay your business and family living expenses.

A comprehensive business plan is an important first step for any size business—no matter how simple or complex. You should create a strong business plan because it:
• Will help you get organized and can help you to make sure you are taking all of the necessary steps and remembering all of the details.
• Will act as your guide. It will help you to think carefully about why you want to farm or ranch and what you want to achieve in the future. Over time, you can look back at your business plan and determine whether you are achieving your goals.
• Is required to get a loan. Lenders look closely at business plans to determine if you can afford to repay the loan.

There are many different styles of business plans. Some are written documents; others may be a set of worksheets that you complete. You can find formats available online and through several agricultural universities. No matter what format you choose, several key aspects of your operation are important to consider. When you are developing your business plan, you should ensure that you address the following questions:

1. Are you starting a new farm or ranch, or are you already in business?
   • What products do you produce?
   • What is the size of your operation?
   • Is the ownership structure of your business a sole proprietorship, partnership, corporation, or other type of entity?
   • What agricultural production and financial management training or experience do you, your family members, or your business partners have?
   • How long have you been in business?

2. What short- and long-term goals do you have for your operation?
   • How do you plan to start, expand, or change your operation?
   • What plans do you have to make your operation more efficient or more profitable?
   • What type of farm or ranch model (conventional, sustainable, organic, or alternative agricultural practices) do you plan to use?

3. What resources do you have, or will you need, for your business?
   • Is the equipment and real estate that you own or rent adequate to conduct your operation? If not, how do you plan to address those needs?
   • What additional resources do you need?

4. Do you have a support system in place?
   • What help will you have operating and managing your farm or ranch?
   • What other resources, such as a mentor or community-based organization, do you plan to use?

5. Will the income you generate be sufficient to pay your operating expenses, living expenses, and loan payments?
   • What crops, livestock, or other products do you plan to sell?
   • How will you market your products?
• Are the yields and prices you used to estimate your income realistic?
• What other sources of income are available to supplement your business income?
• What business expenses will you incur?
• What family living expenses do you pay?
• How will you measure the success of your business?

ADDITIONAL INFORMATION
For additional information on FSA loan programs as well as other offerings, please visit www.fsa.usda.gov and www.fsa.usda.gov/programs-and-services/farm-loan-programs/index or contact your local FSA office.
Navigating the Regulatory Minefield

BY DAVE CARTER

The regulatory environment governing bison meat and inspection can seem like a virtual minefield, where one misstep can result in serious economic injury. It’s important to have a good map and compass to navigate those regulatory requirements, and to seek out marketing opportunities under a host of voluntary label claims as well.

In terms of inspection and regulatory requirements, bison reside in a type of regulatory crossroads involving the Agricultural Marketing Service (AMS) and the Food Safety and Inspection Service (FSIS) within the U.S. Department of Agriculture (USDA), and the Food and Drug Administration (FDA) within the Department of Health and Human Services.

The Federal Meat Inspection Act requires that all “amenable species” of animals must be slaughtered and processed under inspection by the U.S. Department of Agriculture’s FSIS. Amenable species include cattle, sheep, swine, goats, ratites, and equines. Bison are not mentioned in the Meat Inspection Act, and are therefore classified as “non-amenable” (not covered or answerable) under the Federal Meat Inspection Act.

This means that bison technically falls under the jurisdiction of the FDA, and that bison meat processed in any FDA-approved facility can be sold commercially, as long as the plant maintains a separation between amenable and non-amenable species, and as long as the producer complies with FDA labeling requirements.

But it’s not that simple.

Nearly every state—and most commercial retail and foodservice outlets—require all
meat processed for commercial sale to be conducted under USDA or equivalent state inspection.

The Agricultural Marketing Act states that species classified as non-amenable can be processed under FSIS inspection through a procedure known as “voluntary inspection.” Under voluntary inspection, the commodity receives all services provided by FSIS, but bison producers and processors are required to pay for inspection services that are provided at no charge to producers of amenable species animals. The current inspection fee is $55 per hour. Meat processed under this voluntary inspection system must bear a triangle stamp of inspection, rather than the circular stamp seen on beef, pork and other amenable species.

