



U.S. Fish & Wildlife Service

Management of Feral Horses on Sheldon National Wildlife Refuge and Section 106 of the National Historic Preservation Act



USFWS Photo

Wildfires at Sheldon NWR expose networks of horse trails around springs such as this one at Rimrock/ Pat Hurd Springs (Photo #1999-10-11-14, USFWS).

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Table of Contents

<i>Figures and Tables</i>	ii
<i>Introduction</i>	1
<i>Natural Setting</i>	3
<i>Cultural Setting</i>	
<i>Humans on the Landscape</i>	4
<i>Horses on the Landscape</i>	5
Native Horses of Nevada	5
Horses Return to Nevada.....	5
Nineteenth Century Ranches on Sheldon NWR	7
<i>Management Context</i>	
<i>A Refuge for Indigenous Species</i>	9
Conservationists Establish Sheldon NWR for Pronghorn.....	9
Legislation and Policy Regarding Feral Horses on Sheldon NWR	9
<i>Feral Horse Management</i>	11
Historic Management Efforts: A Review of Refuge Annual Narratives	11
Current Management Efforts	12
<i>Section 106 Undertaking</i>	
<i>Part A: Hosting Horses on Sheldon NWR</i>	13
Area of Potential Effects (APE) - Undertaking Part A	13
Cultural Resources in the APE - Undertaking Part A.....	15
Determination of Effect and Recommendations - Undertaking Part A	17
<i>Part B: Gathering and Enclosing Feral Horses</i>	18
Area of Potential Effects (APE) - Undertaking Part B	18
Cultural Resources in the APE - Undertaking Part B	18
Determination of Effect and Recommendations - Undertaking Part B	18
<i>Part C: Removal of Feral Horses</i>	20
Area of Potential Effects (APE) - Undertaking Part C	20
Animals as Contributing Elements to Historic Properties	20
Case Studies: Klamath River and its Salmon; Dugongs of Okinawa, Japan; Coyote Canyon Wild Horse Herd Historic District	20
Cultural Resources in the APE - Undertaking Part C	21
Determination of Effect and Recommendations - Undertaking Part C	21
<i>Conclusions</i>	24
<i>Future Cultural Resource Management</i>	
<i>Comprehensive Conservation Planning</i>	25
<i>References</i>	27

Appendices, Figures and Tables

Appendices

<i>Appendix A: Maps: Extent and overlap of feral horse impacts with known cultural resources around water sources</i>	31	
Big Spring Reservoir	Catnip Reservoir	Martinez Spring
Ten Mile Spring	Horse Canyon Spring	Hell/ Virgin Creek
<i>Appendix B: Maps: Extent of feral horse impacts around water sources which have not been surveyed for cultural resources</i>	39	
Big Spring Creek	Catnip Creek	Hobble Spring
<i>Appendix C: Maps: Past horse gather areas</i>	43	
Big Spring Butte Gather	Catnip Canyon Gather	Swan Lake Gather

Figures

Figure 1. Map of Sheldon NWR, with inset map showing project area in the state of Nevada	2
Figure 2. Sage grouse gravitate to gentle hills and valleys	3
Figure 3. Bighorn sheep tend to frequent the steep, rocky walls above canyons	3
Figure 4. Pronghorn antelope gather around lakes and spring to water and feed on greenery	3
Figure 5. Locations of nineteenth century ranches on what is now Sheldon NWR	6
Figure 6. Overview of historic Gooch Camp, situated in a canyon between Gooch Table and Catnip Mountain	7
Figure 7. Corral at Gooch Camp was used for rounding up feral horses during the early 20th century	8
Figure 8. Multiple horse trails radiating from "Gossamer" Spring after a 1999 wildfire.	13
Figure 9. Page from a 2002 report monitoring impacts of feral horses and burros on Sheldon NWR illustrates the effects of grazing and trampling on Big Spring Creek.	14
Figure 10. Map illustrating Area of Potential Effects (APE) for Part A of the undertaking: locations of documented feral horse concentrations at water sources	16
Figure 11. Map identifying recommended archaeological survey areas: Big Spring Creek, Catnip Creek and Hobble Spring	17
Figure 12. Photograph of a past horse gathering event at ???	18
Figure 13. APE map for Part B of the undertaking: locations of past horse gather events at Big Spring, Swan Lake, and Catnip Canyon	19
Figure 14. APE map for Part C of the undertaking: current herd ranges and historic ranch locations associated with horses	21

Tables

Table 1. Presence and status of known prehistoric sites at water sources frequented by feral horse populations .	15
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Introduction

This report describes compliance with Section 106 of the National Historic Preservation Act for the management of feral horses by the U.S. Fish and Wildlife Service (Service) at Sheldon National Wildlife Refuge in Washoe and Humboldt Counties, Nevada (Figure 1). The Service has determined that the management of feral horses is an undertaking that has the potential to effect cultural resources eligible to the National Register of Historic Places. Feral horse management on the Refuge consists of three activities: hosting feral horses on the refuge; gathering feral horses into corrals; and removing feral horses from the refuge. Under the terms of Section 106, the Service has considered the effect on cultural resources of each management activity and concluded the following:

- 1) Feral horses roaming the refuge can and do inflict damage to archaeological sites, particularly those that coincide with springs, meadows, and riparian habitats. The Service can mitigate this damage by removing the feral horses from sensitive habitats that contain archaeological sites.
- 2) Feral horses can damage archaeological sites that coincide with gathering/round-up corrals. The Service can eliminate the effect by moving such corrals to locations that do not contain cultural resources.
- 3) If the feral horses contribute to the significance of a historic property (such as a site, district, or landscape), then their removal from the refuge would affect those historic properties. However, the Service has determined that there are no historic properties present on the Refuge whose significance derives from the presence of living herds of feral horses. In other words, the feral horses do not contribute to the significance of a historic property. Therefore, the removal of feral horses from Sheldon NWR will have no effect on cultural resources eligible to the National Register of Historic Places.

On the following pages we consider each part of the undertaking separately. Before we describe the undertaking and the Area of Potential effect (APE) in detail, we review the natural and cultural setting of Sheldon NWR as well as the history of feral horses and their management at Sheldon NWR. This review provides the context within which the Service determines whether the activities associated with horse management have an effect on historic properties.

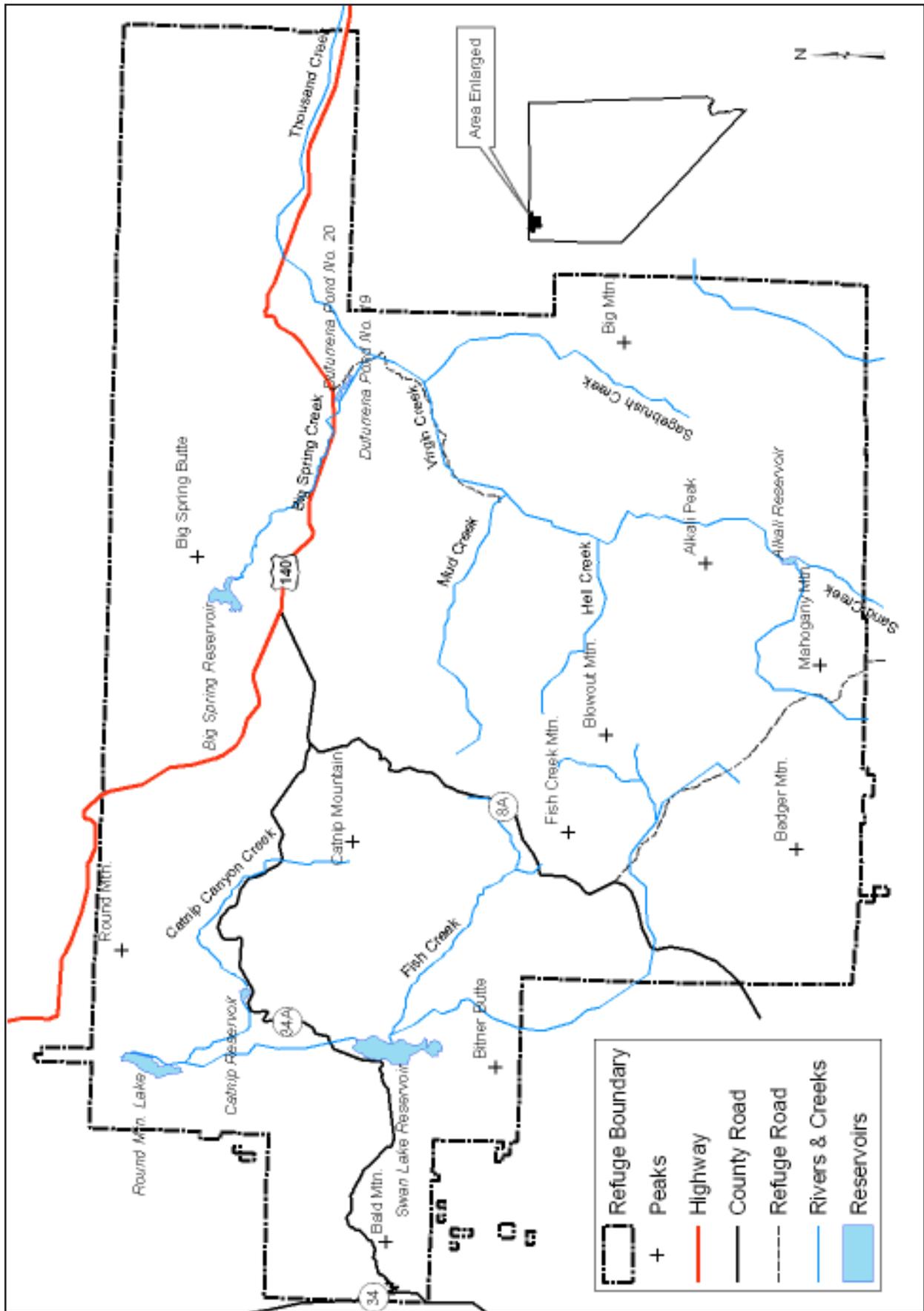


Figure 1. Map of Sheldon National Wildlife Refuge, with inset map showing project area in the state of Nevada.

