Utility of Low-Stress Livestock Handling Techniques for Management of Feral Horses at Theodore Roosevelt National Park

by
Blake McCann, Ph.D. *
Senior Wildlife Biologist
Theodore Roosevelt National park
Medora, North Dakota

Abstract

Management of feral horses on federal lands has become a contentious subject due to animal welfare issues associated with helicopter round-ups. At Theodore Roosevelt National Park managers are working to implement alternative horse capture techniques that will minimize stress to animals while meeting resource management objectives, including low-stress livestock handling (LSLH) which may be an effective option. However, the feasibility of LSLH in terms of time, effort, and efficacy on park lands is currently unknown. Therefore, the objective of this study is to quantitatively and qualitatively evaluate the utility of LSLH techniques for herding of feral horses to specific locations within the park. During August – October 2014 we conducted 31 short-duration (i.e., < 2 hours) LSLH herding attempts in the South Unit of the park—22 on foot and nine on horseback. Where possible, we quantified time invested, pressure zone distances, and straight line and meandering geographic distances traveled during herding attempts. We also recorded qualitative measures of animal behavior pertaining to core principles of LSLH. Animals were herded successfully to objective locations on 67.18% of attempts on foot and 44.44% of attempts on horseback, with a success rate of 61.29% overall. Handlers achieved movement toward herding objectives at a rate of 580.61 meters per hour on foot and 907.80 meters per hour on horseback, and meandering courses of travel were more than twice the straight line distance between starting and ending locations in most cases. Herding attempts by a single handler on foot were most successful at keeping animals in a normal state of mind and moving them in the desired direction to a specific location. Overall, results indicate that LSLH is a viable option for horse management in the park. Ongoing evaluation of lasting impacts to animal behavior, the efficacy of long-duration herding attempts (e.g., > 2 hours), and park staff ability to herd animals into corral facilities for capture will be necessary. Notably, an opportunistic herding and capture attempt by a single park staff member during February 2015 was successful.

* See last page of article for a biographical sketch.

Feral horses at Theodore Roosevelt National Park. (Photo by Whit Hibbard)

Introduction

Free-ranging horses (*Equus caballus*) are charismatic megafauna that garner considerable enthusiasm with the general public in the United States. In North Dakota, the state legislature has recognized feral horses occurring on NPS lands as an important cultural resource to be preserved. Furthermore, horse viewing and photographic opportunities are a primary reason that individuals visit Theodore Roosevelt National Park (TRNP, the park). However, there are no natural predators of horses in TRNP, and the population is closed due to perimeter fencing encompassing the South Unit of the park. Therefore, horses must be managed actively to prevent overpopulation, range degradation, and the onset of detrimental cascading ecosystem effects (Westfall et al., 1993).

Management of feral horses on federal lands has become a contentious topic because of animal welfare issues associated with roundup operations using helicopters, concerns regarding the ultimate disposition of culled animals, and a general lack of science-based management

Helicopter bringing in horses to the animal handling facility at Theodore Roosevelt National Park. (Photo courtesy of the National Park Service)

strategies (National Research Council, 2013). Helicopter-assisted roundups have been the primary tool for periodic (e.g., 3-4 year interval) gathering of horses and other large ungulates at

TRNP. With this technique, a helicopter is used to herd animals to a permanent wildlife handling facility, where they are processed (e.g., marked, tested for disease) and sorted individually to be kept or culled from the population.

Culled horses are then transported off-site and sold at auction facilities. Although this approach is effective at quickly reducing herd size, aerial operations are expensive and can be hazardous, and there is considerable public opposition because of animal welfare concerns

Animal handling facility at Theodore Roosevelt National Park. (Photo by Whit Hibbard)

with aerial herding procedures. Further, periodic gathering of horses results in large numbers of culled animals, for which it is difficult to arrange willing recipients with permanent homes. Finally, large-scale roundups may have biological consequences because a large segment of the population is instantaneously removed, which can result in loss of genetic diversity where culled animals are naively selected.