For many producers, state inspection offers a viable alternative to the confusion and cost of federal inspection. The Federal Meat Inspection Act prohibits state-inspected meat from amenable species to be shipped interstate. That prohibition does not apply to non-amenable species, like bison.33

Twenty seven states now operate state inspection programs that meet the requirements of being “at least equal” to federal inspection. A list of the states operating with approved state inspected programs is available at: http://www.fsis.usda.gov/wps/portal/fsis/topics/inspection/state-inspection-programs/state-inspection-and-cooperative-agreements/states-operating-their-own-mpi-programs

At least one state currently limits the scope of their state inspection services to amenable species, so please check with your state department of agriculture before pursuing this route.

Bison meat from an approved source may be used in an amenable meat food or poultry food product that bears the USDA circular mark of inspection. The approved sources include: 1) slaughter inspection under provisions of the Agricultural Marketing Act; 2) an approved state inspection program; or 3) a foreign inspection program under control of FDA.

Once the animal is processed, the packaging and labeling requirements kick in.

Bison products packaged for the commercial retail marketplace must comply with the regulations governing the information that must be included on retail package labels. FSIS publishes the guidelines for mandatory labeling in the publication, A Guide to

33 A provision in the 2008 Farm Bill allows states inspected programs to enter into a cooperative agreement with USDA that will allow amenable species meat processed in those plants to be shipped interstate. Wisconsin, Ohio and Indiana currently have operating cooperative agreements with USDA.
Federal Food Labeling Requirements for Meat and Poultry Products. You can download the entire guide at http://www.fsis.usda.gov/PDF/Labeling_Requirements_Guide.pdf. That guide also contains the regulatory requirements governing the use of any special nutritional claims, such as “low fat,” “high protein” and “low in cholesterol.”

Dave Carter is Executive Director of the National Bison Association.
With the Exception of the Food and Drug Administration, all of the agencies below are part of the U.S. Department of Agriculture. These agencies offer a variety of resources for producers, and administer a number of regulatory programs governing bison production, transportation and marketing. Local offices for the USDA’s Farm Service Agency, Rural Development Agency, and Natural Resources Conservation Service are co-located in a series of Farm Service Centers throughout the United States.

**USDA HOME PAGE**
www.usda.gov

**AGRICULTURAL MARKETING SERVICE**
www.ams.usda.gov

AMS provides market news reports; develops quality grade standards for agricultural commodities; provides voluntary grading services for livestock, meat, poultry and more; administers marketing regulatory programs, marketing agreements and orders; and research and promotion programs; administers national organic standards activities (see separate entry); administers federal-state marketing improvement programs, wholesale facilities research programs, and food purchases; and is the coordinator for USDA’s pesticide data program activities.

**AGRICULTURAL RESEARCH SERVICE**
www.ars.usda.gov

ARS conducts mission-oriented research to ensure adequate protection of food and agricultural products to meet nutritional and other needs of American consumers in animal and plant sciences, including disease and pest controls, soil and water conservation, food safety, human nutrition, and integration of agricultural systems. Most of the research on Malignant Cathedral Fever is being conducted through ARS.
APHIS administers regulatory programs to control or eradicate animal and plant pests and diseases; enforces domestic and port-of-entry agricultural quarantines; licenses and assures safety and effectiveness of veterinary biological products; enforces the Animal Welfare and Horse Protection acts; administers programs providing protection to livestock and crops from depredation by rodents, birds and predatory animals; and conducts cooperative programs to eradicate animal and plant pests and diseases in other countries.

The federal agency responsible for protecting the public health of the nation by preventing unnecessary disease, disability and premature death by promoting healthy lifestyles.

The Economic Research Service (ERS) is the main source of economic information and research from the U.S. Department of Agriculture. The mission of ERS is to inform and enhance public and private decision-making on economic and policy issues related to agriculture, food, natural resources and rural development.

Farm Service Agency oversees the traditional commodity support programs, along with USDA's farm-lending and disaster assistance activities. FSA administers the beginning farm loan program. The disaster programs include Emergency Livestock Assistance and the Livestock Indemnity Program.

Activities relate to protecting public health as it may be impaired by foods, drugs, biological products, cosmetics poisons, pesticides and food additives. FDA ensures that foods are safe, pure and wholesome. FDA also maintains primary jurisdiction over bison meat processing, unless the processors request USDA
inspection through the Agricultural Marketing Service.

**FOOD SAFETY AND INSPECTION SERVICE**
www.fsis.usda.gov
Phone: (202)-720-9113

FSIS administers the federal meat and poultry inspection program to assure safety, wholesomeness and truthful labeling of meat and poultry products and conducts food-safety consumer educational programs.