Natural Setting

Sheldon National Wildlife Refuge covers 575,000 acres in northwestern Nevada. The refuge protects habitat for large wintering herds of pronghorn antelope, bands of bighorn sheep, leks of sage grouse, and other wildlife (Figures 2, 3, 4). This vast landscape is characterized by shrub steppe vegetation. The most conspicuous plants include bunch grasses, cheat grass, salt bushes, sagebrushes, juniper, and mountain mahogany. Small aspen groves occur on well-watered slopes in the higher elevations. The refuge contains dozens of small springs and seeps which support moist meadows of grass, sedges, rushes and forbs. Some of these springs charge creeks that flow year round. Willows, sedges, rushes, forbs and grass line the creeks. Elevations on the refuge range from 4,100 to 7,200 feet. Annual precipitation rarely amounts to more than a dozen inches, most of which falls in the winter, often as snow (USFWS 2006a).



Figure 2. Sage grouse gravitate to gentle hills and valleys.



Figure 3. Bighorn sheep tend to frequent the steep, rocky walls above canyons.



Figure 4. Pronghorn antelope gather around lakes and springs to water and feed on greenery.

Cultural Setting

Humans on the Landscape

The archaeology and prehistory of the Sheldon NWR area has been studied and reviewed by Elston and Earl (1979), Layton (1970), Layton and Thomas (1979), Smith et al. (1983), and Leach (1988). The Indian ethnography for the area is discussed by Fowler (1989) and Steward (1935). The history of the area is reviewed by Smith et al (1983). Murphy (1984) and Speulda (1995) provide additional histories of Sheldon NWR. It is beyond the scope of this project to reiterate this work in detail. However, the following paragraphs offer a few important summaries from these and other studies that are pertinent to the present project.

Humans have lived in northern Nevada for at least 12,000 years. The earliest radiocarbon dates of human occupation on the refuge (about 8,800 years ago) come from deposits at Last Supper Cave (Grayson 1988:46). However, most of the prehistory of the area is represented by open-air lithic scatters.

At Sheldon, the size and complexity of the lithic scatters is governed by their proximity to naturally occurring toolstone and water, as well as elevation. Large and complex sites generally occur in places with abundant obsidian on low-elevation alluvial plains in well-watered valleys like Virgin Creek and Thousand Creek. Such sites tend to have many flaked stone tools, cultural features such as hearths, ground stone tools, abundant debitage, and good potential for buried archaeological deposits. Absent nearby water and toolstone, archaeological sites tend to be small, lack tools, and are limited to the surface.

Sheldon NWR is the traditional territory of the *Aga'i'paninadokada* ("fish lake eaters") and *Moado'kado* ("wild onion eaters") Northern Paiute. Today many of their descendants live on the Summit Lake Indian Reservation, Fort McDermitt Indian Reservation, Fort Bidwell Indian Reservation and the Cedarville Indian Rancheria. Prior to Euro-American incursion into northern Nevada, the Northern Paiute congregated in villages for winter at lower elevation sites near dependable water, fuel, and food. In the warmer months families dispersed to higher elevations following game and the ripening of plants through the summer (Fowler, 1989, Steward 1935, Stewart 1939). Though the horse became an important part of the native lifeway for some groups in the intermontane West after it was introduced in the late eighteenth century, the Northern Paiute who occupied the vicinity of Sheldon NWR never adopted the horse as an integral part of their culture (Malouf and Findlay 1986:500).

Euro-Americans began arriving in northern Nevada in the mid-1800s, primarily for the purpose of grazing cattle and, to a lesser extent, sheep. Some Indians may have adapted by raiding emigrant settlements and rustling livestock (Layton 1970, but see Lyman 1988). The new Americans persisted and eventually displaced the Indians. They built homes and developed springs and other livestock facilities while their sheep and cattle overran the range. Miners gathered opals from the Virgin Valley. But by the 1930s most homesteaders found it too difficult to make a living in the high desert of northwestern Nevada. The old ranching operations that occupied what is now Sheldon NWR are discussed in more detail below. Many were abandoned and reverted to federal ownership.

The Sheldon National Antelope refuge was established in 1931. Much of the infrastructure, from roads and dams to cabins and culverts, was developed by the Civilian Conservation Corps between 1935 and 1941 (Speulda 1995). The handiwork of the CCC can still be seen in many places on the refuge today.

Horses on the Landscape

Because the current undertaking involves the management of feral horses on the refuge, an examination of the role this species has played in the natural and cultural history of the area is provided here.

Native Horses of Nevada

The evolution of the family Equidae, with all its branching genera and species, originated in North America more than 50 million years ago. Though there are gaps in the fossil record that make its interpretation controversial, paleontologists suggest it documents how the branches on the family tree, which started with Hyracotherium, alternately thrived and died out, splitting off into new species or succumbing to environmental change (Hunt 1995). Regardless of whether one supports this view of horse evolution, however, it is generally accepted that *Equus* sp., the only genus to survive into the modern age, lived in Nevada and many areas of North America during the Pleistocene era until it went extinct about 10,000 years ago.

The Pleistocene-era climate of the Great Basin was less severe than the modern climate. Winters were warmer, summers were cooler, and there was more precipitation. Big shallow lakes and vast grasslands dominated the landscape. Large mammals including bison, mammoths, sloth and large herds of native wild horses thrived. The remains of Pleistocene-age native wild horses occur at no less than 25 different localities in the Great Basin (Grayson 1993:160). Just south of Sheldon NWR on the shores of Pyramid Lake, paleontologists recovered the bones of a complete native wild horse and two camels (*Camelops hesternus*). The animals had become trapped in the mud and died 25,500 years ago (Dansie, in Young 1988). Starting about 10,000 years ago, the seasonally equable Pleistocene climate gave way to the modern climate of relatively hotter summers and colder winters. Sagebrushes, saltbushes, and dry playas replaced the grasslands and lakes of the Pleistocene era. The result for many of the large Pleistocene mammals, including the native horse, was extinction (Grayson 1993). It has also been hypothesized that overhunting by newly-arrived humans may have contributed to the extermination of equids in North America (Martin 1967).

Horses Return to Nevada

The Spanish brought the horse back to America in 1500 A.D. Some soon escaped, earning them the name “mustang,” from the Spanish *mestano* meaning stray or ownerless. In some places, the runaways were adopted and bred by Indians. European and American settlers brought more domestic horses into Nevada in the 1800s. Biologists conclude that today all feral horses in America derive from escaped rancher, miner, and Indian stock. Few, if any, show affinities to the horses that accompanied the Spanish explorers of the 16th century (Berger 1986:12).

Feral horses entered the southeastern portion of the Great Basin about A.D. 1700, while a trickle of feral horses may have wandered into northwest Nevada during the late 18th century. Indians of the eastern Great Basin adopted the horse as a mode of transportation by about 1850. However, the Paiute Indians of northwestern Nevada never used the horse as a mount, probably because there were never enough of them (Fowler 1983:456), and perhaps they were always killed for food.

Archaeologists have recovered domestic horse and cattle bones from surface archaeological deposits at Last Supper Cave on Sheldon NWR. Although this portion of the archaeological site was not securely dated, the bones were believed to date to the 19th century. Initially the archaeologists proposed that the horse and cattle bones were the remains of stock that had been stolen, killed, and eaten by the Northern Paiute (Layton 1977). Later analyses proved that there is no evidence that humans killed or ate the horses and other domesticated animals found in the archaeological deposits at Last Supper Cave (Lyman 1988).