At TRNP, managers have worked proactively to evaluate and fine-tune traditional procedures and develop new techniques for effective management of feral horses that will meet resource needs, employ current scientific approaches, and satisfy concerns surrounding population management strategies. For instance, we are currently cooperating with university partners to evaluate the efficacy of contraceptive vaccines as a population control measure. We also are using molecular data to elucidate park horse origins, evaluate herd health, and inform culling strategies to optimize genetic diversity. Further, we have worked with private organizations to increase awareness of feral horse issues and promote responsible ownership of culled animals. All of the above will improve future management of feral horses at TRNP. However, there is still an immediate need to control the horse population while mitigating animal welfare and herd health issues. Therefore, we must explore alternative methods that will allow us to capture horses on a regular basis, reduce stress, and minimize the number of culled animals expelled from the park at any one time.

Corral trapping and low-stress livestock handling (LSLH) are two promising techniques that may provide a positive path forward for gently removing a limited number of horses from the population at TRNP annually to facilitate transfer of animals at a rate that will not exceed recipient demand. Corral trapping has been used extensively by the Bureau of Land Management, and the park is currently in the process of establishing a corral trapping program. Low-stress livestock handling techniques are best known through the work of Bud Williams, who championed progressive stockmanship ideals and methods for the betterment of livestock and human experiences (Hibbard 2012). In principle, LSLH requires a thoughtful, gentle, quiet approach, whereby animals and handlers are engaged in a mutual relationship based on innate behavioral psychology. Though not widely used for ungulate management by federal agencies, LSLH techniques have been employed by experienced stockmen to effectively herd and capture feral equids at Big Bend National Park, TRNP, and elsewhere (Hibbard 2008). Furthermore, a loose form LSLH is employed routinely by park staff to herd escaped bison (*Bison bison*) back through holes or gates in the perimeter fence at TRNP. The question is whether or not LSLH methods can be employed effectively by park staff and volunteers to herd

horses to corral trap sites, and into confined corral facilities. Further, it is unclear what level of time and energy is required to achieve desired results. Therefore, the objective of this study is to quantitatively and qualitatively evaluate the utility of LSLH techniques for herding of feral horses to specific locations within the park. This objective is operationalized in Methods below.

Method

Behavioral stockmanship principles capitalize on the innate response of ungulates to predatory behavior (Grandin et al., 2015). When confronted with a potential threat, herding animals will turn to face and track the movements of the intruder; in this case, a human handler. Handlers can then manipulate livestock movements by entering the animal's pressure zone, or personal space, causing them to move forward. Next, handlers make sweeping "zigzag" movements, in straight lines and at a forward angle, behind the herd at a walking pace, which causes the animals to bunch together. The sweeping movements are then advanced toward the grouped animals and maintained perpendicular to the desired direction of travel (Hibbard 2012; Grandin et al., 2015). Pressure is applied to the herd until the desired movement is achieved, at which point the pressure is released. In time, the innate responses of the herd are bolstered by learned behavior, and calm, orderly movement of animals can be achieved with minimal effort and stress by a handler or handlers traversing the landscape on foot or horseback (Cote 2004).

Though the above description is easy to conceptualize, it does not capture the true essence of LSLH. Rather than approaching as an aggressive threat, handlers must be careful to develop a give and take relationship with animals to keep them in a normal frame of mind and produce reasonably predictable, controlled movements at a walking pace. Further, pressure zones are dynamic, requiring constant adjustments in the amount of pressure applied to cause movement and the amount maintained once movement has been achieved (Hibbard 2012). Therefore, handlers must develop a "feel" for each group of animals and each situation in order to be successful, and skill can only be obtained through experience. Overall, LSLH is a complex subject that obviously takes years or even decades to master. However, the basic principles and techniques of LSLH are fairly simple and can be taught to a wide range of audiences who can then effectively use them (Cote 2004).

To provide a basis of understanding for new NPS staff and volunteers involved with horse management at TRNP, we arranged LSLH training by Whit Hibbard, a student of Bud Williams, during May 2014 that included a classroom-style presentation of techniques followed by field demonstrations and practice.

