

The Buffalo Chip

Resource Management Newsletter
Yellowstone National Park
August/September 2004



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THE LYNX PROJECT: FINAL RESULTS!

by Kerry Murphy et al.

Introduction

Since 2000, when the Canada lynx was federally listed as a threatened species in the conterminous U.S., the Yellowstone Lynx Project has been documenting Canada lynx (*Lynx canadensis*) presence and distribution in the park through parkwide surveys. Our efforts, methods, and progress were described in the April/May 2001 and early summer 2002 issues of the *Buffalo Chip*, and we are now pleased to report our final results here.

Like top carnivores such as gray wolves (*Canis lupus*), Canada lynx may structure ecological communities through effects on herbivorous prey species. Due to its limited distribution in the continuous 48 states and specific association with boreal forests, deep snow, and snowshoe hares, the Canada lynx may be also be a sensitive indicator of adverse anthropogenic effects. Listing as a threatened species and lack of comprehensive survey data in the park underscored the need for basic information on Canada lynx. Because very little was known about the possible presence and

distribution of Canada lynx and its ecological requirements in Yellowstone, the Yellowstone Lynx Project was initiated.

History

From a historical perspective, it is apparent that Canada lynx have occupied the Yellowstone area, but have been uncommon relative to similarly sized forest carnivores such as red fox (*Vulpes vulpes*). In 1898, E.T. Seton, who distinguished between Canada lynx and bobcats, noted that Canada lynx were "somewhat common in the woods;" Superintendent George S. Anderson believed they were "quite common." V. Bailey, in 1930, stated that Canada lynx "were said to be common and generally distributed throughout the timbered region." In 1927, M.P. Skinner said "probably this cat has always existed in limited numbers in the Park, where it frequents the forests of the plateau region. I believe there are about ten individuals present and that the number has not changed materially for years."

YNP has records of 73 direct or indirect (tracks) observations of Canada lynx made by park visitors or employees from 1887 to 2003. The distribution of sightings suggests a parkwide distribution for the species, but as expected, sightings were concentrated along roads where visitor activity was greatest. We found 34 references to Canada lynx observations (tracks or direct observations) in ranger log books from 1895 to 1926, including at least six individuals killed in the park. This new information suggests that historically, Canada lynx were not necessarily rare.

Methods

We conducted several types of parkwide surveys for lynx. To maximize our survey efforts, we first identified prime habitats (PHs) for Canada lynx. PHs were identified according to their potential to support snowshoe hares (the primary prey of Canada lynx), based on cover types including spruce-fir (*Abies lasiocarpa*, *Picea engelmannii*), and lodgepole pine (*Pinus contorta*) stands in climax, late, middle, or pygmy (wind-blown and snow-free) stages; aspen (*Populus tremuloides*) stands; and willow (*Salix sp.*) shrub fields in riparian zones. Once PHs were identified, we classed them as high, middle, or low quality based on our practical knowledge of park vegetation structure (see Figure 1). We also identified geographic sectors of the park based on their characteristic range of elevation, soils, and over story vegetation.

Then, from 2000 to 2004, we conducted 139 formal and informal ski-based snow tracking surveys, totaling 1,614 km over four winters. We completed 41 snowmobile-based surveys totaling 749 km, and 6 aircraft-based surveys totaling 693 km. We installed seven camera stations designed to detect forest carnivores for 170 total camera nights along trails and roads in the Bear, Cub, and Clear Creek drainages. We also annually deployed and revisited 21–35 hair snare transects (105–175 stations, each consisting of a 2" by 2" piece of carpet containing nails inset to snag and hold animal hairs—e.g., those of cheek-rubbing Canada lynx—and a scent lure nailed to a tree 46 cm above ground, with visual and scent lures hung from nearby tree limbs) on the east side of Yellowstone Lake, collecting 336 total samples,

analyzing 197, and identifying 108 to species. We also deployed from 1 to 10 transects at six survey sites in 2002 and four in 2003, collecting 174 total samples, analyzing 166, and identifying 77 to species. Carnivore sign and food habits were documented, and reports of lynx sightings were investigated.

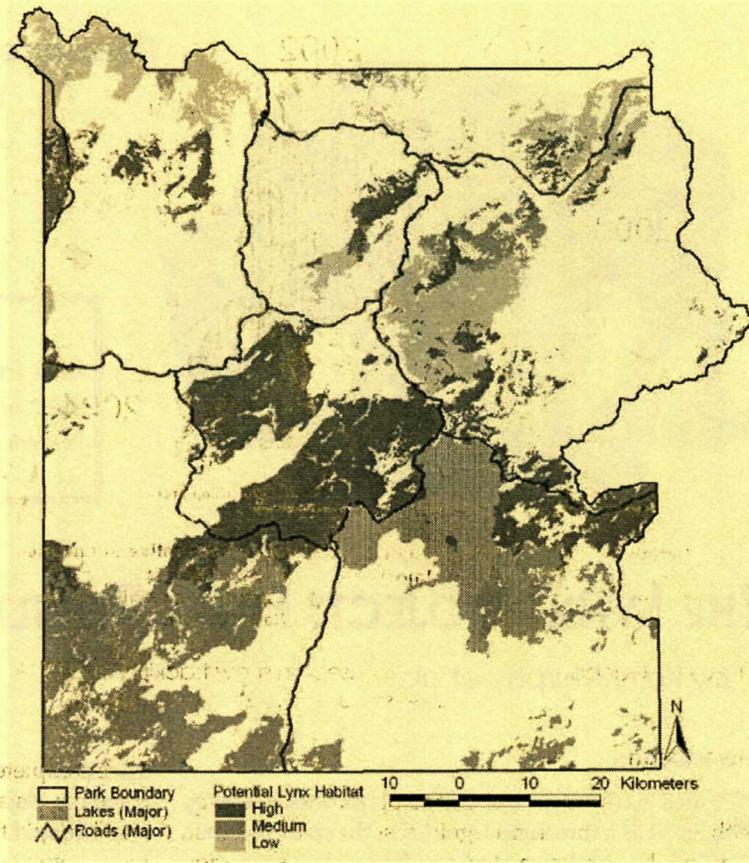


Figure 1. Prime habitat zones for Canada lynx in YNP.