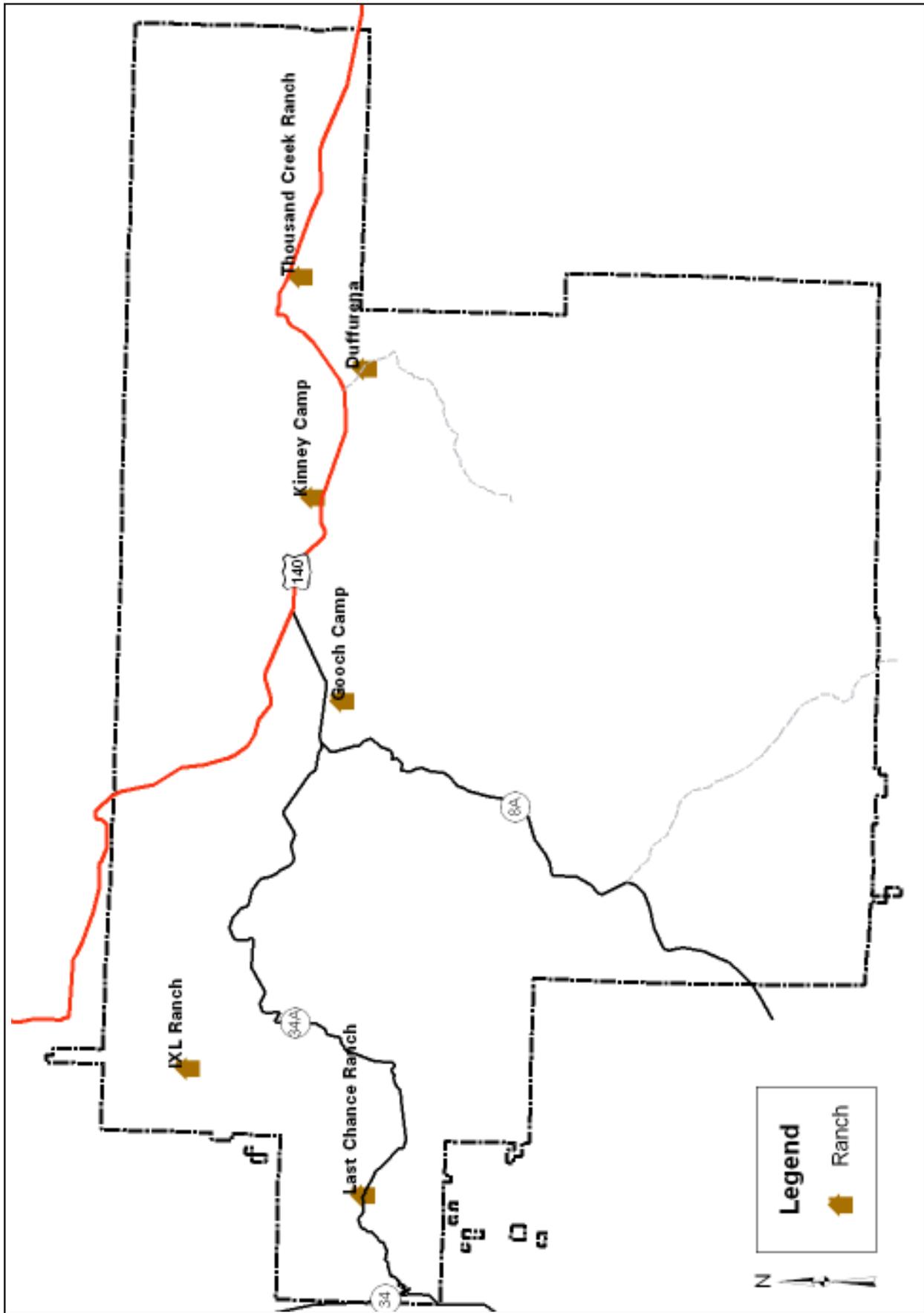


Figure 5. Locations of nineteenth century ranches on what is now Sheldon NWR.

Free-ranging feral horses were first reported in northwest Nevada by emigrant settler John Bidwell in 1841. Indians stole horses from the Fremont expedition in 1843 as it pushed south from Oregon into northwestern Nevada (Berger 1986:35). Fremont also reported that they saw feral horse tracks at Pyramid Lake, 150 miles south of Sheldon NWR. It wasn't until the late 19th century, when European immigrants and American homesteaders settled northwest Nevada, that horses also arrived in significant numbers (Pinger 1985). A Humboldt County livestock census tallied just 250 horses in 1865. By 1880, the livestock census recorded over 5200 horses (Angel 1881:139). Nevada's open range soon became a free and boundless pasture; the feral horse population grew.

Nineteenth Century Ranches on Sheldon NWR

The early settlers in the Sheldon area came primarily to raise cattle, buying up thousands of acres to support grazing. Some also raised European horse breeds as saddle and working stock for the U.S. Cavalry and the burgeoning population of nearby California (Pinger 1985, USFWS 1977). George B. Hapgood built ranches at Calcutta Lake and Last Chance Ranch in 1880. Both ranches were geared to diversified livestock production, although for many years the primary focus of summer activities at Last Chance Ranch was horses (Hapgood 1984 in Pinger 1985:26, Speulda 2002). Starting in 1890, William K. Ebeling built the ranches now known as Dufurrena, Thousand Creek, and Kinney Camp. Buzz Miller, Ebeling's "vaquero boss" in the 1910s, reported that Ebeling ran a mixed outfit including cattle, a few sheep, and predominately horses (Miller in Pinger 1985:40). Figure 5 shows the locations of the historic ranches that were established on what is now Sheldon NWR.

The presence of feral horses was serendipitous and provided another way to eke out a living in the harsh desert. Though not the *raison d'être* of their operations, some ranchers took advantage of the opportunity to round up the horses and sell them. In 1891, Eugene Gooch established a livestock operation which was strategically located to gather, trap, and ship feral horses. "Gooch Camp" is located in a narrow canyon between Gooch Table and Catnip Mountain historically known to harbor herds of feral horses (Figure 6). Marge Stephen, a member of the Dufurrena family that once owned Gooch Camp and other ranches on Sheldon NWR, described the horse operation at Gooch Camp in the early 20th century. She said the buckaroos drove the feral horses off the mountains into the canyon, the walls of which served to concentrate the herd. Barbed wire drift fences or "wings" ran down the canyon walls and led the horses toward Gooch Camp. The buckaroos banged tin cans which dangled from the fence to scare the horses onward. The wing fences funneled the horses into a round corral built with milled lumber, juniper posts, and sticks. The circular corral had no corners on which the frightened horses could have injured themselves (Pinger 1985:34).



Figure 6. Overview of historic Gooch Camp, situated in a canyon between Gooch Table and Catnip Mountain.

A neighboring rock corral was also designed for horses. The stones were carefully stacked to form a smooth and safe interior wall. The rock corral held horses ready for shipping. A small stream runs through Gooch Camp. It watered a meadow from which the ranchers cut native hay to feed horses awaiting shipping. A half mile from Gooch Camp was the road that led to Cedarville and the markets of Reno and California (Pinger 1985:34).

The market for saddle horses waned in the early 20th century, especially for horses from the hinterlands of northwest Nevada. So the ranches on and near Sheldon increased their focus on more lucrative and easier to manage livestock: cattle and sheep. Many horses were set free or simply allowed to roam. Meanwhile, a native ungulate of the Great Basin was in trouble.



Figure 7. The corral at Gooch Camp was used for rounding up feral horses during the early twentieth century.

Management Context

A Refuge for Indigenous Species

Conservationists Establish Sheldon NWR for Pronghorn

Unlike *Equus*, which became extinct in the Great Basin 10,000 years ago as environmental conditions became harsher and humans moved in, the pronghorn (*Antilocarpa americana*) has roamed the deserts and plains of North America without interruption for at least one million years. With its keen eyesight and its record as the fastest North American mammal, the pronghorn has adapted well to the desert plains of northern Nevada. Native American hunters responded with well-planned communal drives and surrounds, capturing and slaughtering dozens at a time. Nevertheless, pronghorn populations remained robust until Euro-Americans and their livestock arrived in the late 1800s.

By the early twentieth century, pronghorn populations in Nevada had plummeted. Several years of cold dry weather, unchecked livestock grazing, degraded rangelands, and unregulated hunting contributed to the precarious state of the pronghorn. By 1920, conservationists including members of the Audubon Society, the Boone and Crockett Club of New York City, employees of the U.S. Biological Survey, and the state of Nevada became concerned about the plight of the pronghorn. The conservationists recognized that forage and habitat was essential for the survival of pronghorn populations. They observed that non-native animals including sheep, cattle, and horses competed for the same forage and habitat as pronghorn. E.R. Sans, an employee of the U.S. Biological Survey (later renamed the U.S. Fish and Wildlife Service) mobilized giants of the conservation movement, including Dr. Gilbert Pearson, president of the National Association of Audubon Societies and Charles Sheldon of the Boone and Crockett Club, to address Nevada's pronghorn problem. Sans convinced them that Hapgood's Last Chance Ranch would make an ideal pronghorn sanctuary (Elston and Earl 1979:39-45).

For 10 years the Nevada pronghorn conservationists organized, raised money, and lobbied county, state, and the Federal government. In 1931 their efforts paid off. President Herbert Hoover signed Executive Order No.7511 which created the Charles Sheldon National Wildlife Refuge centering on Hapgood's Last Chance Ranch. Franklin Roosevelt followed with Executive Order No. 7522, enlarging the Charles Sheldon Antelope Range to over 539,000 acres (Elston and Earl 1979:39-45).

Legislation and Policy Regarding Feral Horses on Sheldon NWR

Sheldon National Wildlife Refuge was established primarily for the conservation of pronghorn antelope and other native wildlife species (USFWS 1980). Since, like most national wildlife refuges, Sheldon was established for the protection of indigenous¹ wildlife and habitat, any use of refuge lands and waters must, by law, be consistent with this purpose. Service policy requires the management of feral animals to prevent damage to native wildlife habitat and other resources (U.S. Fish and Wildlife Service policy (7RM6.1) (701 FW 9)) following federal regulations (50 CFR 30.11-12)).

The horses that roam Sheldon NWR today have sometimes been labeled as "wild horses" in historic documents (such as the refuge annual narratives summarized following). Technically,

¹ The U.S. Fish and Wildlife Service Manual defines "indigenous" in 701 FW 1 as: "Indigenous. Originating in and being produced, growing, or living in a particular region or environment; in common use, not brought by humans accidentally or otherwise."

however, the fact that these horses are the offspring of domesticated horses introduced to the area in the 1800s which subsequently escaped human control classifies them as feral animals.

The horses and burros on Sheldon National Wildlife Refuge are managed under two sets of authorities. The Wild Free-roaming Horse and burro Act of 1971 defines “wild free-roaming horses and burros” as “all unbranded and unclaimed horses and burros on public lands of the United States.” The act goes on to define “public lands” as “any lands administered by the Secretary of the Interior through the Bureau of Land Management or by the Secretary of Agriculture through the Forest Service.”

It is important to note that the Act specifically and purposefully excludes lands of the U.S. Fish and Wildlife Service. Horses and burros that stray onto the refuge from neighboring BLM lands remain “wild” and subject to management under the Wild Free-roaming Horses and Burro Act of 1971. These animals are managed cooperatively with BLM. The vast majority of horses and burros on Sheldon Refuge are considered to be residents. In other words, the refuge is large and the home range of the herd is contained within the refuge boundaries. These resident horses and burros are legally defined as feral, and managed following the regulations and policies of the U.S. Fish and Wildlife Service (50 CFR 30.11-12, 7 RM 6, 601 FW 3).

