

BISON BEHAVIOUR

This information was extracted from *Code of Practice For the Care and Handling of Bison: Review of Scientific Research Priority Issues October 2016*

Objective – The objective of this chapter is to introduce bison producers and bison handlers to bison behaviour so that they can be handled safely. It also provides information on bison behaviors and what those behaviours normally signal to other bison and the people around them.

Bison are the largest land animal in North America. Most mature males weigh over 2,000 lbs. with females weighing around 1,000 lbs. Although bison are large, they are quick to react, can run at speeds of 50 kilometers per hour and can jump six-foot fences if required to do so. Understanding bison will allow their farmers and ranchers to manage them with out harm to the animal or their handlers.

In order to safely carry out routine husbandry procedures, producers must have the ability and knowledge to be able to gather, segregate and confine their animals. Injuries and death during handling are more frequent with bison than with cattle, which have been bred for calm temperaments. Bison handling techniques are considerably different from traditional cattle handling techniques. The aim of this review is to provide some specific information about the natural behaviour of bison, and how that can be used to the advantage of the producer for calm handling practices.

The majority of peer reviewed articles describing bison behaviour are ecological studies, and the bison are observed in wild or semi-wild situations (e.g., National Parks). There is a lack of research studies that observe bison in modern, commercial settings. It would be expected that the bison behave differently on commercial ranches as their social groups, feeding, management and environment would be different to that in the wild. For instance, 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 various times of year.

Males

Bulls will separate from the herds after breeding and only young bulls are allowed to stay with the cows and calves. Bison exhibit male-dominance with males guarding individual females from other rival males during the breeding season or rut as it is often called. Bulls do this by using dominance displays involving vocalizations, postural displays, scent urination, pawing, head rubbing, wallowing and physical fights. Bulls also spend a lot of time tending cows that are not in

estrus. Overall, high ranking dominant bulls obtain more copulations and sire more offspring than low ranking bulls

Male bison have been observed arching their backs during vicious battles, during some “mock battles,” and while walking among the rutting herd – or, more typically, in a bull sub-group during the rut. It has been observed that the frequency of dominance behaviours was much less in the wild than in the captive herds.

Rut

There is more general activity in the herd during the rut than during other seasons, and peaks in rutting activity occur just after dawn and dusk. Males display a very specific set of behaviours during the rut. These activities included sniffing of vulvas, tending of cows, bellowing, wallowing, horning, vicious and non-vicious battles, and incomplete and fertile mountings. Active participation during the rut is physically exhausting, with bulls estimated to lose up to 10% of their body mass over the course of the season.

The bond between a bull and a cow during the rut is called the *tending bond*. When a bull is tending a female, this usually means that he keeps a very close distance to her (usually one to five feet) and is sometimes touching the cow. It has been observed that almost all of the tending was done by bulls ranging from six to at least 14 years of age.

Vocalization

Bulls roar any time of the year, but more commonly and most intensively during the rut when there are many agonistic confrontations between competing males. It is suggested that bulls bellow for several reasons, including maintaining bonds with females, approaching another male, while following the trail of the herd, in answer to the bellow of another bull or in response to an automobile. It has also been observed that bellows are sometimes accompanied by snorts

Females

Bison cows and juveniles form relatively large herds in which members maintain close proximity and synchronized activity patterns. Solitary bison, with the exception of older bulls are rare, as bison are a very social species with strong matriarchal divisions. Cows stimulate bulls to compete for the opportunity to tend them and then cooperate with the successful bull to copulate. Breeding is strongly seasonal: about 90% of all copulations take place in a two-week period

Pre-parturition

Bison cows are known to separate from the herd shortly before parturition. It is generally thought that the reason for doing this is to find shelter from predators (e.g., wolves) and to give birth to her calf without interruptions/annoyance from other members of the herd. This period of isolation can also help to strengthen the bond between mother and calf. In one description of bison social behavior there were instances where the cows gave birth to calves while remaining in cow groups. These groups were usually smaller and composed of several cows that either were pregnant or possessed young calves. In other instances, the pregnant cow was restless and wandered short trips away from the herd for one to sometimes several days prior to calving.