**FOREIGN AGRICULTURAL SERVICE**
www.fas.usda.gov

FAS serves as a basic source of information to U.S. agriculture on world crops, policies and markets; administers agricultural import regulations; assists in the export of U.S. farm products; and represents U.S. agriculture in foreign trade matters.

**NATIONAL ORGANIC PROGRAM**
www.ams.usda.gov/nop

The National Organic Program operates within the USDA’s Agricultural Marketing Service. It oversees the accredited agencies that certify organic producers and processors, and establishes the regulations to implement the Organic Foods Production Act.

**NATURAL RESOURCE CONSERVATION SERVICE**
www.nrcs.usda.gov

The NRCS administers a variety of programs to assist producers in protecting the health of their soil and water. Among the programs heavily utilized by bison producers are the Environmental Quality Incentives Program (EQIP), the Conservation Stewardship Program (CSP), and the Water Bank Program (WBP).

**RISK MANAGEMENT AGENCY**
www.rma.usda.gov

RMA operates the USDA’s Federal Crop Insurance Corporation (FCIC), which provides crop insurance to farmers and ranchers. RMA’s responsibilities have been expanded in recent years to include a variety of risk management tools for producers. Among the tools available to bison producers are the Rainfall Index Program, and the Whole-Farm Revenue Protection (WFRP) program.
Rural Development administers a variety of cooperative development, housing, and community development programs. Among the programs available to groups of producers is the Value Added Producer Grant Program.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abattoir</td>
<td>A slaughter facility.</td>
</tr>
<tr>
<td>Aging</td>
<td>Practice of holding bison carcasses for a period of time (14-28 days) so that natural enzymes can tenderize and add flavor to the meat.</td>
</tr>
<tr>
<td>Antibiotic</td>
<td>A class of medications used to inhibit or destroy the growth bacteria that may cause disease.</td>
</tr>
<tr>
<td>Backstrap</td>
<td>The elastic type of connective tissue found in the neck, blade, rib and loin sections.</td>
</tr>
<tr>
<td>Backgrounding</td>
<td>The supplemental feeding of a calf at weaning.</td>
</tr>
<tr>
<td>Center Cut</td>
<td>The interior portion of a cut left after removal of outer edges resulting in a more desirable appearance.</td>
</tr>
<tr>
<td>Concentrates</td>
<td>Materials of nutritional value fed to animals. Each species has a normal diet composed of feeds or feedstuffs which are appropriate to its kind of alimentary tract and which are economically sensible as well as being nutritious and palatable.</td>
</tr>
<tr>
<td>Conformation</td>
<td>The manner of formation of an animal, with particular reference to the relative development of the muscular and skeletal system.</td>
</tr>
<tr>
<td>Fabrication</td>
<td>The cutting/breaking of a carcass into primal or control cuts.</td>
</tr>
<tr>
<td>Forbs</td>
<td>Any non-woody flowering plant that is not a grass.</td>
</tr>
<tr>
<td>Genotype</td>
<td>The genetic makeup, as distinguished from the physical appearance, of an organism or a group of organisms.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Grain Fed Bison</td>
<td>Bison fed a supplemental ration of grain for varying amounts of time. The additional grain makes the cover fat a whiter color and can assist in quality consistency.</td>
</tr>
<tr>
<td>Gramanoids</td>
<td>True grasses, and include most plants grown as grains, for pasture, and for lawns.</td>
</tr>
<tr>
<td>Grass Fed Bison</td>
<td>All bison eat grass, but this refers to animals which are never given any grain rations. The fat from animals raised strictly on grass may have a yellowish fat, due to the carotene content in grass.</td>
</tr>
<tr>
<td>Heifer</td>
<td>Young female bison that has not had a calf, or recently had her first calf. Female bison may go into the meat market, or may be reserved for herd growth.</td>
</tr>
<tr>
<td>Hump Roast</td>
<td>The muscles which hold up the bison’s enormous head make up this roast, which is the large hump visible on the bison.</td>
</tr>
<tr>
<td>Knuckle</td>
<td>The portion of the hip that has been separated from the inside and outside round sections of the hip, also known as the sirloin tip.</td>
</tr>
<tr>
<td>Lip</td>
<td>Portion of small muscle attached to rib steaks that extends beyond major muscle.</td>
</tr>
<tr>
<td>Marbling</td>
<td>The fat found within the muscle fibers, or flecks of fat in the meat. Bison is very lean with little to no marbling.</td>
</tr>
<tr>
<td>Nidus</td>
<td>A nest, especially one for the eggs of insects, spiders, or small animals; or a cavity where spores develop.</td>
</tr>
<tr>
<td>Palatability</td>
<td>Refers to the overall taste appeal including tenderness, juiciness and flavor of cooked meat.</td>
</tr>
<tr>
<td>Paleo Indians</td>
<td>Of or relating to prehistoric human culture in the Western Hemisphere from the earliest habitation to around 5000 BC.</td>
</tr>
<tr>
<td>Pathogen</td>
<td>Any agent that causes disease, such as bacterium, virus or fungus.</td>
</tr>
<tr>
<td>Plant Crown</td>
<td>The site on a plant where roots join the stem.</td>
</tr>
<tr>
<td><strong>Primal Cuts</strong></td>
<td>Basic major cuts into which the carcasses and sides are separated. They include chuck, brisket, rib, plate, short loin, sirloin, hip and flank.</td>
</tr>
<tr>
<td><strong>Rhizome</strong></td>
<td>The horizontal stem of a plant that is usually found underground, often sending out roots and shoots from its nodes. Rhizomes may also be referred to as creeping rootstalks, or rootstocks.</td>
</tr>
<tr>
<td><strong>Rigor Mortis</strong></td>
<td>The stiffening of muscle tissue after slaughter.</td>
</tr>
<tr>
<td><strong>Ruminant</strong></td>
<td>A mammal of the order Artiodactyla that digests plant-based food by initially softening it within the animal’s first stomach, known as the rumen, then regurgitating the semi-digested mass, now known as cud, and chewing it again.</td>
</tr>
<tr>
<td><strong>Rumen</strong></td>
<td>Also known as a paunch, forms the larger part of the reticulorumen, which is the first chamber in the alimentary canal of ruminant animals. It serves as the primary site for microbial fermentation of ingested feed. The smaller part of the reticulorumen is the reticulum, which is fully continuous with the rumen, but differs from it with regard to the texture of its lining.</td>
</tr>
<tr>
<td><strong>Shelf Life</strong></td>
<td>The length of time meat products can be safely stored without deterioration of quality.</td>
</tr>
<tr>
<td><strong>Ungulates</strong></td>
<td>Hooved animals.</td>
</tr>
<tr>
<td><strong>Variety Meats</strong></td>
<td>Edible organs and glands of a bison which include; heart, tongue, liver, sweetbreads, kidney, and testicles (Rocky Mountain Oysters).</td>
</tr>
</tbody>
</table>
# Index