Based on this training and preliminary field experiments, we developed protocols and data sheets to record quantitative and qualitative information that we deemed relevant to defining the nature of LSLH outcomes. For LSLH herding attempts, we recorded the date, starting and ending time, starting and ending location, herding technique (horseback or on foot), herding objective (the location to which horses were to be moved), and horse demographics (identity of band or bands, number of horses in the group, proximity of other bands). Where possible, we used laser range finders to measure encounter and pressure zone distances to the nearest yard between the lead handler and nearest horse. "Encounter distance" is defined as the point where horses became alert and took notice of approaching handlers, and "pressure zone distance" was the point at which animals first moved due to handler proximity. To record geographic distances traversed during herding attempts, we used Global Positioning Systems (GPS) Data Logger devices. We then downloaded GPS data and calculated straight-line and meandering map distances traveled between starting and ending locations in Geographic Information Systems software. Additionally,

Blake McCann and Whit Hibbard practicing herding a band of feral horses at Theodore Roosevelt National Park. (Photo by Marylu Weber)

we scored outcomes of herding attempts using a series of qualitative Yes/No statements based on core measures of LSLH, including: (1) animals successfully started at a walk; (2) animals moved in a controlled manner; (3) animals moved in the desired direction; and (4) animals successfully moved to herding objective location (Hibbard 2008). Finally, we prepared narratives for herding attempts detailing the lead handler's perception of the experience and any other extraneous details thought to be relevant to herding outcomes.

Field trials were conducted during August – October 2014 using one NPS staff member and five volunteers, individually and in teams of two. To minimize negative behavior of band stallions, geldings were used as hoofstock for all mounted herding attempts. Bands of horses were selected opportunistically as they were encountered on the landscape, and the number and type of handlers employed was determined ad hoc (i.e., we did not use a randomized experimental design). All horses were driven toward a predefined geographic location and then released from pressure. No attempt was made to capture horses during this trial period.

Results

We completed 31 short-duration (i.e., < 2 hours), low-stress herding attempts under field conditions—nine on horseback and 22 on foot. Nine different bands of horses were handled, ranging in frequency from one to seven attempts. Contrary to expectation, among bands handled five or more times (n=3), there were no apparent trends in observed pressure zone distances or successful herding outcomes to suggest habituation over time. Encounter and initial pressure zone distances were greater for handlers on horseback than those on foot, indicating that feral horses were more wary of mounted handlers than pedestrians (Table 1). However, handlers on horseback achieved the longest duration of herding bouts and moved animals the greatest geographic distances. Meandering courses taken by animal handlers were more than twice the length of straight-line distances between starting and ending locations in most instances (see Table 1; Figure 1).

Table 1. Quantitative measures of low-stress livestock handling attempts on feral horses at Theodore Roosevelt National Park, North Dakota, during August - October 2014. Descriptive statistics are provided for herding attempts on foot, on horseback, and overall. Note: numbers in parentheses indicate sample size for respective statistics.

Handling method	No. attempts	Median no. handlers	Median no. horses	Mean encounter distance (m)	Mean pressure zone (m)	Mean duration (minutes)	Mean Euclidean distance (m)	Mean meandering distance (m)
Foot	22	1 (n=22)	9.5 (n=22)	123.84 (n=22)	49.49 (n=19)	40 (n=22)	388.43 (n=21)	904.86 (n=21)
Horseback	9	2 (n=9)	9 (n=8)	253.19 (n=9)	55.76 (n=8)	77 (n=8)	1134.75 (n=5)	2230.00 (n=5)
Overall	31	2 (n=31)	9 (n=30)	161.39 (n=31)	51.34 (n=27)	50 (n=30)	531.95 (n=26)	1159.69 (n=26)