Cows and Calves

Of the relationship between cows and calves, it has been observed and reported that for the first few days the calves remained particularly close their mother. Up to two to three weeks they generally lay down within a few feet of their mothers, while older calves often lay further away in subgroups. Up to an age of eight to twelve months, cohesion between cow and calf was sufficiently evident to identify each pair during most periods of the day. After this age the attachment weakens considerably, particularly with bull calves. Recognition between calf and mother depends upon scent, sight or sound. However, it has also been reported that instances of recognition by scent were rare for calves older than one month and that recognition by grunts without aid of sight showed that some grunts were distinctive.

During observations it has been reported mothers never abandoned their calves or hesitated to defend them against approaching animals or human beings by quick charges or slow advances. In the instance of twins, a bison cow will first attempt to care for both, but if the bison are free-roaming and she has to travel to keep up with the herd, she will quickly lose interest in one of the calves and it will most likely die of starvation. The occurrence of twin calves is very uncommon in commercial operations and in the wild.

Body language

Through observation of confined herds throughout the seasons, there are some notable points. Alarm responses are usually elicited due to disturbances by strange objects, usually human beings. Based on observation, bison stop and stared for several seconds with ears brought forwards and head directed towards the disturbance. This was followed by the bison running away.

The position of the bison's tail is also a great indication of body language. In addition to switching the tail back and forth to flush insects, frequent tail-switching occurred in a variety of situations, predominantly during play, such as chasing and bounding. Elevation and switching of the tail also occurred during the violent battles of the rut, by the calves during nursing and during herd movements. The

tail was raised and stiffly held 0° to 90° above the horizontal most frequently during trotting/running/bounding such as in playful chases, stampedes or in short charges, while moving forward and investigating unfamiliar objects or during moments of tenseness or excitement, such as moving through the herd in the rut or before an attempted mount.

In many species, it has been observed that tail elevation and high postural tonus (muscle contraction) are correlated and indicate a preparation for locomotion and an increase in pace. This upright posture has become of communicative value to indicate a preparation for locomotion, alertness and warning. It is also used in confident approach and often associated with aggressive intentions.

Bison were also observed “horning” lodgepole pine by stripping bark with the ends of their horns; this was sometimes accompanied by eating the bark and rubbing. This behaviour was most commonly observed during the rut. Interestingly, bison preferred horning the bark or branches of previously horned trees rather than starting on fresh material.

Some behaviours are particularly useful for producers to be able to recognize, e.g., “sickness behaviours.” These are a group of postures typically associated with the animal experiencing poor health. Identifying sickness behaviours in bison can be very challenging, particularly as prey animals do not want to advertise the fact that they are a weak member of the herd. Typical signs of fever include animals spending additional time at water sources, more frequent trips to the water source, drooping ears, mouth breathing and time spent away from the herd. Bison that lag behind when bison move to graze new pastures are suspect, as it might encompass either problems with locomotion or rejection from other herd animals.

Bison Behaviour during Handling

Bison, like cattle, are routinely handled to maintain herd health and meet the requirements of various regulatory agencies for diseases. Injuries and death during handling are more frequent in bison than in cattle, which have been bred for calm temperaments. Bison can break off a horn cap, gore one another, attempt to jump out or smash through a holding pen, and even die due to excessive stress cause by handling. Calm handling of bison, an excitable animal, requires attention to detail and strategies that differ greatly from traditional animal handling.

Based on observation, it is beneficial to understand bison’s behavioral signs of stress and allow them a chance to recuperate. For example, when bison are suffering from heat stress, they will display heavy, open-mouthed panting, sometimes accompanied by a protruding tongue and excessive salivation. Bison calves activate a stress adaptation response to significant stress that can cause an increased level of cortisol in the blood, which results in an inhibition of

the animal's immune response system. This will render the calf more susceptible to infection. Also, animals that exhibit a high level of stress when handled may be a real challenge the next time through the corrals. Transitioning their exposure to people, equipment, vehicles and other things in their environment usually pays off by maintaining a low stress environment.

As mentioned previously, bison are not domestic cattle, and therefore will not move the same way through handling facilities. In a study conducted in Colorado, bison calves were conditioned (trained) to some common handling practices, such as standing calmly in a chute and standing calmly during a novel experience and rewarded with food, resulted in the desired behaviour. Habituation (training) changes the animal's perception of a frightening experience, and habituating bison to routinely accept handling procedures in a squeeze chute will help reduce injuries, thus allowing the wild genetic type to remain in the herd.