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Added Value</strong></td>
<td>41, 196</td>
</tr>
<tr>
<td><strong>Agricultural Marketing Service</strong></td>
<td>174, 185, 186, 241, 281, 283, 285</td>
</tr>
<tr>
<td><strong>Anabolic</strong></td>
<td>246</td>
</tr>
<tr>
<td><strong>Alberta</strong></td>
<td>18, 26, 128, 212</td>
</tr>
<tr>
<td><strong>Allard, Charles</strong></td>
<td>25, 28</td>
</tr>
<tr>
<td><strong>Allen, J.A.</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>American Bison</strong></td>
<td>20, 47, 55, 198</td>
</tr>
<tr>
<td><strong>American Bison Society</strong></td>
<td>24, 32</td>
</tr>
<tr>
<td><strong>American Grassfed Association</strong></td>
<td>187</td>
</tr>
<tr>
<td><strong>American Humane Certified</strong></td>
<td>188</td>
</tr>
<tr>
<td><strong>Anderson, Bruce</strong></td>
<td>167</td>
</tr>
<tr>
<td><strong>Animal &amp; Plant Health</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Inspection Service</strong></td>
<td>284</td>
</tr>
<tr>
<td><strong>Animal Management</strong></td>
<td>102</td>
</tr>
<tr>
<td><strong>Animal Welfare Approved</strong></td>
<td>188</td>
</tr>
<tr>
<td><strong>Antelope Island State Park</strong></td>
<td>34</td>
</tr>
<tr>
<td><strong>Anthrax</strong></td>
<td>119, 127-128, 131</td>
</tr>
<tr>
<td><strong>Antibiotic</strong></td>
<td>43, 122, 123, 185, 205, 253</td>
</tr>
<tr>
<td><strong>Antiquus</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>Agricultural Research Service</strong></td>
<td>283</td>
</tr>
<tr>
<td><strong>Bison Antiquus</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>Bison Latifrons</strong></td>
<td>12-13, 15</td>
</tr>
<tr>
<td><strong>Bison Priscus</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>Bison Respiratory Disease</strong></td>
<td>123</td>
</tr>
<tr>
<td><strong>Bison Welfare Audit</strong></td>
<td>111, 112</td>
</tr>
<tr>
<td><strong>Blackfeet</strong></td>
<td>17, 25</td>
</tr>
<tr>
<td><strong>Blackleg</strong></td>
<td>126, 129</td>
</tr>
<tr>
<td><strong>Blue Babe</strong></td>
<td>13</td>
</tr>
<tr>
<td><strong>Bluetongue</strong></td>
<td>126-128, 131</td>
</tr>
<tr>
<td><strong>Body Mass</strong></td>
<td>12, 80</td>
</tr>
<tr>
<td><strong>Bolus</strong></td>
<td>133</td>
</tr>
<tr>
<td><strong>Boone &amp; Crockett Club</strong></td>
<td>21</td>
</tr>
<tr>
<td><strong>Bos bison</strong></td>
<td>14</td>
</tr>
<tr>
<td><strong>Bottleneck</strong></td>
<td>20, 54, 56</td>
</tr>
<tr>
<td><strong>Bovine Respiratory Syncytial Virus</strong></td>
<td>123</td>
</tr>
<tr>
<td><strong>Bovine Rhinotracheitis Virus</strong></td>
<td>123</td>
</tr>
<tr>
<td><strong>Bovine Tuberculosis</strong></td>
<td>122</td>
</tr>
<tr>
<td><strong>Bovine Virus Diarrhea</strong></td>
<td>212, 126</td>
</tr>
<tr>
<td><strong>Bronx Zoo</strong></td>
<td>24</td>
</tr>
<tr>
<td><strong>Brown Stomach Worm</strong></td>
<td>124</td>
</tr>
<tr>
