Horses born in the park since the 1954 round-up can be traced to three major lines: the original "wild" greys, the black Barnhart mare and the crippled grey stallion, and the blue roans, most of which descended from the "Old Blue" mare. During the 1960s, stallions from the grey line were predominant, but most horses of this lineage were removed by 1978. Blue roan stallions dominated throughout the 1970s, but a concerted effort was made to eliminate these horses in preparation for the introduction of domestic stallions in the early 1980s. Since reaching maturity, the introduced "Brookman stud" has become dominant by virtue of controlling the largest group of horses (twenty in 1988). However, the stallions that controlled mares in 1988 do represent each of the major known lines. E-1 (black stallion) combines the "old grey" and blue roan lines; D-1 (blue roan) the Barnhart and blue roan lines; C-1 (blue roan) the blue roan line; and B-1 (grey) represents the "old grey" line through his sire.

Inbreeding has been documented among horses of the blue roan lineage during the late 1960s and early 1970s. However, inbreeding does not seem to have affected the reproductive and social success of the blue roans. The recent genealogical history of the park herd provides no evidence of inbreeding, and horses born with physical deformities have not been reported since circa 1970, when the population was very low.

The social organization of the horses changed in 1989; current behavioral and census data on the horses has been collected
by Elena Hovland of Montana State University. Once completed, MSU's report is expected to contain detailed behavioral and organizational data on the horses, information that was beyond the design of the present undertaking.
Summary

History of the THRO Horses

The free-roaming horses at Theodore Roosevelt Park are descended from horses that inhabited the Little Missouri Badlands when the park was created in 1947. Those horses were of two types: domestic ranch stock and "wild," unclaimed animals. Both domestic horses and a wild contingent had been present in the badlands since at least 1880. Area ranchers grazed their own livestock in the badlands and frequently chased and captured unclaimed horses for use or sale.

Most horses extant in the park area from 1940 to 1954 were rodeo or saddle stock owned by local ranchers. During the Roosevelt era of large-scale cattle ranching (1880-1900), ranchers raised horses on the open range, gathering and branding them periodically. After most of the range was fenced in the early twentieth century, local stockmen continued to use the badlands as a grazing area, particularly during the winter. This practice continued until the park's establishment and fencing, 1947-1958. In 1954 a cooperative round-up was staged by the NPS and area ranchers with the purpose of removing trespass horses. Nearly all branded and/or claimed animals were removed at that time (150-200 head). However, isolated reports of trespass grazing continued, with decreasing frequency, through 1984.
Also present in the park during the 1940s and 1950s were small groups of wild, unclaimed horses. Ranchers and cowboys from the Medora area report observing such animals in the badlands as early as 1920. Informants state that an earlier generation of cowboys frequently chased and captured wild horses in this area during the late nineteenth and early twentieth centuries. Individuals such as William "Badlands Bill" McCarty and Fred Gorham are reported to have made a portion of their living capturing and selling horses from the badlands during the period 1900-1935, and a few horse trap sites from this period remain visible in the park (see Photo No. 33). At least one large-scale wild horse round-up is reported to have taken place circa 1915. The Tescher brothers and other local cowboys frequently captured and sold wild or unclaimed horses during the period 1940-1960.