For the past 30 years the management of feral horses at Sheldon has been governed by the 1977 Sheldon Horse Management Plan EIA (FWS 1977), the 1980 Sheldon NWR Renewable Natural Resources Management Plan Final EIS (FWS 1980), and a 2000 Environmental Action Memorandum updating previous documents (FWS 2000). Feral horse management is also a topic of the Sheldon NWR Comprehensive Conservation Plan which was initiated in 2006 and which is expected to be completed in 2009.

Feral Horse Management

Historic Management Efforts: A Review of Refuge Annual Narratives

Managing feral horses has always been an element of habitat management at Sheldon NWR. A review of the Annual Narrative reports for Sheldon NWR documents the ebb and flow of feral horse populations and their periodic removal during the refuge's 70-year history. Summaries and excerpts from some of the extant narratives are provided here (as compiled by Elston and Earl 1979).

1938: The narrative noted that 100-150 feral horses were observed on Big Springs Table, but there was no comment on whether they were damaging the pronghorn grazing areas.

1942: This report pointed out that while all browse types for deer were "in fine shape.... The key fall and winter range for antelope, however, even at this time presents a different picture." (USFWS 1942:7). The narrative continues:

It is significant that this area is being browsed very heavily by antelope. The only other grazing animals in this area are about 100 wild horses. Domestic livestock are not nor have not been permitted in the area, nor should they be. Every effort should be made to exclude the wild horse from this area as rapidly as possible and we should begin immediately looking toward and planning for means by which we can effectively manage antelope numbers on the area in the immediate future.

1946: This was the first mention of large-scale horse removal, when 260 were trapped using a light plane and shipped to a California slaughterhouse.

1947: Another 400 feral horses were removed by a California trapper with the assistance of a light plane.

1948: Feral horse management continued with 767 horses removed, again by a California trapper.

1954: Only 50 feral horses were spotted during the year, according to the report.

1956: Numbers begin to increase again and 237 feral horses were taken by a California trapper.

1962: Development of a burro and feral horse management program got underway. A feral horse census was completed that summer.

1964: A feral horse and burro survey was conducted. "The writer of the report, Ben Hazeltine, indicated a lack of interest in a horse and burro program on the part of his personnel, but he acknowledged a great public interest in the creatures." (Elston and Earl 1979:xx)

1965: In fulfillment of the "wild horse management program," 86 horses were rounded up and shipped to California for "domestic use" that year.

1967: "Both the wild horses and the burros in the Thousand Creek area proved to be a particular draw for tourists that year. Refuge personnel also attended several wildlife conferences and took part in a number of meetings to promote a better public understanding of the Refuge."

1970: "The wild horses and burros continued to draw tourists, much to the disgust of Range personnel who considered the antelope a much more interesting creature."

Current Management Efforts

The burgeoning horse population level on Sheldon is causing negative impacts to native wildlife and their habitats. Along stream banks and at spring heads, impacts include trampling of vegetation, exclusion of native species by dominant stud horses, and contamination from feces and urine.

Monitoring information from 2002 concluded that 44% of all streams and 80% of the springs on the refuge are heavily or severely impacted by horses. The feral horse population has continued to increase since that report. Feral horses also cause habitat degradation by removal and trampling of vegetation in upland areas.

When cattle grazing was permanently removed from Sheldon NWR in the early 1990s because of these same conflicts with wildlife, the population of feral horses was about 200-300 animals. However, these horses have no natural predators and their populations increase at a very high rate when compared to populations of deer, antelope and other native species for which the refuge was established. The herd's growth rate is very strong, averaging about 23% net increase per year.

The refuge's 1977 revised horse management plan established a total feral horse target population of 75 to 125 animals in two separate populations (USFWS 1977:3). With an estimated current population of about 1,500 animals, 345 animals must be removed to keep the current population stable. For this reason, the Service has undertaken two horse gathers per year to decrease the horse population. The gathering program uses helicopters and ground personnel to herd and move the horses into temporary corrals near roads. The horses are held for a brief time before they are moved off the Refuge to adoption facilities.

Section 106 Undertaking

The management of feral horses on Sheldon NWR is an undertaking according to Section 106 of the National Historic Preservation Act (NHPA). The undertaking is best analyzed as three distinct activities with corresponding areas of potential effect (APEs). The three activities include: hosting horses on the refuge (Part A); gathering and enclosing horses (Part B); and removing horses from the refuge (Part C).

Part A: Hosting Horses on Sheldon NWR

Area of Potential Effect s(APE) - Undertaking Part A

Part A of the undertaking is management by the FWS that results in the presence of feral horses on the Refuge. Feral horses are not indigenous. Their behavior and impacts to the landscape are generally incompatible with the native ecosystem. The presence and impacts of feral horses on the Refuge are ultimately the responsibility of the FWS. Therefore, it is appropriate that we consider, pursuant to the Section 106 of the NHPA, the effects of feral horses on historic properties.

Analogy can be found on nearby Forest Service and BLM lands. There, cattle and cattle grazing programs receive increasing scrutiny under Section 106 of the NHPA. These agencies consider the effects of cattle trampling on cultural resources that may coincide with spring developments, drift fences, and other places associated with cattle management (Gates 2004, personal communication). Although cattle and cattle grazing no longer occur on Sheldon NWR, feral horses and feral horse grazing do. However, feral horses are not owned by private parties who lease federal land to graze them. They are rogue animals whose numbers and locations cannot be controlled like cattle. Nevertheless, the FWS has tried to manage feral horses and their impacts to the environment on Sheldon NWR for 70 years. Like cattle, they tend to congregate at water sources and meadows (Cover, Figures 8 and 9). They trample and erode the soil causing damage to the archaeological sites that may occur in the same locations.



Figure 8. Multiple horse trails can be seen radiating from “Gossamer” Spring after a 1999 wildfire.

Figure B1. Big Spring Creek 1-1. Photo taken April 29, 2002, when utilization cage was placed on reach.

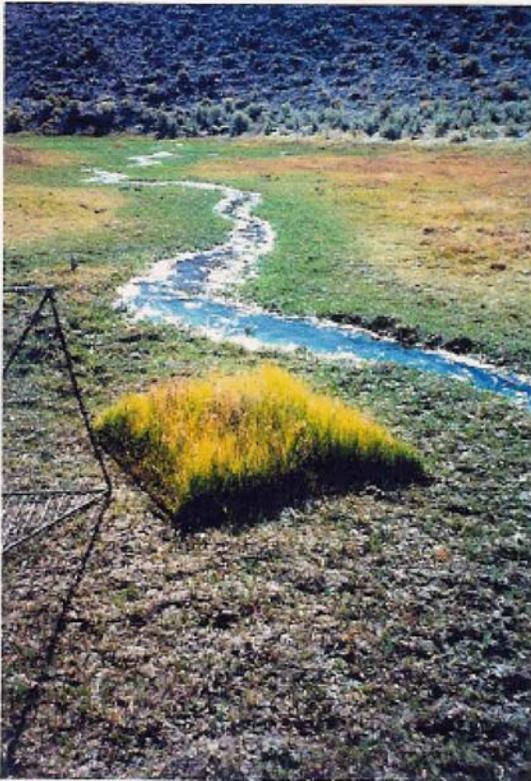


Figure B2. Big Spring Creek 1-1. Photo taken September 20, 2002, when stubble height transect was read.

Figure 9. A page from Barnett's report monitoring impacts of feral horses and burros on Sheldon NWR illustrates the effects of grazing and trampling on Big Spring Creek(2002).

The area of potential effects (APE) for Part A of the undertaking comprises the places where horses regularly congregate on a small patch of ground for a period of time. Refuge personnel have identified the following springs and water sources as receiving especially heavy use by feral horses: the north shore of Big Springs Reservoir, Big Spring Creek, Catnip Reservoir, Catnip Creek, (Catnip spring), Martinez Spring, Hobble Spring, TenMile Spring, Horse Canyon Spring and the confluence of Hell Creek and Virgin Creek (Figure 10).

Feral horse impacts at these locations include grazing off all the vegetation, trampling and compaction of dry soil, churning and compaction of wet soil, trampling and collapsing of banks in riparian zones, and soil erosion (Barnett 2002). These areas range between 1 and 20 acres in size. If any historic properties are “under hoof” at these places of concentrated horse use, they would likely be adversely affected by trampling or soil erosion. Therefore, we need to determine if any cultural resources coincide with the places on the refuge where the feral horses regularly concentrate.

Cultural Resources in the APE - Undertaking Part A

The cultural resource identification effort for this part of the undertaking was limited to a review of the existing survey data and cultural resource records for the refuge. The purpose was to determine if previously recorded cultural resources occur in or near the APE, i.e., places where horses are known to concentrate, trample, and erode the soil. The results of the review are summarized in Table 1.

Area trampled by feral horses	Previously surveyed for cultural resources?	Cultural resources present?	Impacts from horses observed?	Reference
Big Springs Reservoir	Yes	Yes, 5 sites	Yes	Daehnke et al.
Big Spring Creek	No	unknown	n/a	n/a
Catnip Reservoir	Yes	Yes, 2 sites	?	Raymond
Catnip Creek	No	unknown	n/a	n/a
Martinez Spring	Yes	Yes, 1 site	Yes	Raymond
Hobble Spring	No	unknown	n/a	n/a
Ten Mile Spring	Yes	Yes, 1 site	Yes	Raymond
Horse Canyon Spring	Yes	Yes, 1 site	?	Site record
Hell/Virgin Creek	Yes	Yes, 2 sites	?	Site record

Table 1. Presence and status of known prehistoric sites at water sources frequented by feral horse populations.