<td><strong>Brucellosis</strong></td>
<td>121, 128, 131</td>
</tr>
<tr>
<td><strong>Bud Williams Schools</strong></td>
<td>96, 100, 115</td>
</tr>
<tr>
<td><strong>Buffalo Caller</strong></td>
<td>17</td>
</tr>
<tr>
<td><strong>Buffalo Gold</strong></td>
<td>198</td>
</tr>
<tr>
<td><strong>Bunostomum</strong></td>
<td>124</td>
</tr>
<tr>
<td><strong>Byproducts</strong></td>
<td>150, 186</td>
</tr>
</tbody>
</table>
Calcium  97, 137, 149
Calving  31, 43-44, 50-51, 55, 57, 67, 79, 94, 125, 129, 133, 137-138, 213, 246
Canadian Bison Association  22
Carrington Research  154,
Carter, Dave  10, 23, 35, 36, 39,43, 44, 50, 86, 100, 101, 104, 110, 121, 137, 159, 165, 174, 184, 185, 197, 202, 208, 243, 247, 281
Case Ready  208,
Catabolic  120, 246,
Catch Pen  88,
Cellulose  145,
Cellulosic bacteria  145
Chauvet  12
Clostridia  126
Clostridium Chauvoei  126
Cobalt  147
Collier, John  35
Colorado State University  61, 107, 200-201
Colostrum  50, 125
Commercial Marketing  142, 173-176
Concentrates  145-146, 287
Conditioning  50
Confined Feeding  105
Conformation  52-53, 77-78, 246l 287
Conjunctiva  123
Cooperative  22, 36, 61, 237, 238, 261, 276, 282, 284, 286
Copper  147, 192
Corn  62, 146-150, 213, 245
Corrals  69-76, 92, 96-97, 106, 110, 143, 191, 233
Cortisol  120
Cow Calf  117, 129, 153, 156, 211-216, 229, 231, 243, 252, 259, 257, 261, 263, 265, 267
Cote, Steve  100, 115
C. Perfringens  126
C. Septicum  126
C. Tetani  126
Culcoides  127
Cull  52-53, 56, 94, 96, 140, 212, 213, 214, 215-216, 253
Custer State Park  32-34, 169, 205
Denver Museum of Natural History  15
Department of Agriculture  7, 41, 166, 200, 236, 271-279, 281, 282, 283-286
Dietyocaulus  124
Dineen, Bob  249
Dire wolves  12
Disease  13, 34, 35, 83, 97, 101, 105, 106, 117-133, 143, 253, 283, 284 287
Distillers Grain  146-148
Distributor  168, 173, 251,
Drench  133
Drought  140, 161, 175, 215, 222, 224, 269
Dry Bean Splits  148
Dupree, Frederick  30
Durham Ranch  54, 64-65
Dust Bowl  16
Eastern Bison Association  156
Easton, David  217-226
Ecosystem  7, 16, 42, 58, 62, 87, 88, 136
Electric Fence  64, 91, 92
Enterotoxemia  126
Epizootic Hemorrhagic Disease  126
Extension Agents  187, 258, 260
Farmers’ market  39, 89,142, 155-166, 208, 230, 240, 260
Farm Ownership  271, 274-277
Farm Service Agency  230, 236, 271-279, 283, 284
Federal Crop Insurance  285
Food and Drug Administration (FDA) 187, 153, 281, 283, 284
Federal Meat Inspection Act 191, 192, 281, 282
Feed Additives 150
Feeder 42, 52, 63, 74, 146, 148, 150, 152-153, 243, 250, 252, 262
Feist, Murray 145, 154
Fencing 31, 43, 64, 99, 104, 125, 138, 235, 237, 247, 267
Field Pea 148-150
Financial Institutions 258, 268
Finishing 42, 135-143, 145-154, 243, 244, 245, 252, 260
Flocchini, Armando 34
Flocchini, John 47, 53, 54, 65, 103
Flying D 57, 59-61, 115
Food Safety and Inspection Service 185, 281, 285
Foodservice 41, 175, 249, 281
Foreign Agricultural Service 285
Flushing 51