Wild horses were first reported in the Medora area in 1881 by Theodore Roosevelt, who stated that the animals were estrays from Indian groups or ranches. Indian and ranch horses of the nineteenth century were primarily Spanish mustangs or mustang-crosses. Mustang-based horses of western North Dakota included the "Montana" or Cayuse, the Texas cow pony, and horses obtained from Indian groups. The stamina and thriftiness of the "bronco" or Indian type made them ideally suited as ranch mounts in the rugged badlands environment. Wealthy stockmen such as the Marquis de Mores, A.C. Huidtkoper, and Theodore Roosevelt used such horses as their foundation stock for saddle horses. There would have been little difference between wild and domestic horses of nineteenth-century western North Dakota.
Over time, ranch horses of the Indian or "bronco" type were crossed with Thoroughbreds, Quarter Horses, and other breeds to produce a more aesthetically pleasing animal. However, the "bronco" type seems to have endured well into the twentieth century. Virtually all informants stated that the ranch or saddle horse of the period 1900-1940 was the "common" horse of no particular breeding, often described as an "Indian type." Several informants described typical early twentieth-century ranch horses as rangy, bald-faced roans. Gerald Barnhart stated that his father once purchased a Thoroughbred horse, but the animal stepped into a prairie dog hole and was crippled. In contrast, informants describe the "common" horse as an animal that could withstand continual hard work with little or no care and could travel tremendous distances through the badlands.

By 1930 the changing nature of ranch life no longer required a horse with such characteristics. Removed from the rigors of open range work and released from a dependence on horse power by mechanization, ranchers placed increasing emphasis on the appearance of a horse, and the roping arena became the "proving ground" for a horse's abilities. The American Quarter Horse, bred for short bursts of speed and quick stops, became the western ideal. Long popular in the Southwest, by 1941, when the breed was officially organized, the Quarter Horse had become the standard ranch horse in the North and far West (Denhardt, 1967).

Ranch horses extant in the park at the time of the 1954 round-up are reported to have been "common" horses, Quarter Horses, and some with Thoroughbred blood. Tom Tescher states that
the "good" saddle horses "were always taken in and out." Therefore, it would seem that horses that were truly abandoned in the badlands were the older, "common horse" variety, which had become undesirable. These horses were described by informants as "broom-tails" and "mustangs." The only owned and identified horses left in the park after the 1954 round-up were the two Barnhart mares, which both Gerald Barnhart and Tom Tescher have described as "Indian ponies."

The origin of the "original greys" that remained after 1954 and that had been wild for many years is unknown. It is possible that these horses were descended from groups of animals reported to have been in the badlands since the nineteenth century. Such horses could have survived both because they were undesirable and because non-domestic horses were more difficult to catch. Tom Tescher reports that the "wilder" stallions were virtually impossible to capture prior to the use of helicopters, and the Tescher brothers state that they "didn't even try" to chase some groups for that reason. During the period 1900-1940, when people captured horses in the badlands, a primary market for these animals was the slaughter house. Horseback riders would have captured the slower and less agile horses, such as abandoned work or draft stock or other formerly domestic animals. Although it is known that draft horses were abandoned in the badlands circa 1920-1930, the Teschers do not recall such animals. Feral horses in the badlands came under increased pressure after the park was established and the NFS attempted to eliminate them in the period 1947-1970. The 1954 round-up was designed to remove all free-roaming horses,
but Tom Tescher states that of the captured animals, "99% were branded." It is reasonable to assume that only the hardiest and "wildest" horses survived repeated attempts at capture during this period.

When capturing horses for use or for sale as saddle stock, local cowboys did not select for the "Indian type." The "Indian type" was partially identified by color, as Indians exhibited a preference for roans, paints, and bald-faced horses. Roe states that "the range prejudice against pintos was very strong. . . . The plainsman regarded the pinto with contempt because the Indian liked it" (1955: 170-171). When A. C. Huidekoper (H.T. Ranch) purchased 60 Sioux mares from the Marquis de Mores, he attempted to choose solid-colored horses (Huidekoper, 1955: 64). However, many of the mares were roans, and when they were cross-bred, many of the offspring had bald faces and other white markings (Noyce, 1959). Harry Roberts stated that many of the Sioux-Thoroughbred cross horses at the HT had "plumb white heads. There were a lot of bald-faced horses in the old days; they reminded people of Herefords; they didn't like that." According to informants' descriptions, many of these early horses were probably overo paints, horses with white faces and irregular white body markings. Denhardt (1947: 196) states,

Pintos have never been extremely popular with North American horsemen. Perhaps one of the main reasons is that with one exception, and that exception does not occur in North America, practically every recognized
breed refuses to allow spotted horses in the stud-books.\(^1\)

Regarding horse round-ups in the badlands circa 1945-1960, Gerald Barnhart stated that "bay was the ideal; people didn't try to catch the others." Bruce Northrup commented that during the 1950s, the horses people tried to catch in the park were the offspring of Walt Cooper's Quarter Horse stallion "Dick Thomas."