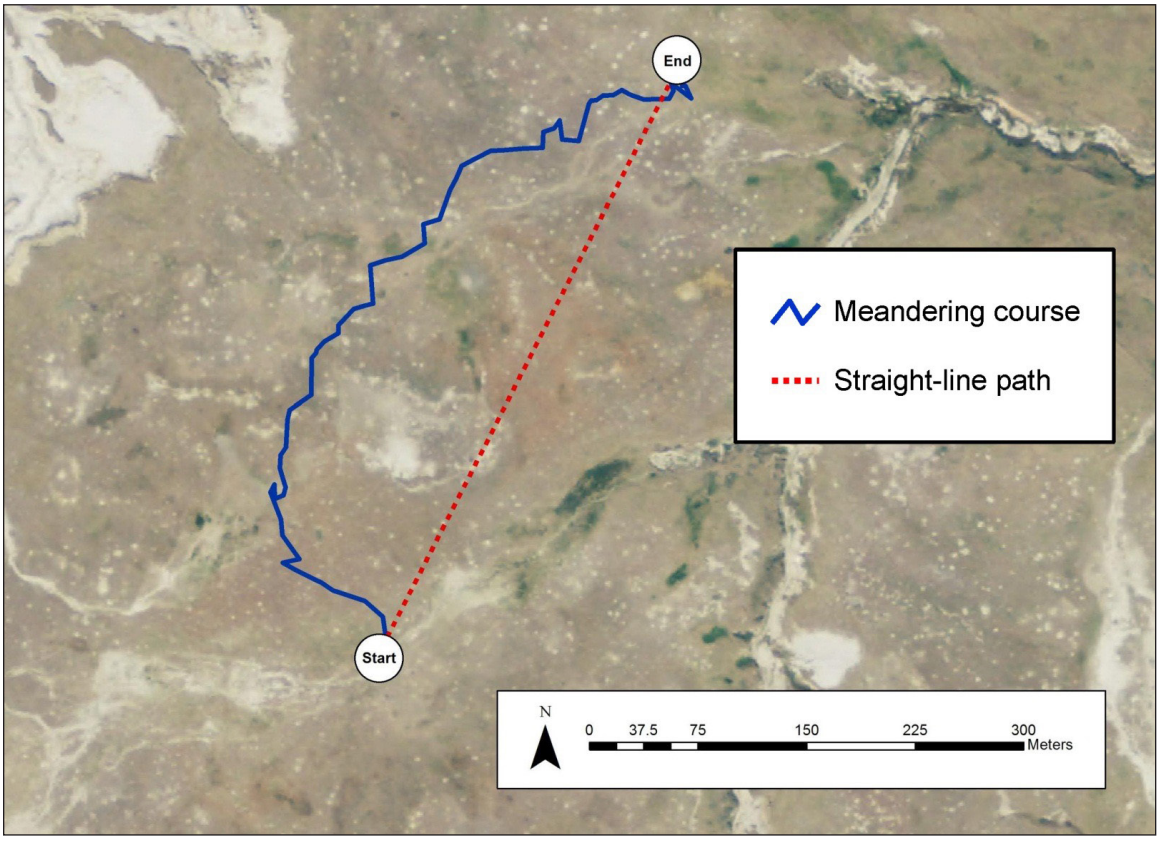

Figure 1. *Example of meandering course of travel and straight-line distance between starting and ending locations for a single low-stress livestock handling attempt during September 2014 in the South Unit of Theodore Roosevelt National Park, North Dakota.*

Table 2. Qualitative measures of low-stress livestock handling attempts on feral horses at Theodore Roosevelt National Park, North Dakota, during August - October 2014. The percentage of "Yes" scores for each of the four categories are presented across herding attempts on foot, on horseback, and total.

Handling method	Animals successfully started at a walk	Animals moved in controlled manner	Animals moved in desired direction	Animals successfully driven to objective
Foot	100.00	95.45	100.00	67.18
Horseback	44.44	33.33	66.67	44.44
Overall	83.87	77.42	90.32	61.29

Herding attempts on foot were most successful at keeping animals in a normal state of mind and moving them in the desired direction to a specific location (Table 2). Though herding on horseback resulted in less controlled movement of animals, riders still achieved movement in the right direction most of the time and movement to the objective location nearly half the time (Table 2). Attempts on foot with single handlers (n=14) were successful at herding horses to the objective location ~ 79% of the time, whereas attempts with two handlers (n=8) succeeded only 50% of the time. Two handlers were used for all but one attempt on horseback, negating fair comparison of herding attempts by individual or multiple mounted riders. Overall, desired animal behavior was obtained during most outings (see Table 2).

Other bands of horses were in close proximity during ~ 68% of attempts, and inter-band rivalries were cited in narratives as primary causes for animals breaking from groups and undermining controlled movement. Horses also appeared to show some habitat-related affinities that worked for and against herding efforts. For instance, we found that wallowing holes and elevated positions, where mud and wind presumably kept flies at bay, were prized locations that horses would not easily abandon during the study period. (The incidental observation of horses being attracted to certain geographic or habitat-related features during LSLH herding attempts is informative. In the future, we may capitalize on these landscape-level associations when determining locations for corral traps.)