G
Gates 75, 76, 89, 92, 114, 139, 153
Gehring, Dick 77-83
Gestation 186
Gilcrease Museum 16, 17
Golembeski, Susan 227-232
Goodnight, Charles 21, 28-29, 31, 39
Goodnight, Mary Ann 29, 31
Graese, Lee and Mary 244, 246, 247
Grain Finishing 136, 140, 145-153
Grain Screenings 149
Grandin, Temple 92, 93, 96, 107, 111, 115
Grass Finishing 135-143, 245
Graser 12, 14, 59, 104, 145, 224
Great Slaughter 19-21
Grinnell, George Bird 23
Growth Hormone 43, 185, 205, 253
Grubb, Brian 227-232

H
HACCP 191
Haemonchus 124
Hana, Ryan, 85-90
Handling Systems 69, 143
Heifers 50, 65, 82-83, 147, 153, 211, 213, 230, 244-245, 259-260
Herbivores 11
Hrdlicka, Dr. Ales 15
High Stress 70, 75, 101-102, 108, 86, 235
Holistic 66-68, 93, 234, 241
Holocene 14, 93
Hooves 58, 62-63
Hookworm 124
Hormones 43, 185, 192, 205, 253
Hornaday. William 20, 21, 24-25, 39
Houck, Roy 34
Humane Farm Animal Care 188
Hunter, David 117