Photographic and descriptive evidence for the feral preservation of a type of horse present in nineteenth-century western North Dakota is convincing. The feral horses in Theodore Roosevelt National Park are predominantly roan, grey, or overo paint (white markings such as side spots), and many have bald faces. Except for being larger in stature, their conformation is consistent with that of the Indian pony: large heads, short backs, steeply sloping croupes, strong, straight legs and feet, and an over-all rough or "common" appearance deemed undesirable in the modern horse. Many of the horses at THRO bear a strong resemblance to horses illustrated in nineteenth-century photographs and drawings. For example, compare the grey mare in Photo No. 117 or the blue roan mare in Photo No. 122 with Remington's drawing "Northern Plains Cowboy," Figure 4. A line of blue roan stallions (Photos No. 114 and 115) appear nearly identical to the mount of Sioux warrior Long Dog, shown in Figure 10. Overo paint horses in

\(^1\) This prejudice has fallen away. For the past decade the American Paint Horse Association has been the fastest growing breed registry in the United States. Horses registered by the APHA are not the "Indian type" but are almost wholly of Quarter Horse breeding. Because the Quarter Horse was partially founded on the Indian or mustang type, occasionally animals of this breed are born with overo paint markings and blue eyes ("crop outs"). Selective breeding has produced a paint horse that conforms to the Quarter Horse ideal with paint coloration.
the park (e.g. Photos No. 73, 123) approximate in build and color the Sioux horse in Figure 11. Roan horses in the park are very similar to nineteenth-century Medora ranch horses shown in Plates 9, 10, 12, and 16. Most striking are two photographs of the Marquise de Mores (Plates 9 and 10) with a large-headed, bald-faced roan that is very nearly the prototypical park horse. Compare this horse with E-3 (Photos No. 102, 103, and 107), the mares in Photo No. 11B, the Kuntz horse "Bad Toe," Photos No. 123-125, B-3 (Photo No. 74), or A-5 (Photo No. 37).2

Medora-area ranchers in the late nineteenth century, including De Mores, Huidekoper, and Roosevelt, selectively bred and/or kept the Indian pony for sale and use. Those men ran their horses on the open range, and it is possible that some of their stock became feral. Dobie (1952: 90) claims that descendants of the Sioux-Thoroughbred crosses of De Mores and Huidekoper were still used as ranch and saddle stock in the Medora area during the 1930s. However, it is not necessary to hypothesize a direct line of feral descent between those horses and the extant park animals to conclude that the THRO horses are representative of an early North Dakota ranch type. Informants state that the "common" or "Indian type" horse was the standard ranch mount a decade later. Therefore it is unlikely that a dramatic divergence in type between wild and domestic horses occurred until circa 1930-1940, even with the continual introduction of ranch stock to the feral herds. Although feral and domestic horses of the early twentieth

2 This characterization of the THRO horse phenotype is much less accurate than it was prior to the round-ups of 1978, 1981, and 1986 and the introduction of outside stallions.
century seem to have remained essentially the same as their nineteenth-century counterparts, admixture with other breeds undoubtedly increased over time. For example, the saddle horse of Sam Rhodes shown in a photograph probably taken during the 1920s (Plate 20) bears a resemblance to the park horses (compare with Photo No. 125) but is more muscular and compact, possibly due to a Quarter Horse cross. Wild or feral horses, while mixing with a variety of abandoned or loose ranch stock, probably remained true to the "Indian type" through the selective pressures of round-ups. Still, occasional cases of admixture did occur, as with the Griggs mare that escaped into the park during the early 1970s.