The frequency of human contact will determine how wary the bison are, and will affect their flight zone. Also, previous negative handling experiences can make subsequent handling more difficult. The flight zone is the critical distance at which an animal, or group of animals, will make an escape response upon the approach of another animal, human handler or object. The flight zone of bison tends to be much greater than that of cattle, and bison can be moved most effectively if the handlers work on the edge of it. Handlers should stay out of the blind spot directly behind the animal, and where possible handlers should always work bison from one side only, and preferably outside of the pen. Handlers should avoid deep penetration of the flight zones because this will cause panic and attempts to escape. Panic behaviour typified by excessive and disorientated running may take place, increasing the risk of animals sustaining injuries by running into fences, corrals and other objects.

Bison that are held individually, in small groups away from the herd, or who are exposed to unfamiliar handlers, objects or noises tend to be flightier. Ideally, a bison handling facility should be designed in such a way that the bison intuitively want to move in the desired direction (i.e., they will want to exit at the same point they entered a corral), thus reducing the stress associated with handling.

Requirements for wallowing/rubbing

Wallowing (in which the animal rolls in dirt) is a common behaviour observed in bison, which is not typical of domestic cattle. Wallowing appears to be primarily a grooming or comfort behaviour however; it may serve many other functions. There are several different suggestions for why bison require to perform wallowing and rubbing behaviours, including grooming associated with shedding, male-male interaction (typically rutting behaviour), social behaviour for group cohesion, play behaviour, relief from skin irritation due to biting insects, reduction of ectoparasites (ticks and lice), and thermoregulation. Shedding, rut and insect

harassment all occur simultaneously in summer; therefore, it may be a combination of these factors that result in horning and wallowing behaviours.

Wallowing and rubbing behaviours include oral grooming by means of tongue licking, scratching with the hind hoof, and rubbing against trees and other stationary objects, which would all be effective to varying degrees in dislodging unattached, traversing ticks. A bison's first line of defence from ticks is its coat, which has more primary hairs per square inch than any other members of the bovid family—ten times more than cattle—and a woolly undercoat as well. Researchers described that bison commonly rubbed their heads, necks and sometimes their sides on stumps, large low branches and trunks of trees. Bison also rub on trees to remove tufts of shed winter fur, although this was not the sole purpose of rubbing since this behaviour was observed in all four seasons.

One researcher described bison wallowing as consisting of one to three actions: a sniffing of the ground, a preliminary pawing, and rolling on the ground. He also observed that the first two actions were sometimes omitted, although rolling never was. It was also observed that wallowing was preceded or followed by horning or rubbing the head in the earth and a type of "neck-crooking" where the neck was stretched and flexed and the horns occasionally scratched against the back. Most wallowing was also done where previous wallowing had broken the sod. Other areas of preferred wallowing occurred in natural bare areas, prairie dog mounds, wet mud holes and occasionally on snow. Wallowing was the most noticeable among bulls during the rut although it was observed in both sexes at all times of year. Within the herd, it is thought that adult males wallow more frequently than adult females, and both adult males and females wallow more frequently than yearlings.

Requirements for bedding/shade/wind protection

There is currently no scientific evidence as to whether or not bison either require or would use bedding, shade or wind protection. However, it is known that bison are extremely cold tolerant, and, unlike other wild oxen and domestic cattle species (which raise metabolic output at cold temperatures), bison maintain or reduce their metabolic rate in still air to -30 degrees Celsius. Conservation of thermal energy during times of cold and food deprivation is accomplished by minimizing physical activity. Bison have evolved many physiological and anatomical adaptations making them extremely successful in surviving harsh winters. Other species of animal, such as cattle and horses, can usually be seen exposing their backs to the direction the wind is coming from. However, bison instinctively face the storm and are able, as a result, to survive. In doing so they prevent snow, ice and cold air from blowing under their coats and thus becoming chilled; moreover, their dense, woolly winter coat keeps them warm.

Bison have several morphological adaptations towards cold stress, including their hair coat. The insulation of the fur is higher in bison than in any other bovid,

owing to the extremely dense fur and thick woolly undercoat. Thus, the bison hair coat, although doubtless evolved as an adaptation to winter cold stress, also acts as a barrier to tick movement which offsets the sharp decline in grooming during the winter and early spring, when bison must conserve energy.

For reference details go to: *Code of Practice for the Care and Handling of Bison: Review of Scientific Research on Priority Issues* at <http://www.nfacc.ca/codes-of-practice/bison>