Canada Lynx Detections

We made three definite (DNA-based) Canada lynx detections, all on the east side of Yellowstone Lake: a female (identified by female DNA) in summer 2001; a female accompanied by a male kitten in winter 2003 (identified by snow tracking and male DNA); and an adult male in winter 2004 (identified by snow tracking and male DNA). Three probable detections were also made on the east side of Yellowstone Lake (identified by snow tracking), including one case of a female accompanied by one kitten. Two possible tracks were observed from a helicopter during a survey of Middle Creek (east sector), but no landing site was available

to permit close inspection of tracks. In addition, one probable and one possible detection (by snow tracking) were made at Mary Mountain (2001) and LeHardys Rapids (2002), respectively, in the central plateau sector (see Figure 2).

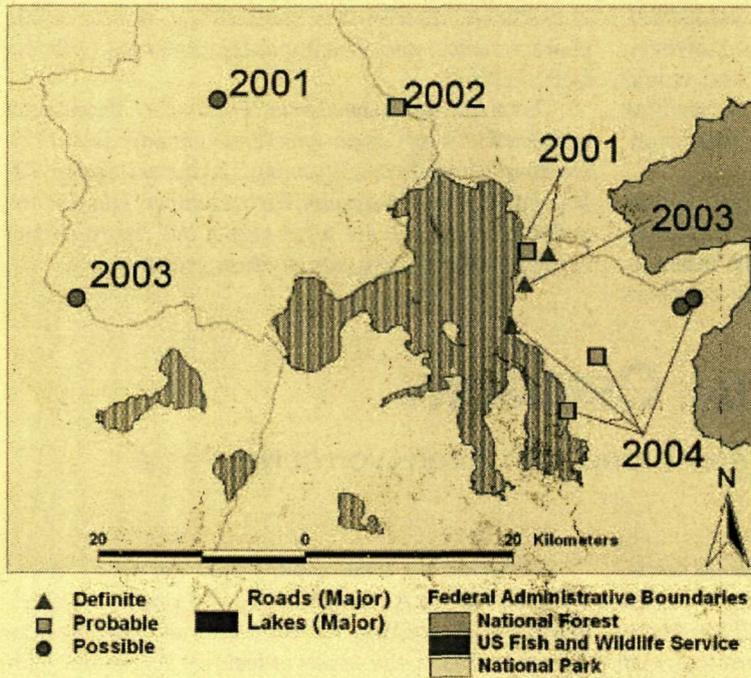


Figure 2. Canada lynx detections based on snow tracking and DNA analysis since 2001.

Discussion

Canada lynx persisted in the park at low density, with their distribution largely restricted to the east, and possibly central plateau sectors. The distribution of detections was consistent with our formal snow tracking data, which suggested that the highest densities of snowshoe hares occurred in the east sector. This portion of the park is dominated by andesitic soils, which exceed other park soils in moisture-holding capacity and nutrients, and therefore better support the type of forest and dense understory vegetation that provides sufficient horizontal and vertical cover for snowshoe hares. Favorable growing conditions and weather events also contribute to the suitability of this hare habitat.

Our cumulative detections of Canada lynx in the park from 2001 to 2004 likely represented at least four individuals, including two kittens born in two different years. The presence of offspring indicates that resident, breeding individuals were present—an important finding, because Canada lynx reproduction

has not been previously documented in the park, and rarely in the Greater Yellowstone Ecosystem. As is true of most carnivores, reproducing Canada lynx females are typically resident, as opposed to nomadic or transient. Although detections of offspring do not confirm the presence of a viable, reproductively-stable population in the park or ecosystem, they do suggest that reproduction by resident females may contribute to population persistence. Recruitment from local sources, in concert with distant populations that provide ingress from northwest Montana or Canada, could wholly or partially drive population dynamics and viability of Canada lynx in the park and the ecosystem.

Our conclusion that Canada lynx persist in the park was consistent with recent DNA-based detections by U.S. Forest Service (USFS) personnel using hair snares, snow tracking, and animal captures; the species persists at low densities in the Yellowstone ecosystem, but appears to be limited in distribution. Of approximately 15 hair snare grids deployed by USFS and NPS units in the ecosystem from 1998 to present, only six grids, distributed across three portions of the ecosystem, detected Canada lynx. In addition, most USFS and NPS units have completed surveys using snow tracking, but only three have made DNA-based detections.

Through the course of our surveys, we also detected wolverines in three park sectors on five total occasions, suggesting they were moderately well-distributed in the park. We did not detect fisher, though they could have been present; they have not been detected on other transect grids in the Northern Rockies where they are known to occur, and their track sizes and stride lengths overlap those of martens.