I
Ice Age 11-14, 47, 98
Infectious Bovine Rhinotracheitis 123
Internal parasites 124-125
Internet Marketing 178
Inter Tribal Buffalo Council 36
Intestinal Worm 124
Ionophores 151
<table>
<thead>
<tr>
<th>J</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jesse Figgins</td>
<td>15</td>
</tr>
<tr>
<td>Johne’s</td>
<td>125, 131</td>
</tr>
<tr>
<td>Jones, C.J. &quot;Buffalo&quot;</td>
<td>21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>K</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly, Kristopher</td>
<td>243-247</td>
</tr>
<tr>
<td>Klemm, Ken</td>
<td>69, 70, 71, 74, 75-76</td>
</tr>
<tr>
<td>Kocik, Carrie</td>
<td>181-184</td>
</tr>
<tr>
<td>Kossler, Mark</td>
<td>57, 65, 99, 115</td>
</tr>
<tr>
<td>Kremeniuk, Terry</td>
<td>39, 44, 257</td>
</tr>
<tr>
<td>Kroos, Roland</td>
<td>57-68</td>
</tr>
<tr>
<td>Kuck, Lance</td>
<td>211-216</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lammars, Duane</td>
<td>91-98</td>
</tr>
<tr>
<td>Lascaux</td>
<td>12</td>
</tr>
<tr>
<td>Latifrons</td>
<td>12, 13, 15</td>
</tr>
<tr>
<td>Leniman, Sean</td>
<td>177-180</td>
</tr>
<tr>
<td>Leptosirosis</td>
<td>126</td>
</tr>
<tr>
<td>Lice</td>
<td>125, 133</td>
</tr>
<tr>
<td>Linnaeus</td>
<td>14</td>
</tr>
<tr>
<td>Liver fluke</td>
<td>124, 230</td>
</tr>
<tr>
<td>Low Stress</td>
<td>66, 97, 99-115, 153</td>
</tr>
<tr>
<td>Lungworm</td>
<td>124</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>McLunkin, George W.</td>
<td>15</td>
</tr>
<tr>
<td>McKay, James</td>
<td>26</td>
</tr>
<tr>
<td>Malignant Catarrhal Fever</td>
<td>117, 119, 121, 127</td>
</tr>
<tr>
<td>Malignant Edama</td>
<td>126</td>
</tr>
<tr>
<td>Manganese</td>
<td>147</td>
</tr>
<tr>
<td>Manitoba</td>
<td>27, 124</td>
</tr>
<tr>
<td>Mannheimia</td>
<td>123</td>
</tr>
<tr>
<td>Marquis, Ted</td>
<td>34</td>
</tr>
<tr>
<td>Matheson, Jim</td>
<td>203</td>
</tr>
<tr>
<td>Mastodons</td>
<td>11</td>
</tr>
<tr>
<td>Metabolism</td>
<td>118</td>
</tr>
<tr>
<td>Miller, Randy and Hame</td>
<td>205-208</td>
</tr>
<tr>
<td>Miskin, Cecil, Theresa, Ron</td>
<td>195-198</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National Bison Association</td>
<td>7, 9, 10, 22, 36, 40, 41, 43, 44, 56, 115, 121, 133, 156, 167, 171, 188, 189, 202, 205, 217, 218, 235, 241m 243, 260</td>
</tr>
<tr>
<td>National Bison Range</td>
<td>21, 24, 26, 32, 33</td>
</tr>
<tr>
<td>National Organic Program</td>
<td>186, 187, 285</td>
</tr>
<tr>
<td>National Organic Standards</td>
<td>283</td>
</tr>
<tr>
<td>Natural Resources</td>
<td></td>
</tr>
<tr>
<td>Conservation Service</td>
<td>283</td>
</tr>
<tr>
<td>Nematodirus</td>
<td>124</td>
</tr>
<tr>
<td>Nitrate</td>
<td>238</td>
</tr>
<tr>
<td>Niobrara</td>
<td>24, 34</td>
</tr>
<tr>
<td>Nodular Worm</td>
<td>124</td>
</tr>
<tr>
<td>North Dakota State University</td>
<td>146, 154</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>O</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Oats</td>
<td>146, 149, 150</td>
</tr>
<tr>
<td>O’Brien, Dan</td>
<td>191-193</td>
</tr>
<tr>
<td>Oesophagostomum</td>
<td>124</td>
</tr>
<tr>
<td>Oglala Sioux</td>
<td>35</td>
</tr>
<tr>
<td>Operating Loans</td>
<td>271, 275</td>
</tr>
<tr>
<td>Organic Foods Production</td>
<td>285</td>
</tr>
<tr>
<td>Ostertagia</td>
<td>124</td>
</tr>
<tr>
<td>OvHV-2</td>
<td>127</td>
</tr>