We may conclude that wild horses and, to a lesser extent, ranch horses found in the Little Missouri Badlands circa 1940 were of the same general type used in Medora during the late nineteenth century. Phenotypically, the park horses strongly resemble the nineteenth-century horse, and informants identify the extant animals as "old time ranch horses." This type of horse gradually lost favor during the twentieth century and has today been completely eclipsed by the American Quarter Horse. "Common" or Indian-type horses remained in the park because "they weren't worth catching" and because they were harder to capture than domestic stock.

The Tescher brothers attempted to "upgrade" the herd by removing "mustang type" horses that they considered "poor" during the period 1945-1975 (mares and young stallions). THRO accelerated this process by selectively removing blue roans, "older type" horses, and dominant park stallions and replacing
them with domestic animals such as a purebred Arabian (D-6) during the period 1978-1986. The goal of this policy has been to change the appearance (phenotype) of the horses to achieve a closer conformity to modern standards of conformation and hence a higher sale value for culled animals. As a consequence, the extant horses appear more like modern saddle horses than they did a decade ago (compare Photos No. 1-21 with photos of extant animals). Although some extant horses exhibit the conformation of the older or "original" park type circa 1954 (e.g. A-5, A-3, A-14, B-3, C-1, E-1, E-3), most others (e.g. B-1) now look entirely "modern." The most tenacious aspect of the park horse "type" seems to be patterns of coloration: roan, grey, and overo paint. A factor in the preservation of the "older type" horse in the park has been the inability of introduced stallions (with the exception of A-1) to successfully compete against the park-born horses in terms of reproductive success (the acquisition and maintenance of mares).

In sum, the original feral horses at THRO were descended from a type of ranch horse common in the Medora area from 1880 to 1930, which was based on the Indian horse or mustang, often cross-bred. This type survived primarily (but not wholly) in a feral state after becoming undesirable as saddle animals. Admixture with modern and domestic horses has occurred, but some park horses remain phenotypically similar to horses observed in southwestern North Dakota during the late nineteenth and early twentieth centuries.

Many of the removed park horses were purchased by Leo Kuntz, Jr., of Linton, North Dakota.
Management of the THRO Horses

Management of the feral horses at THRO has changed throughout virtually every administration since 1947. With the exception of the McCaw superintendency of 1960-1963, until 1970 the goal of the park was total elimination of the horses. A large-scale round-up was conducted in 1954, and numerous small-scale removal efforts were attempted throughout the ensuing twenty years. The removal policy was supported by the NPS regional administration and was pursued most forcefully by Superintendent Warren Hotchkiss throughout 1964-1966. During that time the horse population was reduced to approximately 16 known animals.

Public and local opposition to removal of the horses, coupled with the discovery of historic documentation establishing the presence of wild horses in the Little Missouri Badlands during the nineteenth-century, motivated superintendent Arthur Sullivan to reverse the elimination policy during his tenure of 1966-1970. A Wild Horse Management Plan developed in 1970 established the policy of protecting a designated number of horses at THRO "in the interest of historical accuracy."

Since 1970, the most consistent policy regarding the horses has been "comprehensive management," i.e., the periodic reduction of horses through a round-up process each time herd numbers surpass a designated level. The 1970 Wild Horse Management Plan established 40 head as the ceiling figure. By 1978 the population had risen to approximately 75 animals. A Proposed Feral Horse
Reduction Plan and Environmental Review stipulated that the horses would be reduced "at intervals of from every two to four years to maintain the herd at from 35 to 60 head."

A round-up was staged on 5 and 6 September, 1978; Tom Tescher was contracted to provide riders, and one helicopter was used. Extremely hot weather and a long drive to the buffalo corrals contributed to the deaths of seven horses, and 14 were removed and sold at Stockman's Livestock Exchange on 12 September. A rancher adjacent to the park trapped approximately 10-12 horses that broke through the fence during the action and subsequently sold them for slaughter.