Conclusions and Recommendations

The weak signal of Canada lynx presence, coupled with restricted distribution, points to reduced population viability of this species in the ecosystem. This condition is not surprising for a species at the periphery of its continental range. Wet, boreal forests that characterize snowshoe hare and Canada lynx habitat in the Rocky Mountains, including the Yellowstone ecosystem, are highly fragmented on gradients of aspect and elevation and support Canada lynx in lower densities

than suitable habitats in Canada and Alaska.

Because only a single, limited ecological study of Canada lynx has been completed in the Yellowstone ecosystem, our knowledge would increase dramatically as a result of successful population and telemetry-based studies in the park. The information would be of great interest to forest managers who develop silvicultural and fire management prescriptions. However, this study would be logistically difficult, and would involve risks for personnel. Inferences to Canada lynx at an ecosystem scale would be limited by small sample sizes.

In the absence of intensive studies on Canada lynx in the park, we recommend that this survey be repeated at 10-year intervals with the same search intensity and spatial extent as 2000–2004. Because the numbers

and distribution of Canada lynx may improve due to increases in snowshoe hare abundance that are expected from post-fire (1988) lodgepole pine regeneration, future surveys must necessarily be geographically broad. We also recommend that snowshoe hare studies be continued to document trends in this prey's abundance, distribution, underlying demographic characteristics, and functional relationships with the Canada lynx.

This article was adapted from "Final report: the presence and distribution of Canada lynx (Lynx canadensis) in Yellowstone National Park, Wyoming," by Kerry Murphy, Tiffany Potter, James Halfpenny, Kerry Gunther, Tildon Jones, and Peter Lundberg. For a full copy of this report, contact Kerry Murphy at kerry_murphy@nps.gov.

NEZ PERCE MEMORIAL CEREMONY

by Tami Blackford and Rosemary Sucec, with Jason Lyon of Nez Perce National Historical Park

"We the surviving Nez Percés, want to leave our hearts, memories, hallowed presence as a never-ending revelation to the story of the event of 1877. This trail will live in our hearts. We want to thank all who visit this sacred trail, that will share our innermost feelings. Because their journey makes this an important time for the present, past, and future."

—Frank B. Andrews, Nez Perce descendant
from the Nez Perce National Historic Trail website

On August 21, 2004, for the first time in Yellowstone National Park's history, members of the Nez Perce (or Nimípuu, meaning "we the people" or the "real people") gathered in the park along Fountain Flat Drive near Nez Perce Creek for a memorial and pipe ceremony to commemorate their ancestors who endured hardship and died in the park during the 1877 Nez Perce War. Nez Perce Tribal Executive Committee member Wilfred Scott helped plan this ceremony in remembrance that the Nez Perce "were there, and had a long history of coming to Yellowstone prior to the 1877 conflict. We, as their descendants, wish to come back to honor them, especially those who died in the park." The memorial was also open to and attended by park visitors and staff, including Superintendent Suzanne Lewis and Deputy Superintendent Frank Walker, who for almost eight years was superintendent of Nez Perce National Historical Park in Spalding, Idaho.

Strengthening relationships with the park's 26 associated Native American tribes is a priority for Yellowstone. According to the National Park System Advisory Board, the depth of feelings associated with events like the 1877 Nez Perce War and the places in Yellowstone that are intimately connected with them "should be actively acknowledged." The Board also recommends that "efforts should be made to connect indigenous peoples with parks to strengthen their living cultures." This memorial event was an opportu-



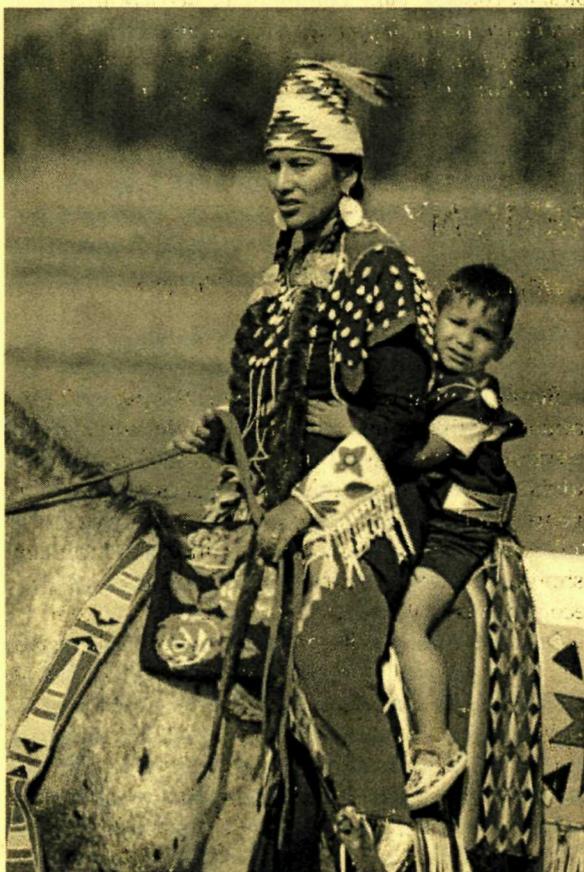
Nez Perce elder, "Uncle" Horace Axtell (left), and Nez Perce Tribal Executive Committee member Wilfred Scott (right).

NPS/JIM PEACOCK

nity for the park to further its understanding, as well as preserve cultural diversity.

The territory of the Nez Perce once included parts of southeastern Washington, northeastern Oregon, and all of central Idaho, but they also traveled into western Montana and Wyoming as hunters, traders, and sometimes, raiders. Even before the Nez Perce obtained the horse in the early 1700s, they traveled on foot to what is now Yellowstone National Park. After obtaining the horse these trips became more frequent, and the Nez Perce often came to the park's Fishing

NPS/JIM PEACOCK



Angel and Payton Sobotta are descendants of *Wottolen*, who was wounded in the battle at Camas Meadows before entering YNP in 1877.