The review indicates that among the nine locations known for horse concentrations, 7 have been previously systematically surveyed by archaeologists. Among the surveyed areas, all contain at least one prehistoric archaeological site. This is not surprising since people, like wildlife and feral horses, are attracted to water. Although none of these surveys were specifically mounted to address the present undertaking, archaeologists routinely note impacts to cultural resources when inventorying them. The site records for Big Spring Reservoir, Martinez, and Ten Mile springs specifically note that trampling and erosion from horses has impacted, and threatens to continue impacting, archaeological sites that are eligible to the National Register of Historic Places. Indeed, after a wildfire, archaeologists conducted a site evaluation at Ten Mile Spring because the erosion from horse grazing was considered a serious threat. The archaeologists also established a photo monitoring project to document the impacts of horse grazing as the site recovered from the wildfire. Unfortunately, funding and logistical constraints have prevented a follow-up to the photo monitoring project. The site records for Catnip Reservoir, Horse Canyon

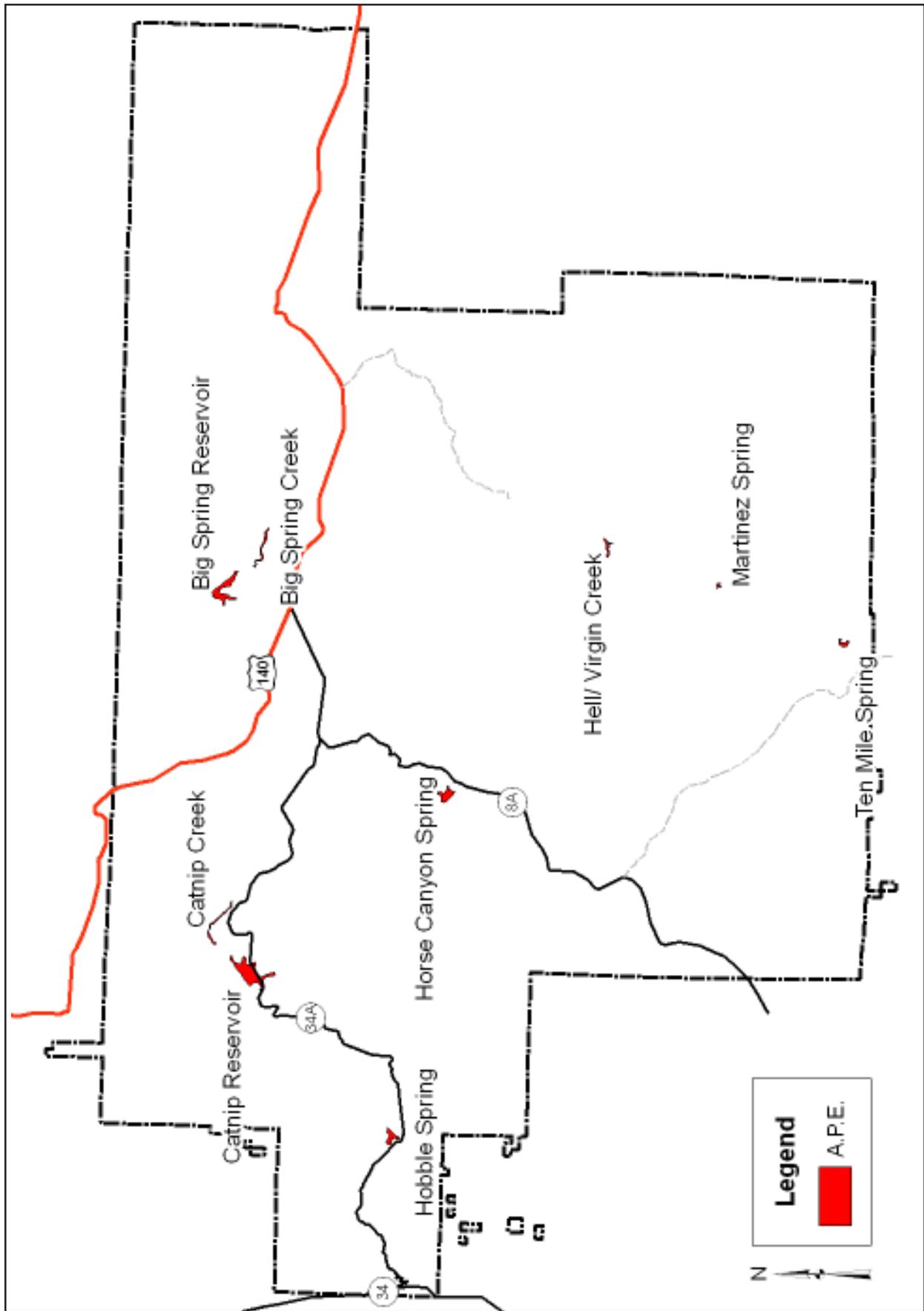


Figure 10. Map illustrating Area of Potential Effects (APE) for Part A of the undertaking: locations of documented feral horse concentrations at water sources.

Spring, and Hell/Virgin Creek document “grazing” impacts to the sites. However, the sites were recorded prior to the permanent removal of cattle, and no distinction was made on the forms between cattle grazing and horse grazing.

Determination of Effect and Recommendations- Undertaking Part A

The majority of the known areas where congregations of horses occur have been surveyed for cultural resources, and the data indicates that feral horses concentrating at water sources are inflicting damage to known prehistoric archaeological sites, representing an adverse effect on resources eligible to be historic properties. Maps illustrating where horse trampled areas coincide with cultural resources are included in Appendix A. Due to the protected status of archaeological site location information, these maps are not to be publically distributed.

Three areas -- Big Spring Creek, Catnip Creek, and Hobble Spring -- have not been systematically surveyed by archaeologists, although there is one petroglyph site recorded near Hobble Spring. Given their proximity to permanent water, these places have a high potential for the presence of prehistoric archaeological sites. It is recommended that systematic survey in these locations be conducted (Figure 11 and Appendix B). Future management planning would benefit from additional research into the presence of cultural resources at all horse concentration points.

The most effective mitigation measure for the adverse effect of horse trampling on archaeological sites on the refuge would be their complete removal from the vicinity of sites. This measure is partially fulfilled by the activities associated with Undertaking Parts B and C, described following.

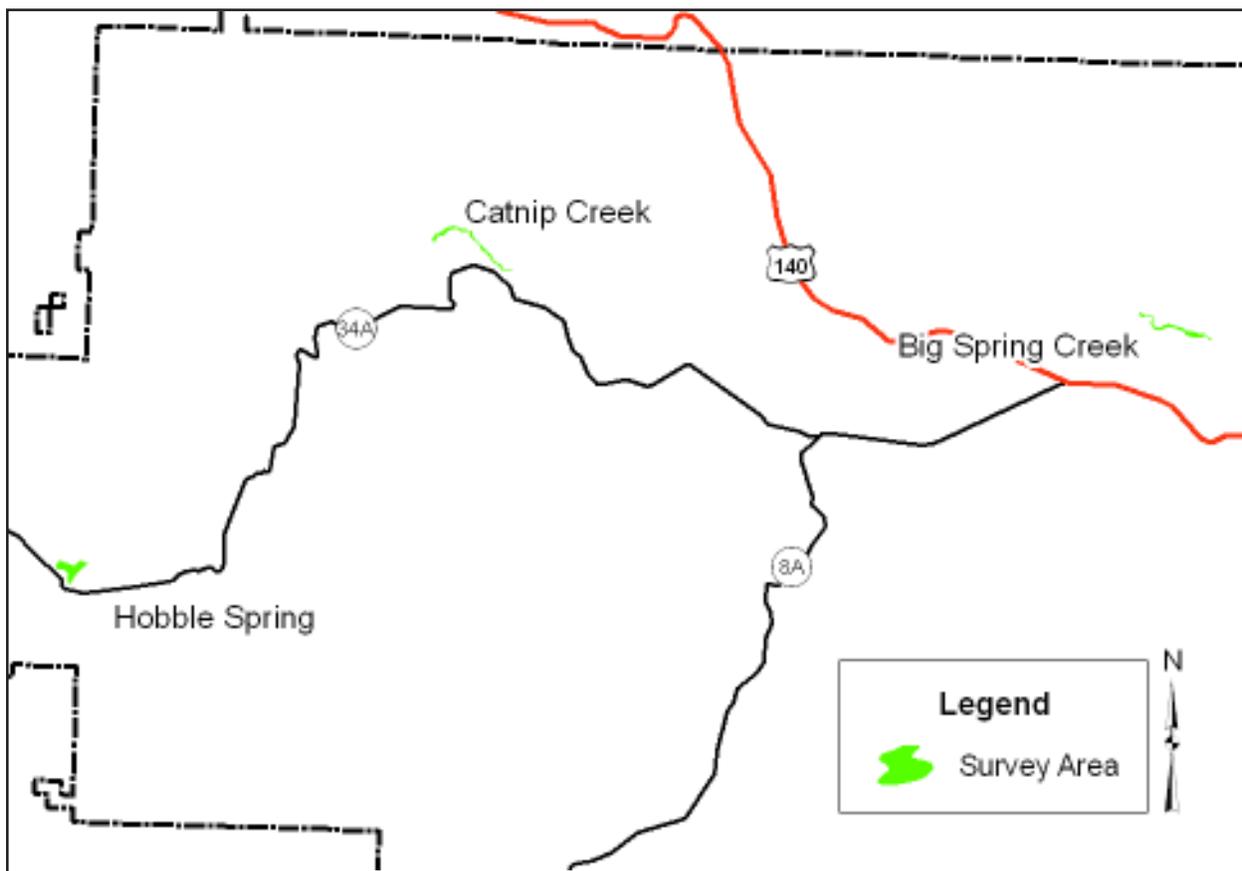


Figure 11. Map identifying recommended archaeological survey areas: Big Spring Creek, Catnip Creek, and Hobble Spring.