Horse corrals were constructed in the northeast corner of the park during the summer of 1981, and a second round-up was staged on 5 October. Tom Tescher and a helicopter were contracted to assist. A total of 32 horses were removed, reducing the population from approximately 71 to 39 head. Twenty-eight horses were sold at Stockman's Livestock Exchange on 13 October. This round-up received regional news coverage and generated some local opposition to park policies.

By 1986 the horse population had increased to approximately 97-100 animals. Two helicopters and Tom Tescher were contracted, and a round-up was conducted on 23 and 24 August. Eighty head were captured, and 54 animals were sold at Western Livestock Company on 2 October 1986. During the round-up the horse trap and pens sustained substantial damage.

A total of approximately 103 horses were removed from the park through round-up and sale during the period 1970-1986. In
addition, approximately 30 horses were roped and sold by local ranchers (most with park approval) or were removed through direct reduction. A 1988 census revealed 61-62 horses in the park.

As expressed in park memoranda and documents, several management objectives have yet to be clearly formulated. Major concerns include defining the desired number of horses, defining the desired type of horse, evaluating the extent of inbreeding within the population, and determining the ecological role of the horses. No research had been undertaken prior to 1987, and the park has not collected or recorded annual census and genealogical data on the horses that would reveal changes in herd composition and numbers. Therefore, while these concerns have been common to all administrations since 1970, they have been differentially addressed.

Inbreeding has been specified as a concern in virtually all THRO documents regarding the horses since the 1970 Wild Horse Management Plan. At that time the horse population was only 26 animals, the herd having been drastically reduced during the previous decade. Indications of inbreeding cited by park documents include the occurrence of crooked legs, a preponderance of grey and blue roan horses, and horses with poor overall conformation. A 1977 evaluation of the park horses by BLM Range Conservationist and Wild Horse Management Specialist Milton Frei found no evidence of inbreeding among the park horses, as determined by appearance and vigor. This report was cited in only one subsequent THRO document, most of which continued to assert significant levels of inbreeding among the horses. Genealogical research con-
ducted for the present report has documented the occurrence of inbreeding among the horses during the early 1970s, when population levels were extremely low. However, the resultant offspring were physically sound and became socially dominant animals, as indicated by significant reproductive success. Inbreeding appears to have virtually ceased with the population growth that has occurred during the past two decades. (See "Genealogy" section and the 1984 Natural Resources Management Plan and Environmental Assessment.)

The concern with inbreeding among the horses resulted in the development of a policy to remove dominant park stallions and to replace them with introduced animals. The introduction of replacement stock was first suggested in the 1970 Wild Horse Management Plan, but Superintendents James B. Thompson (1969-1972) and John Lancaster (1972-1978) were conservative in their approach to this issue. During Thompson's administration, several Spanish Mustang breeders lobbied for the introduction of that type of horse. Thompson resisted the suggestion on the grounds that mustangs would be "historically inaccurate," and he argued that area residents were opposed to the introduction of horses that would change the historic park type. He stated that the chief criterion for the introduction of outside horses was to "acquire animals with a good amount of color to break up the preponderence of greys, blacks, and whites that exists within the present horse herd." The Pryor Mountain Wild Horse Refuge was notified that THRO would be interested in acquiring two of their surplus stallions.
Superintendent John Lancaster (1972-1978) established the legalization of ownership of the herd as his top priority regarding the horses, and succeeded in accomplishing this in 1973. Second, he was interested in replacing park stallions with new stock "to forestall inbreeding problems." With regard to the introduction of outside horses, Lancaster stated that

... We would not want to corrupt the present herd with introductions of any special breed until or unless it can be firmly established by professional genealogists that the present herd does indeed contain Spanish mustangs.