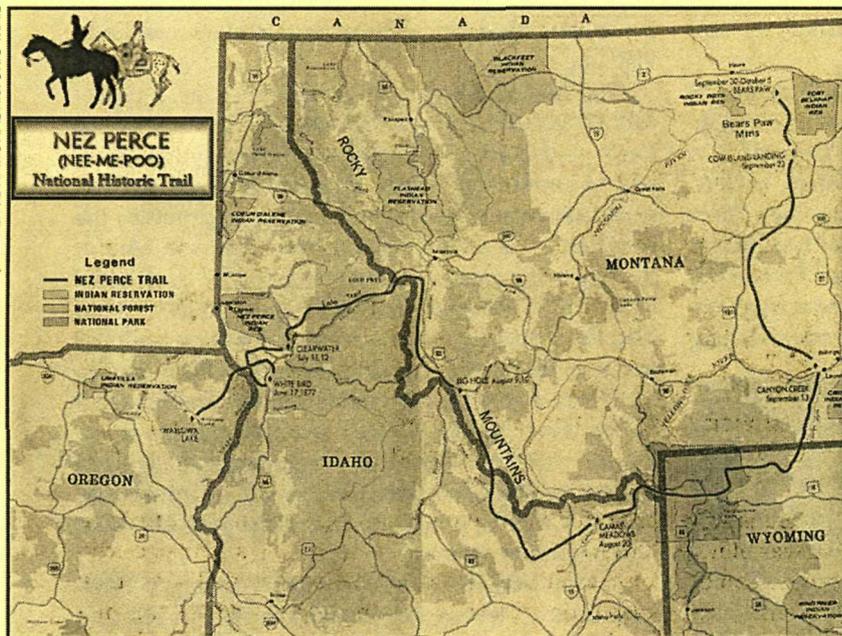
Bridge area to rendezvous with others, such as the Salish and the Shoshone. Annual buffalo hunts allowed the Nez Perce to form friendly associations with the Crow on the central Montana plains. Yellow Wolf, a Nez Perce war participant who later in life provided invaluable information on Nez Perce history and culture, has related that his grandfather used to hunt buffalo in the park and is buried here. Both Crow and Nez

Perce used what is now the park as a travel corridor to visit one another.

The Nez Perce earned a reputation as a peaceful and generous people, as noted in 1805–06 by the Lewis and Clark expedition. After crossing the Bitterroot Mountains on their way west in 1805, the starving expedition was offered salmon and camas roots by the Nez Perce. As the expedition headed east in May of the following year, they were stopped by deep snow in the Bitterroots and camped for four weeks with the Nez Perce in Idaho while waiting for the snowpack to decrease. After the spring thaw, Nez Perce guides lead them across the mountains and into the Bitterroot Valley. Even during the 1877 war, the Nez Perce followed what Euro-Americans regarded as a civilized code of conduct, refraining from scalping, mutilating bodies, torturing prisoners, or in large part, attacking noncombatant citizens.

In May 1855, the governor of the Washington Territory, Isaac I. Stevens, negotiated a treaty that reduced the 13.5-million-acre Nez Perce homeland to a 7.5-million-acre reservation encompassing most of central Idaho and portions of northeastern Oregon and southeastern Washington. When gold was discovered on the reservation in the 1860s, miners and other settlers moved into the area indiscriminately. In 1863, a new treaty shrunk the reservation to one-tenth of its 1855 size, leaving it mostly along Idaho's Clearwater River. Besides abandoning claims to lands in Oregon and Washington, the treaties required recognition of the American government and also the imposition of an Office of Principal or "Head" Chief among the Nez Perce. The designation of "Head Chief" never existed in the traditional Nez Perce social organization and was subsequently not acceptable to several bands of Nez Perce. As they believed there was not one head chief who could speak for all Nez Perce, these bands insisted they had never sold their land to the U.S. government or signed any new treaty. They remained on their ancestral lands in the Wallowa Valley in eastern Oregon and along the lower Salmon River in Idaho, and became known by some as the "nontreaty" Nez Perce. Because the Nez Perce did not reside on these lands year-round, white settlers continued to move in and claim them, and tensions mounted.

Finally, by the first half of 1877, all remaining Nez Perce not on the reservation were ordered to move there or troops would be sent to forcibly remove them. On May 15, the nontreaty Nez Perce were given a final ultimatum to immediately move to the reservation, with just an additional 30 days to return home, collect their livestock and possessions, and travel to Idaho. But on June 13, just before the deadline, as they were



in Idaho encamped near the reservation, some young warriors killed four white settlers in revenge for past murders of their own people. Companies of the First Cavalry were immediately sent from Fort Lapwai, Idaho, to stop this perceived uprising among the Nez Perce, and on the morning of June 17, 1877, attacked several bands of Nez Perce camped along White Bird Creek. The ensuing battle of White Bird Canyon resulted in a rout of the military forces by the Nez Perce and the death of 38 soldiers with no known Nez Perce casualties. This ended all hopes for a peaceful resolution, and during the next three months, military forces continued to pursue the Nez Perce through central Idaho, across the Bitterroot Mountains, and into Montana.