<tr>
<td>Ovine Herpesvirus-2</td>
<td>127</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pablo, Michel</td>
<td>21, 25</td>
</tr>
<tr>
<td>Packaging</td>
<td>162-163, 167, 193, 235, 266, 282</td>
</tr>
<tr>
<td>Paleo</td>
<td>15-16, 183, 288</td>
</tr>
<tr>
<td>Paquime</td>
<td>19</td>
</tr>
<tr>
<td>Parainfluenza-3</td>
<td>123</td>
</tr>
<tr>
<td>Index Terms</td>
<td>Page Numbers</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Partnership</td>
<td>85, 188, 225, 261, 264, 276, 278</td>
</tr>
<tr>
<td>Pasteurella</td>
<td>123</td>
</tr>
<tr>
<td>Pasture Management</td>
<td>59, 103</td>
</tr>
<tr>
<td>Pasturing</td>
<td>260</td>
</tr>
<tr>
<td>Pathogens</td>
<td>117, 119-121, 125, 127-129, 131, 132</td>
</tr>
<tr>
<td>Paulson, Aaron</td>
<td>63, 99, 115</td>
</tr>
<tr>
<td>Pelage</td>
<td>14</td>
</tr>
<tr>
<td>Permafrost</td>
<td>13</td>
</tr>
<tr>
<td>Physiology</td>
<td>118, 153, 154</td>
</tr>
<tr>
<td>Pinchot, Gifford</td>
<td>32</td>
</tr>
<tr>
<td>Pine Ridge</td>
<td>35</td>
</tr>
<tr>
<td>Pipe</td>
<td>19, 74, 87</td>
</tr>
<tr>
<td>Philip, Scotty</td>
<td>21, 30, 39</td>
</tr>
<tr>
<td>Pickering, Bob</td>
<td>11, 22</td>
</tr>
<tr>
<td>Plains Indians</td>
<td>29</td>
</tr>
<tr>
<td>Pleasant, Jack and Sandy</td>
<td>155, 166</td>
</tr>
<tr>
<td>Pleistocene</td>
<td>11-12</td>
</tr>
<tr>
<td>Pinkeye</td>
<td>131</td>
</tr>
<tr>
<td>Post-legged</td>
<td>77-78</td>
</tr>
<tr>
<td>Posts</td>
<td>87, 91, 182, 184</td>
</tr>
<tr>
<td>Process Verified Program</td>
<td>187</td>
</tr>
<tr>
<td>Rotational Grazing</td>
<td>87, 93, 136, 137-138, 237, 239</td>
</tr>
<tr>
<td>Ruminant</td>
<td>106, 118, 123, 124, 125, 126, 128, 145, 146, 148, 154, 289</td>
</tr>
<tr>
<td>Rumination</td>
<td>146, 150</td>
</tr>
<tr>
<td>Rural Development</td>
<td>142, 283, 284, 286</td>
</tr>
<tr>
<td>Rut</td>
<td>48, 49, 51, 82, 120,</td>
</tr>
<tr>
<td>Rutley, Dr. Bruce</td>
<td>153</td>
</tr>
<tr>
<td>Saber-toothed Cats</td>
<td>12</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>27, 154</td>
</tr>
<tr>
<td>Selenium</td>
<td>147</td>
</tr>
<tr>
<td>Self-feeders</td>
<td>148, 152</td>
</tr>
<tr>
<td>Sheridan, Phil</td>
<td>21</td>
</tr>
<tr>
<td>Siberia</td>
<td>11-13</td>
</tr>
<tr>
<td>Sickle-hocked</td>
<td>77-78</td>
</tr>
<tr>
<td>Slaughtering</td>
<td>235, 260</td>
</tr>
<tr>
<td>Smithsonian Institution</td>
<td>15, 20, 23-24</td>
</tr>
<tr>
<td>Soak time</td>
<td>109, 111</td>
</tr>
<tr>
<td>Social Structure</td>
<td>71, 103, 104, 118, 120, 145, 152, 154, 213-214</td>
</tr>
<tr>
<td>Sodium</td>
<td>137</td>
</tr>
<tr>
<td>Soil5</td>
<td>2, 58-63, 125-128, 137-139, 147, 205, 229, 230, 234-239, 244, 246, 247, 268, 271, 283</td>
</tr>
<tr>
<td>Sole Proprietorship</td>
<td>261, 264, 278</td>
</tr>
<tr>
<td>Solis</td>
<td>19</td>
</tr>
<tr>
<td>Soybean Hulls</td>
<td>146, 148</td>
</tr>
<tr>
<td>Squeeze Chute</td>
<td>70-71, 74-75, 108-110, 197</td>
</tr>
<tr>
<td>Stampeding</td>
<td>18, 72, 107, 36</td>
</tr>
<tr>
<td>Steenbergen, Jill</td>
<td>143</td>
</tr>
<tr>
<td>Steppe Bison</td>
<td>11-13</td>
</tr>
<tr>
<td>Stirling, Bob</td>
<td>173-176</td>
</tr>
<tr>
<td>Stocking Rate</td>
<td>81, 82, 87, 137, 140, 239</td>
</tr>
<tr>
<td>Stoltenow, Dr. Charles</td>
<td>147</td>
</tr>
<tr>
<td>Stone, Jim</td>
<td>35-36</td>
</tr>
</tbody>
</table>