Discussion

During this field trial we have learned a great deal about the potential of LSLH techniques for herding of horses, and our work has served as proof of concept for potentially modifying management practices. Clearly, LSLH techniques are effective and can be employed by park staff and volunteers to herd horses to specific locations within the park. It also is apparent that "less is more" regarding single handlers achieving the best results in terms of controlled movement and reaching herding objective locations. Further, our experience suggests that where solitary bands of horses are encountered, in the absence of inter-band rivalries, handlers will have the greatest opportunity for success. All of the above findings are in alignment with central tenants of LSLH theory and suggest that positively motivated individuals of various backgrounds and experience levels can successfully conduct low-stress techniques with minimal training (Cote 2004, Hibbard 2008).

This exercise also has yielded preliminary

insights pertaining to effects of LSLH on horse behavior. Though counterproductive for developing a lasting rapport for handling by staff, the observed lack of habituation during our study is a positive outcome because it is important to maintain natural wariness of horses to humans as an unimpaired resource of the park. The heightened wariness of park horses to mounted handlers is also a positive result, at least where equestrian visitors are concerned. However, the short duration of our study does not provide sufficient information regarding effects of long-term, close-proximity handling on behavior. Therefore, ongoing monitoring of habituation related to LSLH will be necessary to ensure that management practices do not compromise the resource.

The high technical success rate of single handlers on foot during our study is particularly exciting from an operational standpoint because this method requires a relatively small investment in staffing and logistical support in comparison to multiple handlers on horseback (to say nothing of the cost of traditional approaches using a helicopter). However, herding horses on foot will be physically demanding, especially at longer distances where meandering courses of travel are more than double that of the straight-line distance. Considering the duration and distance of herding attempts where both values were recorded during our study, handlers may expect to move horses Euclidean distances at a rate of 580.61 meters per hour on foot and 907.80 meters per hour on horseback. Based on these figures, herding horses a straight-line distance of one mile would require approximately two hours and forty five minutes on foot and one hour and forty five minutes on horseback (however, these times might shorten as a function of handler experience). Therefore, it is hypothesized that horses would need to be within a three to five mile radius of corral locations to facilitate LSLH herding and capture during a single work day with handlers on foot or horseback, respectively. However, it is important to note that no attempt of this duration or distance was made during the study. Therefore, additional evaluations of long-distance LSLH herding within the park should be conducted to test this hypothesis. In practice, a combined approach may be most productive—mounted handlers could herd animals most efficiently over long distances to within sight of corrals and then fresh handlers on foot could take over to more precisely manipulate horses through gates and into the facility.

In light of the statement above, it is important to note that a key factor not evaluated during the study period is the ability of staff to actually capture animals using low-stress techniques. From our current findings, we should expect to be able to herd horses cross-country to corral trap locations where they can be presented with bait (e.g., salt, water, lick tubs). This alone will be a useful management tool in support of a multifaceted population control program, presuming that horses will accept bait and freely enter corrals. However, we must implement focused efforts to refine LSLH skills among staff to the extent that animals ideally can be herded directly into corral facilities. Though NPS staff and volunteers have handled horses successfully with low-stress techniques under the guidance of an experienced LSLH trainer (see *Rounding Up Wild Horses in Theodore Roosevelt National Park* in Applied Stockmanship in this issue), at the time this article was written only one attempt to herd and capture horses had been made by park staff acting alone. On February 13, 2015 I opportunistically observed a band of eight horses in close proximity to the park's permanent wildlife handling corrals. I approached the horses alone on foot, and after working with them for one and a half hours, I managed to herd them approximately 300 yards and guide them through three gates into the corrals. I then released them. This successful one-time experience is very encouraging, and it is hoped by park management that future attempts will result in similar outcomes, providing a viable alternative to helicopter roundups for capture and removal of excess horses.

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Blake McCann was born in 1975 in Alton, Illinois. He developed a love for the outdoors at an early age through hunting and fishing experiences. Blake began his professional career in wildlife management at Great Smoky Mountains National Park in 1996, and has since worked on a variety of native and non-native species research and management initiatives throughout the United States. Blake has earned a Bachelor of Science degree in Biology from Southern Illinois University Edwardsville, a Master of Science degree in Zoology from Southern Illinois University Carbondale, and a Doctorate of Philosophy in Biology from the University of North Dakota. Blake is currently the senior wildlife biologist at Theodore Roosevelt National Park in Medora, North Dakota, where his work focusses on management and preservation of elk, bison, and feral horses.