When the Nez Perce began what turned out to be a 1,170-mile journey from Oregon through Washington, Idaho, and Yellowstone to northern Montana, they numbered around 800 (only 250 were warriors, and the rest were women, children, elderly, and frail), and had with them about 2,000 head of stock. Around August 22, 1877, the Nez Perce first entered the newly created Yellowstone National Park along the Madison and Firehole Rivers, and spent two weeks traversing the park. Their route took them up Nez Perce Creek, across Mary Mountain, across the Yellowstone River at Nez Perce Ford, and up Pelican Valley over the Absaroka Mountains. En route, some warriors captured a handful of tourists as prisoners, and although they were either released or escaped, one was severely wounded. Two other park visitors were killed by scouting/raiding parties. As the Nez Perce traveled

through the park, it became clear that the Crows' well-known allegiance to the army would take precedence over their old friendship with the Nez Perce—for reasons of self-preservation, they would not alienate the whites.

The entire Nez Perce trek was marked by 20 skirmishes and battles against more than 2,000 soldiers (representing 10 separate U.S. military commands), the last of which stopped the remaining 650 Nez Perce on October 5 at Montana's Bear Paw Mountains, less than 40 miles from safety in Canada. The Nez Perce who survived the Battle of the Bear Paw were sent to Ft. Leavenworth, Kansas, and later the Oklahoma territories for several years before being allowed to return to reservations in the northwest.

Nearly 220 Nez Perce did escape to refuge in Canada, where they camped with the Lakota (a year before, between 3,000 and 4,000 Lakota had also escaped into Canada after the Battle of the Little Bighorn). The next spring, many attempted to return to Idaho, but were killed, chased back to Canada, or captured and sent to Kansas. Today, many Nez Perce travel to Canada for ceremonies and commemorative activities with relatives and friends who are descendants of those who escaped into Canada in 1877.

To commemorate the history and culture of the Nez Perce people, Nez Perce National Historical Park (NPNHP) was created in 1965. NPNHP includes 38 sites scattered across Idaho, Oregon, Washington, and Montana. If Yellowstone had not been previously declared a national park in its own right, the skirmishes that occurred in Wyoming likely would have made it a unit of NPNHP. In 1986, Congress designated the entire Nez Perce route as a nationally significant historic trail (Nez Perce National Historic Trail), the only such resource in Yellowstone National Park.

The Nez Perce have conducted similar memorials at all of the other Nez Perce War sites administered by the National Park Service and other federal, state, and local entities. These include the following battlefields: Bear Paw, Big Hole National Battlefield, Camas Meadows, Canyon Creek, Clear Creek, Clearwater, and White Bird, all of which are along the trail. These memorials are generally well attended by Nez Perce and non-Nez Perce alike.

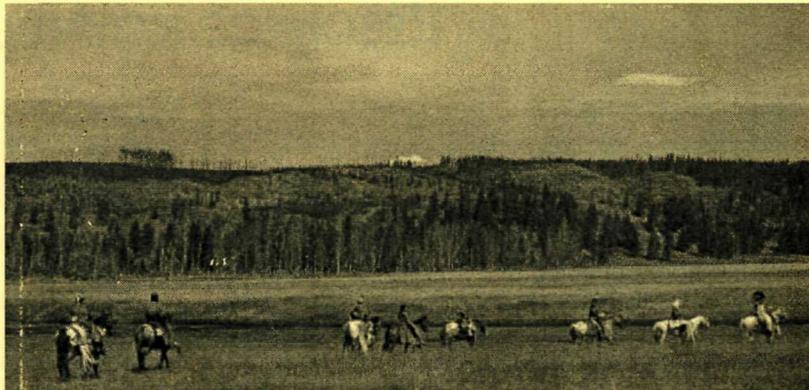
Nez Perce Elder Horace Axtell and Tribal

Council Member Wilfred Scott led the memorial ceremony held here at Yellowstone. Horace Axtell, whom everyone calls "Uncle," is fluent in the Nez Perce language. A World War II veteran with two honorary doctorates, he is revered for helping to maintain a traditional way of life for the Nez Perce. The ceremony began with a brief introduction, which was followed by drumming and singing. Levi Holt, who was instrumental in the Idaho wolf re-introduction in 1995–96, played a song on the flute. All the men present at the ceremony were invited to

join the pipe circle, and then all women veterans and law enforcement officials as well. A breeze was blowing, and Uncle explained that when a breeze comes through a gathering, it is the ancestors' presence.

Eight Nez Perce Appaloosa Horse Club members in full regalia rode down the hill and around the pipe circle three times counter-clockwise. The Nez Perce are distinguished for selectively breeding Appaloosas to improve their strength and durability. Kay Kidder, president of the Nez Perce Appaloosa Horse Club, Director of Adult Education for the Nez Perce Tribe, and daughter of Horace Axtell, introduced the riders. Then she talked about her relatives who were in the war and came through Yellowstone, and how that history has affected her life. The Nez Perce then rode down along the Firehole River in single file and back up the hill. For just a moment, while watching those beautiful horses, listening to the drum and the singing with the fall-colored grass moving in the breeze, it was possible to imagine the Nez Perce fleeing through that area at the same time of year, so long ago.

When the pipe ceremony began, everyone was asked to put recording devices away. Two pipes were passed around the circle, again counter-clockwise, three times. An osprey was hunting along the creek behind the circle, stalling and diving, but didn't catch anything. Introductions were made around the circle, and some people, as is customary at memorials, told a short story about themselves, how they were related to the Nez Perce who came through the park, and the wars they have fought in. Many gifts were presented by the Nez Perce; no one went away empty handed. Toward the end of the ceremony, an eagle feather came loose from a small U.S. flag in the breeze and dropped to the ground. Uncle explained that such a feather always represents a fallen warrior—such a telling symbol for this place and time. The feather must be



NPS/TAMI BLACKFORD

Members of the Nez Perce Appaloosa Horse Club ride along the Firehole River.

protected by a "whipman" until another warrior can retrieve it. In the past, a whipman was the one who kept order during ceremonial occasions. Today, they keep order at powwows and events such as this memorial. Uncle then collected the feather, and blessed it in the Nez Perce language. Everyone participated in the conclusion of the gathering, the retiring of the eagle-feather staffs, which, to the Nez Perce, is like the lowering of the American flag. The event was friendly and informal, while at the same time respectful and mournful.