Part B: Gathering and Enclosing Feral Horses

Area of Potential Effects (APE)– Undertaking Part B

Part B of the undertaking consists of gathering and enclosing feral horses. The APE for Part B comprises the places where refuge personnel gather, confine, and hold a group of feral horses in advance of their removal from the refuge. Three such places have been used in the past. They include: Big Spring gathering location, Swan Lake gathering location, and Catnip Canyon gathering location (Figures 12 and 13).

A feral horse gathering place consists of a 35-meter diameter corral fence within a one-acre work area. Refuge personnel opportunistically select gathering places depending on the accessibility of the target horse herd. Gathering places are generally used only once, and the corral is dismantled after use. Using helicopters and horse mounted buckaroos, the refuge herds feral horses into the corral. The horses trample and compact the soil and remove all vegetation. As with undertaking Part A, if any historic properties are “under hoof” they would be adversely affected by trampling or subsequent soil erosion. Therefore, we need to determine if any cultural resources coincide with the places and facilities designed for horse gathering and confinement.

Refuge personnel transport the feral horses by vehicle on existing roads from the gathering locations to an existing pasture at the Dufurrena sub headquarters where they are held until adopted or purchased (Day, personal communication 2006). Transport and grazing in an existing and managed pasture is not considered an undertaking under Section 106 of the NHPA.

Cultural Resources in the APE - Undertaking Part B

Because selection of gathering places is opportunistic, a specific location for the next horse gather has not been identified.

Determination of Effect and Recommendations - Undertaking Part B

As in Part A, trampling of horses in corral areas associated with cultural resources would constitute an adverse effect. Cultural resource surveys were not conducted in the APEs of the three previous horse gathering events, and it is recommended that an archaeologist inspect these locations, especially if they are targeted for additional use. It is also recommended that archaeological survey be conducted in the APE of all future gathering locations prior to their utilization. If cultural resources are identified in the proposed APE, alternative gathering locations should be considered and surveyed.



Figure 12. Temporary corral set up beside a road during a past horse gathering event (USFWS 2004).

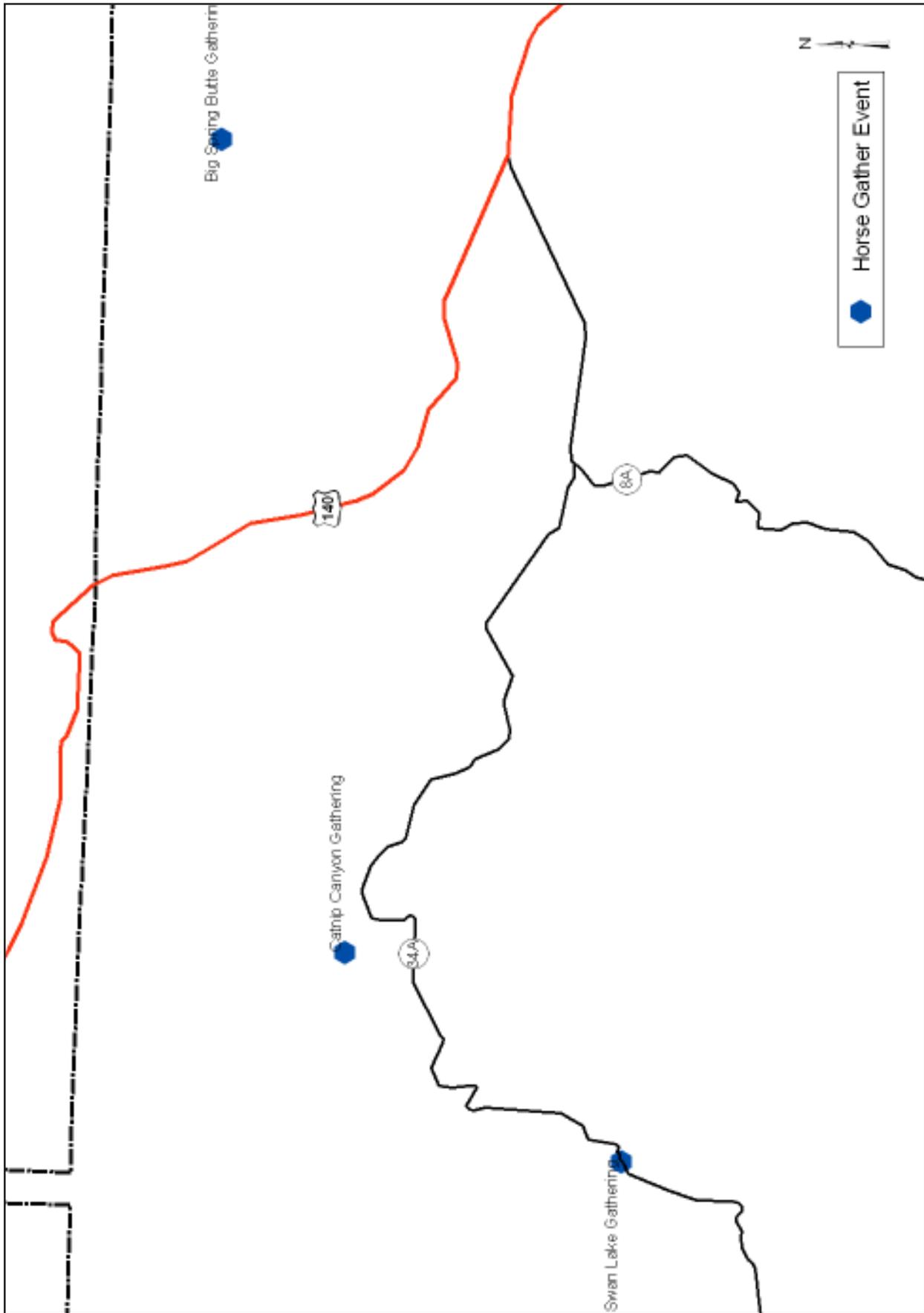


Figure 13. APE map for Part B of undertaking: locations of past horse gather events at Big Spring, Swan Lake, and Catnip Canyon.

Part C: Removal of Feral Horses

Area of Potential Effect - Undertaking Part C

The third part of the undertaking, Part C, is the removal of feral horses from Sheldon NWR. Generally, the routine removal of feral animals from refuges is not considered an undertaking under NHPA. Elsewhere, however, a few recent cases have explored the potential of animals as contributing or defining elements of an historic property. Because the feral horses at Sheldon have been a part of the landscape for more than a century, we have investigated this issue as it pertains to their removal.

While technically there is no mechanism for nominating living animals to the National Register of Historic Places (NRHP), the concept that living animals can contribute to the significance of a historic property is not unprecedented. If it is determined that the presence of feral horses contributes to the significance of a “historic property” (i.e., historic site(s) and/or landscape eligible to the National Register of Historic Places), then the removal of the horses could adversely affect the integrity of the property. Therefore the APE for undertaking activity C is the physical range or landscape where feral horses and associated cultural resources occur. Refuge personnel (Day, personal communication 2006; Barnett 2002) indicate that there are four distinct herds of feral horses on Sheldon NWR: Fish Creek Herd, Badger Mountain Herd, Catnip Mountain Herd and Big Spring Herd. Though a cultural resource field inventory of these areas has not been mounted specifically for this APE, the primary cultural resources associated with this horse-culture era on the refuge have been previously inventoried and described in detail (Pinger 1985, Speulda 1995). Figure 14 illustrates the APE, identified as those areas where current horse herds are located in relation to the historic ranches where horse-related activities are known to have occurred, specifically Last Chance Ranch and Gooch Camp.

Animals as Contributing Elements to Historic Properties

To consider the concept of animals in relation to cultural resources, the following case studies are summarized.

Klamath River and its Salmon

In an article appearing in *The Applied Anthropologist*, NHPA consultant Thomas King presents two situations in which he proposes that animals serve as contributing elements to historic properties that are eligible to the NRHP (King 2006). The first is the native salmon of the Klamath River, both of which (fish and river) are intimately connected to the culture of the American Indian tribes that live along the river. The river itself, he argues, is eligible to the NRHP as a traditional cultural property, and “the fish, other wildlife, and plants native to the river, and particularly the salmon, are **contributing elements**, that is, elements that contribute to the river’s significance, because without them the river’s cultural integrity would be compromised” (King 2006:129).

Dugongs of Okinawa, Japan

The second case is that of the dugongs of Okinawa. While this is more complex and involves another country (Japan), it also explores the relationship of the animal species to the cultural landscape. The dugong is an endangered marine mammal that is a “cultural icon of the Okinawan people” whose remaining habitat is a bay on eastern Okinawa (King 2006:130). At issue is the potential destruction of that habitat due to the construction of a U.S. military installation.