A Resource Management Plan developed in 1976 recommended the removal and subsequent replacement of park stallioons on the grounds that "an inbred herd would not be aesthetically pleasing and would reflect poor management judgment." Horses targeted for removal were defined as "older studs or animals displaying noticeable physical deformities." Introduced animals should be "of the same general domestic stock that is now present" and "of mixed colors to provide contrast within the herd."

The 1978 Proposed Feral Horse Reduction Plan and Environmental Review focused on the need to forestall environmental degradation by reducing the horse population. During the subsequent round-up, two dominant stallions were removed and one was shot, but the 34 horses removed from the park were about equally divided by sex.

The policy of replacing park horses by introducing new animals was implemented during the Wickware administration (1978-1986). The expressed rationale supporting this decision was to increase color variation in the herd and to improve the sale
potential of the horses by creating a more desirable type of horse according to current standards of conformation. Initially the plan was to introduce outside mares. In 1981, Wickware began the introduction of new stallions by negotiating the donation of a purebred Arabian colt with breeder Les Sellnow of Brainerd, Minnesota.

The Wickware administration recognized that the successful introduction of new stallions could not be accomplished without removing dominant park stallions:

The goal of increasing the genepool will succeed only if the stud is dominant enough to take mares from the present stud or if he is assisted to this end by having the competition removed. . . . We plan on taking just such measures.

The primary goal of the ensuing 1981 round-up was to remove dominant stallions (i.e., those with the largest and most stable mare bands). This objective was realized, as many of the dominant stallions were removed by round-up and direct reduction on 8 and 9 October. The implementation of the "replacement" policy received news coverage and met with some local opposition.

During 1982 at least four more stallions were removed or destroyed. The possibility of introducing mares was again raised but was not pursued.

Six young stallions were released during 1981-1982: a registered Arabian, a registered Quarter Horse, three wild horses obtained from the BLM, and a Shire-Paint horse purchased by Medora ranchers from a Montana stock contractor.

The 1984 Natural Resources Management Plan and Environmental Assessment addressed horse management at THRO in some detail. The
plan cited a need for research in order to formulate specific policies, and called for the regular monitoring of the herd and the development of interpretation. The plan recommended the removal and replacement of park-born horses. At the same time, the plan acknowledged that the preservation of "a historic badlands horse herd, with the animals being direct descendants of the horses which were found here when the park was founded" was an alternative approach. In the same discussion, the plan noted that two mechanisms for the selection of horse types at THRO have operated: biological fitness and success, and human preference. Cultural factors that have no effect on biological fitness, such as a desire for a wide range of color patterns, have directed changes in the genetic and phenotypic changes in the herd.

During 1981-1986, the park selectively removed the most biologically and socially successful stallions in order to facilitate their usurpation by the introduced domestic animals. To date, approximately 150 horses descended from stock present in 1947 have been removed from the park. However, only one of the introduced stallions has been able to successfully collect and maintain a harem of mares. Two of the introduced stallions were badly injured in fights with park horses and had to be removed; three others have assumed sub-dominant roles within bands controlled by dominant park-born horses. The Arabian has adapted poorly. A-1, the most successful introduced stallion, controlled 25 horses in 1988, nearly one-half of the entire population (62 or 63). This horse alone can be expected to make a significant impact on the genealogical future of the horses (see "Genealogy").
His offspring are large and strong, and may sell well as potential rodeo stock.

In sum, the National Park Service was not prepared to manage wild horses when the park was established in 1947, and no research had been undertaken to guide that process prior to 1987. Park policy has changed from total elimination of the horses to the protection of a designated number; but more specific decisions regarding the herd have fallen upon the judgment of succeeding superintendents and staff. Future decisions regarding the number and type of horses to be conserved, methods of herd reduction, the continuation of introductions, etc., are decisions pending study; such research must provide the basis for establishing policies and developing a Wild Horse Management Plan.