The following day, Canyon deputy subdistrict ranger Matt Vandzura, VIP Jerry Mernin, and Deputy Superintendent Frank Walker joined several Nez Perce on a horseback trip into Hayden Valley. It was an opportunity for the Nez Perce to experience the terrain their ancestors traveled in 1877. Kay Kidder referred to the ride as "awesome, and a good spiritual journey in the beauty of nature as our place to worship and connect to our past. We rode by two herds of buffalo, and into the middle of a herd spread out in three bunches. We left them alone, and they us in their natural habitat. Truly an experience to 'ride with the buffalo.' We have the slogan to 'ride with the Nez Perce'."

After the event, Wilfred Scott sent an e-mail expressing his thanks to the park. "We enjoyed the hospitality. Your staff did an outstanding job in working with the Nez Perce. They treated us like people. We felt welcome. I hope it got rid of anxiety or apprehension people had about us." They had such a positive experience that they plan to hold another memorial at Nez Perce Ford next year.

In a gathering of cultures with a history so complex, it seemed enough just to be together in that place, to remember.

RESOURCE ROUNDUP

Mammoth Hot Springs

A portion of the boardwalk at Canary Spring was rerouted last year because it was being buried by the travertine deposited by the spring, one of the more active thermal features on the Mammoth Terraces. One of the platforms (a very popular overlook) left in place last year is now being buried by travertine, as well. Rerouting the boardwalk allows the natural processes to construct new travertine terraces.

—Jennifer Conrad



Sections of the boardwalk at Canary Spring are being rerouted to make way for encroaching travertine deposits.

Norris Geyser Basin

7/6/04 *Boil, boil, toil and... As usual, as ever, nothing is normal at Norris. At 10:15, we took a report at the visitor center desk of thermal activity at the junction of the Back Basin inner loop near Corporal Geyser. Melanie ran down there to check it out—encountering a kid on the trail who had burned his hand playing in the steam—and found a hot spot with a little steam in the center of the trail. Oooo, baby, it was hot! Call in the troops!*

So begins the July 6 entry in the Norris Geyser Basin logbook noting new steam vents in one section of trail that reached 200°F last year. While the surface ground temperatures were lower overall, and more localized than last year's, they necessitated a closure of the bit of trail open out to Porkchop Geyser.

But it was our great luck that the boardwalk crew was at the basin at that same time, working on the trail reroute from last year's closure. As they completed the new trail in the back basin, they moved the trail at the junction, and built an elevated bridge beside the new steam vents. Even if you know where to look, it is hard

to see the old trail.

The new trail allows views of the opalescent water in Porkchop Geyser, and of the silica bogs. Previously, the trail was restricted to the front of Porkchop; the reroute has allowed a new perspective on one of Norris's most interesting features. Also, higher boardwalks direct one's gaze into the center of features such as Yellow Funnel Spring and Blue Mud Steam Vent. Visitors have responded positively, despite the fact that the trail is now a bit longer than the old one. But as one visitor commented, "It's well worth the walk."

Current Thermal Activity at Norris

Steamboat Geyser continues to have minor eruptions ranging in height from 10 to 30 feet.

Whirligig Geyser has had only two known eruptions since April. Its pool has, at times, a layer of *Cyanidium* (an acid-tolerant, thermophilic algae) lining it. Eruptions would result from temperatures too high for the algae to survive.

Constant Geyser erupts frequently, sometimes at 30-minute intervals. The eruptions come in a series of one to five bursts, ranging from one to three minutes apart.

Echinus Geyser remains unpredictable, with intervals ranging from two hours to three days. Once the crater fills and overflows, the overflow stage can last for multiple days, so the increased mineral deposition has rapidly been giving the area a much redder color.

Vixen Geyser began the season with low water levels—it seemed to be having eruptive cycles inside the crater, rather than erupting out. At times, a tiny bit of water would splash out. It is again having visible eruptions, but these are erratic, with intervals ranging from minutes to days.

—Melanie Armstrong, Denise Herman,
Jamie Silberberger, John Tebby

Lamar Valley

Mornings are chillier, evenings cool more quickly as the sun disappears. Tonight, someone turned off the lights at 9:08 p.m. The signs are subtle, but summer is slowly shifting into autumn.

Nothing speaks to the coming of autumn like the bison rut. As early as July 19, I watched bulls join the cows and calves in Lamar Valley. Roaming through the herd, they would stop by certain cows. The bulls would lift their heads, curl their upper lips, and sniff for cow receptivity.

Today, almost a month later, bulls still roam the herd with even more intensity. Almost every cow has

a bull by her side, 'husbanding' her as she grazes. She stops, he stops. She moves ahead, he follows. Some younger bulls harass the cows, trying to force them in other directions. I imagine they will soon learn the futility of that method of courtship.