Coyote Canyon Wild Horse Herd Historic District

A third case is that of the Coyote Canyon Wild Horse Herd Historic District in Southern California. King, also the author of an NRHP nomination which is currently being reviewed by the CA State Historic Preservation Office, makes the case for the establishment of an historic

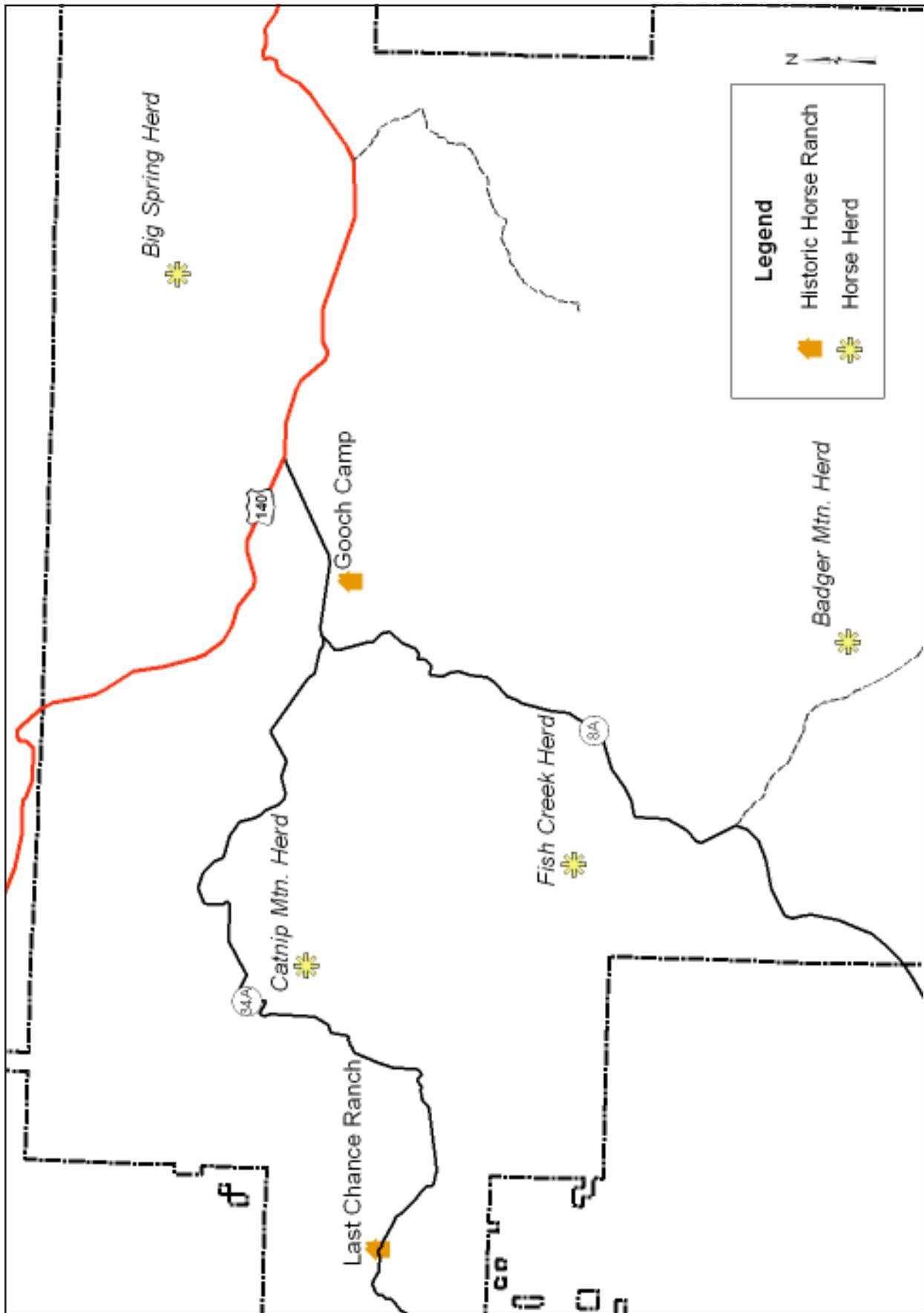


Figure 14. APE map for Part C of the undertaking: current herd ranges and historic ranch locations associated with horses.

district encompassing the range of the Coyote Canyon herd, which can be traced back to the late 19th century or longer. The nomination argues that the herd is “significant as the last wild horse herd in Southern California, and as a representative of a rapidly vanishing element in the cultural landscape of the western United States” (King 2005:4). King stresses that the nomination does not propose the physical herd of horses itself to be eligible, but that they are “character-defining” or contributing elements to a place that is eligible. He goes on to describe other character-defining elements which make the canyon historically and culturally significant, including: the Cahuilla Indian culture represented by more than 300 archaeological sites; the canyon’s association with the 1775 de Anza expedition; and the history of stockraising by early settlers.

Cultural Resources in the APE - Undertaking Part C

Using the examples cited above as sources of reference and comparison, the task for this project is to determine whether the landscapes occupied by feral horses on Sheldon contain history and cultural resources with which the feral horses are associated. If there are such places, does the presence of living feral horses contribute to their significance?

Horses were not central to the lifeways of the Northern Paiute who lived in this area. And the culture and history of the Service at Sheldon NWR since its inception has been to act to remove feral horses. The most appropriate potentially “character-defining” association to be explored, therefore, would seem to be the era of cattle ranching from the late 19th to early 20th century. This is when the horses began escaping domestic control and became feral.

As summarized earlier in this report, the structures and infrastructure associated with ranching properties were built for the purpose of raising livestock. Domestic horses were an integral element of ranch operations, both as work animals and as stock for sale. Inevitably, some of those horses escaped, contributing to the population of feral horses uncontrolled by, but occasionally recaptured by, the ranchers. At Gooch Camp, in particular, the presence of a corral which was built to gather and ship out feral horses indicates an active interest in capitalizing on the commercial opportunity presented by feral horses.

Determination of Effect and Recommendations - Undertaking Part C

While the presence and history of feral horses at Sheldon NWR does not correlate closely with any of the examples above, some comparative observations can be made to help articulate the determination of effect.

-As King proposes in the Coyote Canyon nomination, many people view the feral horse, aka. the wild horse, as a cultural icon of the American west. The passage of the 1971 Wild Free-Roaming Horse and Burro Act and the continuing concern for the well-being of horse herds attests to their popularity. The feral horses at Sheldon also draw this romantic interest from highway-bound tourists straining to see any sign of “wild” animal life in a landscape that appears bleak as it passes in a blur through car windows. However, unlike the Coyote Canyon herd, the feral horses at Sheldon do not represent a special or unique population. The Refuge is surrounded by Bureau of Land Management lands where thousands of “wild free-roaming” horses (13,300 in FY05) continue to range under the protection of the 1971 act.

-While no traditional cultural landscape has been designated at Sheldon NWR similar to that proposed for the Klamath River and its salmon, it is unlikely that the feral horse would constitute a contributing element to such a landscape. Because their significance to the refuge’s ranch-era landscape is as: 1) domestic animals that escaped, and 2) feral animals that were rounded up and sold, it would be difficult to argue that the presence of these horses contributes to — and conversely that their absence would diminish — the significance of the landscape to which they were of peripheral importance historically.

-The dugong of King's second case study is a native species and "cultural icon" whose habitat is threatened. At Sheldon, it is the indigenous pronghorn antelope that is the refuge icon and whose habitat is threatened. The sight of a horse herd running free across the sagebrush can prove visceral in its evocation of an old West which has mostly disappeared. So too, marveling at the grace and speed of the pronghorn as it sprints across the landscape, one can imagine a much more ancient time when our Native American ancestors witnessed the same phenomenon.

Both the horse and the pronghorn can be considered icons to the American people, who have taken important measures to protect them both. For the horse, the Bureau of Land Management has been mandated to put aside places where they can roam free. For the pronghorn and for other native species, the U.S. Fish and Wildlife Service has been mandated to manage its lands specifically for the benefit of wildlife and their habitats.

As it concerns the removal of feral horses from Sheldon NWR, therefore, the Service has determined that the action does not affect historic properties, and should continue as authorized by law and policy to maintain habitat for the species for which the refuge was established. Removal of feral horses can be considered a mitigating action for the adverse effects to cultural resources caused by horse trampling under Parts A and B of this undertaking.

Conclusions

The following is a summary of our findings and a list of recommended action items to ensure continued compliance with Section 106 of the NHPA.

Undertaking Part A: Hosting feral horses on the refuge results in the congregation of horses around springs where archaeological sites are often concentrated and therefore constitutes a potential to effect cultural resources.

Recommendations:

- a) Archaeological survey of horse congregation areas - specifically at Catnip Creek, Big Springs Creek, and Hobble Spring. Additional surveys should be conducted when field data provides new information about horse trampling in any area where the potential for cultural resources is high.
- b) Restrict access of horses and burros to springs and water sources that are culturally sensitive through removal and management.

Undertaking Part B: Gathering and enclosing horses in temporary corrals constitutes a potential to effect cultural resources.

Recommendations:

- a) Survey proposed corral/ gather areas prior to development and use. We note that the standard operating procedure of the Sheldon NWR includes conducting cultural resource surveys prior to ground altering activities such as the erection of temporary horse corrals. The FWS cultural resource team will review such projects in accordance with its Programmatic Agreement for routine Section 106 NHPA undertakings with the Nevada State Historic Preservation Office.

Undertaking Part C: The presence of living feral horses does not contribute to the significance of a national register eligible historic property. Therefore, removal of feral horses constitutes a “no historic properties affected” outcome.

Recommendations:

- a) Continue with feral horse removal activities as mandated.

As part of its commitment to comply with Section 110 of the NHPA, the Service inventories and evaluates cultural resources for their eligibility to the National Register of Historic Places (NRHP) on an ongoing basis as funding and priorities dictate. To this end, we recommend complete documentation of Gooch Camp which has associations with the ranching era as well as the corralling of feral horses. We have determined, however, that the presence of living feral horses are not essential, nor will they contribute, to the potential NRHP eligibility of the property.

Future Cultural Resource Management

Comprehensive Conservation Planning

The removal of feral horses from Sheldon NWR is an ongoing management strategy which has been guided through policy since its establishment. This issue and many others will be examined during the refuge's comprehensive conservation planning process being initiated in 2007.