Two days ago, I watched a cow lead four bulls on a merry chase across the valley. The cow began to run, and a bull followed. Soon, others joined in. The lead bull pivoted on his forelegs to confront bull number 2. Bull number 3 sped past them and grabbed the lead. The cow seemed tireless, but bulls would drop back and others would take over. After at least 10 minutes of constant running, the cow slowed to a stop and began to graze. The nearest bull passed her and appeared to lose interest, also beginning to graze. The other bulls caught up, but showed no interest in the cow either.

This courtship seems to go on forever. My question became, "When are they going to get down to it?" According to YCR wildlife biologist Rick Wallen, the rut is a complex "tending process" in which the males track ovulating females. Receptive females, in turn, appear to have some degree of choice in their selection of a mate. The social order of the males is likely to change throughout the breeding season. While a dominant male takes a restorative break from tending after copulation, another bull asserts his dominance. The purpose of this time-consuming and exhausting behavior is reproduction. More pregnant cows mean more calves, and more calves mean that not all will fill the bellies of predators.

An almost constant low, rumbling growl emanates from the herd, perhaps from the bulls. When bulls confront each other, it is often without violence. The smaller bison may suddenly find the grass more interesting than "his" female. Two bison may bypass each other, each studiously ignoring the other. Two bulls may butt heads. The weaker bison will turn its side to the stronger. The winner does not press his advantage; once he is shown to have the power, he takes over the female or moves off. I wish I could be out here daily, taking notes and drawing. But other obligations press, and I must leave the valley.

Now it is August 24, as I once again cruise the Lamar. The rut looks to be slowing down a bit. I see more bulls out in the valley. They travel singly or in pairs. Cows and calves lie peacefully in the sage and grass, and there appears to be less tending behavior. There seems to be an aura of calm. The valley is becoming once again that "secluded valley" that Osborne Russell wrote of when he passed this way in the 1830s and thought of spending the remainder of his days in "A place like this where happiness and contentment

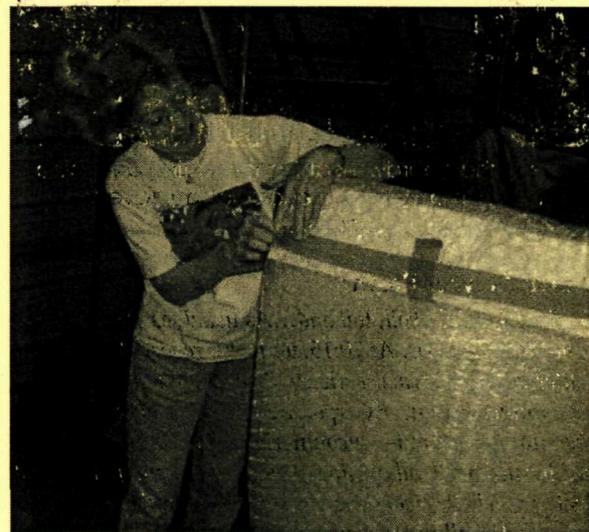
seem to reign in wild romantic splendor."

Life surges endlessly, seen or unseen. I measure my time here in Yellowstone not by hours or months, but by the doings of the Northern Range wildlife: the bison rut, followed by the bugling bull elk, the life and death struggles of winter, and the hope of spring calving season. The heat of summer becomes once again the heat of the bison rut, and the circle of another year adds its spiral to the endless seam of life.

—Julianne Baker

Gardiner, Montana

Museum Curator Colleen Curry and her staff, with the help of moving teams comprised of "keepers of collections" from all over the country, successfully moved Yellowstone's research library, archives, and museum collections from their various repositories in Mammoth to the park's new Heritage and Research Center (HRC) in Gardiner, Montana. They treated each object as if it were the most important historic artifact in existence, cherishing each thing (and there are more than 5,000,000) as part of the great story of our park and our past.



NPS/JESSICA GERDES

Volunteer Ella Ross, from Shenandoah National Park, demonstrates how to bubble-wrap a historic sign.

Everything, from archeological artifacts to Thomas Moran paintings, was painstakingly wrapped in special archival tissue paper, then bubble-wrapped, taped, and boxed so that nothing could shift or break on its trip down the hill.

The move was completed by summer's end. Staff are now busy unpacking and getting organized. The new building will open to park staff sometime later this fall, and to the public in Spring 2005.

...NEWS BRIEFS...

NEW BOARDWALK OPENS IN NORRIS GEYSER BASIN

New route reopens access through Back Basin area

A portion of the Norris Geyser Basin closed for over a year has reopened to visitors. Construction of a new boardwalk through the Back Basin has been completed. On July 22, 2003, a section of the Back Basin Trail in the Norris area was temporarily closed due to visitor safety concerns. High ground temperatures and increased thermal activity had developed on or near a mile-long section of trail. While most of the area reopened to visitors last October 9, part of the trail remained closed until the boardwalk was built along a new route through the thermal area. The new route allows visitors to see Porkchop Geyser and Green Dragon Spring, provides access to new thermal features that have developed within the past year, and affords visitors new vistas of the Norris Geyser Basin area.

Norris Geyser Basin is the hottest and most seismically active geyser basin in Yellowstone. Dynamic changes in thermal activity have been recorded there over several decades. Ever-improving scientific monitoring of the changes allows researchers to gain a better understanding of the geology of the system and the park. The continued changes in thermal activity at Norris are typical, and do not pose a threat to visitors or employees as long as they stay on open trails and boardwalks. As a normal part of the always-changing face of Norris, it is not a sign of increased seismic or volcanic activity.