The archaeological and historic record at Sheldon NWR attests to thousands of years of utilization of the landscape for habitation, subsistence, commerce, and wildlife conservation. Ranging from lithic scatters, petroglyphs and hunting blinds to historic buildings, corrals, and CCC-built structures and features, these cultural resources offer fascinating glimpses into the past. Because of this rich and tangible record of human history, consideration of cultural resources will be an integral part of the comprehensive conservation planning process.

Cultural resources have the potential to be directly affected by ground-disturbing activities such as facilities construction, infrastructure repairs or habitat improvement. As demonstrated by this report, animal management activities such as removal of feral horses can also impact cultural resources. Activities that increase public access to sensitive cultural areas can impact cultural resources. Activities such as wildlife observation, interpretation, photography, and environmental education, when confined to non-sensitive cultural areas will result in minimal to no effect on cultural resources. Public programs that include interpretation of the cultural history of the refuge provide an educational benefit, and may reduce illegal looting and vandalism of cultural resources.

Regardless of the alternatives and actions proposed by the CCP, the management of cultural resources will comply with the regulations of Section 106 of the National Historic Preservation Act (NHPA). Therefore, determining whether a particular action within an alternative has the potential to affect cultural resources is an ongoing process that occurs within the planning stages of each project.

Section 110 of the NHPA stipulates the implementation of a program by the agency to identify and protect historic properties, including evaluation of eligible properties to the National Register of Historic Places (NRHP). To that end, ongoing efforts should be made to conduct systematic archaeological survey and to inventory, evaluate and interpret historic properties, as appropriate.

This report specifically documents our efforts and recommendations for compliance with the Section 106 process regarding management of feral horses at Sheldon NWR. We will continue to consult with the Nevada SHPO and interested Tribes on Section 106 issues on the refuge and throughout the CCP planning process.

References

Angel, Myron

1881 ***History of Nevada***. Thompson and West. Oakland, California.

Barnett, Jenny

2002 ***Managing Feral Horse and Burro Impacts on Habitat, Sheldon National Wildlife Refuge***. Ms on file at Sheldon NWR, Lakeview, Oregon.

Berger, Joel

1986 ***Wild Horses of the Great Basin***. University of Chicago Press, Chicago.

Daehnke, Jon, Alex Bourdeau and Anan Raymond

2001 ***Archaeological Investigations at Big Springs Reservoir, Sheldon National Wildlife Refuge, Nevada***. U.S. Fish and Wildlife Service, Sherwood, Oregon.

Dansie, Amy J., Jonathan O. Davis and Thomas W. Stafford

1988 The Wizards Beach Recession: Farmedalian (25,500 yr B.P.) Vertebrate Fossils Co-occur with Early Archaic Artifacts. In Early Human Occupation in Far Western North America: The Clovis-Archaic Interface. Edited by J. A. Willig, C. M. Aikens and J. L. Fagan. ***Nevada State Museum Anthropological Papers*** No. 21. Carson City.

Day, Brian

2006 Personal communication in November 2006 with Brian Day, Refuge Manager, concerning feral horses on Sheldon NWR.

Elston, Robert G. and Phillip I. Earl (1979)

1979 A Cultural Resources Overview for the Sheldon National Wildlife Refuge. Archaeological Survey/ Anthropological Department, University of Nevada, Reno.

Fowler, Catherine S. (editor)

1989 ***Willard Z. Park's Ethnographic Notes on the Northern Paiute of Western Nevada, 1933-1944***. University of Utah Anthropological Papers, No. 114. Salt Lake City.

Fowler, Catherine and Sven Liljeblad

1986 Northern Paiute. In, Handbook of North American Indians: Great Basin. pp 435-465. Smithsonian institution, Washington.

Gates Gerry

2004 Personal communication in 2004 with Gerry Gates, Forest Archaeologist, Modoc National Forest concerning cattle grazing and cultural resource management.

Grayson, Donald K.

1988 ***Danger Cave, Last Supper Cave, and Hanging Rock Shelter: The Faunas***. Volume 66: Part 1. Anthropological Papers of the American Museum of Natural History. New York.

- 1993 ***The Desert's Past: A Natural Prehistory of the Great Basin.*** Smithsonian Institution Press, Washington.
- Hunt, Kathleen
- 1995 ***The Talk Origins Archive: Horse Evolution.*** 5 December 2006. <http://www.talkorigins.org/faqs/horses/horse_evol.html>
- King, Thomas F.
- 2005 Coyote Canyon Wild Horse Herd Historic District, National Register of Historic Places nomination form (unpublished?).
- 2006 Animals and the United States National Register of Historic Places, in ***The Applied Anthropologist***, Volume 26, No. 2 Fall 2006.
- Layton, Thomas
- 1977 Indian Rustlers of the High Rock, in ***Archaeology*** 30:366-373.
- 1979 ***High Rock Archaeology: An Interpretation of the Prehistory of the Northwestern Great Basin.*** Ph.D. dissertation. Department of Anthropology, Harvard University, Cambridge.
- Layton, Thomas and David Hurst Thomas
- 1979 The Archaeology of Silent Snake Springs, Humboldt County, Nevada. Anthropological Papers of the American Museum of Natural History 55(3).
- Leach, Melinda
- 1988 ***Subsistence Intensification and Settlement Change among Prehistoric Hunters and Gatherers of the Northwestern Great Basin.*** Ph.D. dissertation, Department of Anthropology, University of California, Los Angeles.
- Lyman, R. Lee
- 1988 Was there a Last Supper at Last Supper Cave? In ***Danger Cave, Last Supper Cave, and Hanging Rock Shelter: The Faunas.*** Edited by Donald K. Grayson Anthropological papers of the American Museum of Natural history, Volume 66: Part 1. New York.
- Malouf, C and J. Findlay
- 1986 Euro-American Impact Before 1870, in ***Handbook of North American Indians, Volume 11: Great Basin.*** Pp 499-516. Smithsonian Institution, Washington, DC.
- Martin, Paul S.
- 1967 Pleistocene Overkill, in ***Natural History*** December:32-38.
- Murphy, Ralph
- 1984 ***A Collection of Historical Vignettes, Sheldon National Wildlife Refuge.*** July 1984, pamphlet on file at Sheldon National Wildlife Refuge Headquarters, Lakeview, Oregon.
- Pinger, Julie
- 1985 Cultural Resource Inventory: Hart Mountain National Antelope Refuge, Sheldon National Wildlife Refuge. Prepared for U.S. Fish and Wildlife Service. On file at USFWS Cultural Resources Team, Sherwood, Oregon.

Raymond, Anan

- 1991 Cultural Resource Inventory for the Catnip Reservoir and Bateman Creek Projects, Sheldon National Antelope Range. U.S. Fish and Wildlife Service. On file at USFWS Cultural Resources Team, Sherwood, Oregon.

Raymond, Anan, Alex Bourdeau and Nick Valentine

- 2001 Badger Spring and Tenmile Spring: Archaeological Investigations after the Badger Fire of 1999 at Sheldon National Wildlife Refuge, Nevada. U.S. Fish and Wildlife Service. On file at USFWS Cultural Resources Team, Sherwood, Oregon.

Raymond, Anan, Virginia Parks, Lou Ann Speulda, Nick Valentine, Alex Bourdeau and Carla Burnside

- 2000 Cultural Resource Inventory of the Badger Fire 1999, Sheldon National Wildlife Refuge, Nevada. U.S. Fish and Wildlife Service. On file at USFWS Cultural Resources Team, Sherwood, Oregon.

Smith, Regina C., P.M. Jones, J.R. Roney, and K.E. Pedrick

- 1983 ***Prehistory and History of the Winnemucca District: A Cultural Resources Overview.*** Cultural Resources Series, Monograph No. 5. Bureau of Land Management, Reno.

Speulda, Lou Ann

- 1995 Evaluation and Assessment of the Virgin Valley Campground Bath House, Sheldon NWR, Humboldt County, Nevada. U.S. Fish and Wildlife Service. On file at USFWS Cultural Resources Team, Sherwood, Oregon.
- 2002 Last Chance Ranch Stabilization Project – 2000-2001. Sheldon National Wildlife Refuge, Nevada. U.S. Fish and Wildlife Service. On file at USFWS Cultural Resources Team, Sherwood, Oregon.

Steward, Julian

- 1935 ***Basin Plateau Aboriginal Socio-Political Groups.*** Bureau of American Ethnology Bulletin 120. Smithsonian Institution, Washington D.C.

Stewart, Omer C

- 1939 ***The Northern Paiute Bands.*** University of California Anthropological Records, Volume 2, No. 3. Berkeley.
- 1941 ***Culture Element Distribution: XIV Northern Paiute.*** University of California Anthropological Records 4(3). Berkeley.

United States Fish and Wildlife Service (USFWS)

- 1977 ***Sheldon Horse Management Plan, Environmental Impact Assessment, November 1977.*** U.S. Fish and Wildlife Service, Portland, Oregon.
- 1980 ***Sheldon NWR Renewable Natural Resources Management Plan: Final Environmental Impact Statement.*** U.S. Fish and Wildlife Service, Portland, Oregon.
- 2000 ***Environmental Action Memorandum, Sheldon NWR concerning disposition of feral horses.*** June 2000.

2006 Sheldon NWR web page. 5 December 2006. < www.fws.gov/sheldonhartmtn/Sheldon/index.html>

Young, Cheryl, ed.

1985 ***The Wild Horse in Nevada: I Thought I Heard a Discouraging Word.*** Nevada State Museum Popular Series 8. Carson City. (OUT OF PRINT, Available as photocopy).