A new fact sheet that helps explain the active nature of the park's geologic and thermal features has just been released by the Yellowstone Volcano Observatory, a cooperative venture of the U.S. Geological Survey, the University of Utah, and Yellowstone National Park. "Tracking Changes in Yellowstone's Restless Volcanic System" is available online at <http://pubs.usgs.gov/fs/fs100-03/>.

TEMPORARY WINTER USE PLANS ENVIRONMENTAL ASSESSMENT RELEASED FOR PUBLIC REVIEW

The Temporary Winter Use Plans Environmental Assessment (EA) for Yellowstone and Grand Teton national parks and the John D. Rockefeller, Jr., Memorial Parkway, and the draft Finding of No Significant Impact, were released for a 30-day public review on August 20. The EA includes five alternatives. The preferred alternative provides for a wide range of appropriate winter recreational opportunities, including

strictly limited and regulated snowmobile use, while carrying out the National Park Service's mission to protect the natural and cultural resources of the three parks. Specifically, the preferred alternative would allow 720 snowmobiles per day in Yellowstone, led by commercial guides. This is below the historic use levels in the park, and somewhat lower than the level of access allowed during the last half of the 2003-2004 winter season. Commercial guides would not be required for the 140 snowmobiles per day allowed in Grand Teton National Park. Under the preferred alternative, snowmobiles operating in Yellowstone would continue to be allowed only on roads prepared for snowmobile use. All snowmobiles entering the parks would be required to be four-stroke machines that meet cleaner, quieter "Best Available Technology" standards.

Operating under a temporary winter use management plan for up to three years would give visitors, employees, and residents of the park's gateway communities the information they want and need to plan for the near term. This would minimize economic impacts on gateway communities and provide the National Park Service the opportunity to gather additional data to be used in preparing permanent regulations for winter use in the parks.

The EA and draft Finding of No Significant Impact are available for review online at <http://www.nps.gov/yell/winteruse-ea/>. Printed copies may be requested by calling Yellowstone National Park at (307) 344-2013. Comments can be submitted using an online form found at the above web address, or by mail to Temporary Winter Use Plans EA, Yellowstone National Park, P.O. Box 168, Yellowstone National Park, WY 82190. Comments must be received by midnight on September 20, 2004. A proposed rule guiding winter use for an interim period will be published in the *Federal Register* by early September. It will have a separate review period and comment process.

FALL BULL ELK RUTTING SEASON REMINDER

The fall season of bull elk rutting activity is about to start. During this period, it is not uncommon for bull elk to mock fight with many types of household items found in residents' yards. As a consequence, elk often get household items wrapped around their antlers. This can result in bull elk getting tied to each other, or to brush, trees, or other objects. Over the last few years, Bear Management Office staff has had to capture and remove extension cords, clotheslines, shrubbery baskets, leashes, wire, nets, cloth bags, swings,

hammocks, coaxial cable, and volleyball nets (complete with poles) from bull elk. In one incident, a bull elk that had cord wrapped around his antlers became entangled and tied to the antlers of another bull elk while fighting over a harem of cows. The elk were not discovered until after one of the bulls had already died from starvation/exhaustion from being tied to the other elk. When we approached to dart the live bull in order to cut him loose from the dead elk, several coyotes and a black bear that had been scavenging the dead bull jumped up and ran away. During the fall rut, please make an effort to remove all such items from your yards when not in use. Bull elk are also much more aggressive toward people and vehicles during the breeding season. Please use caution when walking near elk and look around corners before exiting buildings or walking around blind spots.

DRIVERS TAKE TOLL ON BEARS

Five black bears, including three cubs, and one grizzly bear have died after being hit by motor vehicles this summer—five times the annual average. On August 16, a cub-of-the-year was found dead on US Highway 191; it had been struck and killed by a car or truck. On August 19, a 130-pound adult female black bear was struck by a tan sport-utility vehicle near the Grebe Lake Trailhead on the road between Canyon and Norris at about 9:00 p.m. Rangers responding to the accident had to euthanize the critically injured animal. The driver of the SUV left the scene but later reported the accident to rangers. An adult black bear was killed on the road between West Yellowstone and Madison in early July, and two cubs were killed on the road south of Mammoth Hot Springs in mid-June. On September 7, a 13-year old adult male grizzly bear was struck and killed by an SUV south of the Nez Perce trailhead in the Fountain Flat area. The 473-pound bear had been captured for research and tagged in 2001.

According to bear management specialist Kerry Gunther, the bears killed “were all wild, wary bears,” considered to be at lower risk for vehicle accidents than roadside-habituated bears. Because the park’s whitebark pine trees, whose pine nuts are a favorite and important fall food of bears, didn’t produce many cones with nuts this year, more bears are likely to be seen along park roads this fall as they forage for food.

All of the bears were struck at dusk, after dark, or during bad weather. Visitors and employees are reminded to be especially cautious when driving through the park from dusk to dawn or in rain or snow, because wildlife are more difficult to see under

those conditions. Drivers who accidentally strike an animal in the park are asked to report the incident at the nearest ranger station.

NUISANCE BEAR FOUND DEAD NEAR CAMPGROUND

Review shows hazing effort to blame

Efforts to chase away a black bear that entered a campground in Yellowstone National Park inadvertently led to the animal’s death. A cinnamon-colored black bear had been seen in and around the Slough Creek Campground on several occasions in mid July. The 180-pound male bear had reportedly charged three anglers along the Slough Creek Trail and is believed to have damaged an occupied tent early one morning in the campground. Early in the afternoon of July 17, the bear was again spotted in Slough Creek Campground. Because a bear in a campground is a potential hazard to visitors, a ranger attempted to scare the bear away by firing a “cracker” shell from a shotgun towards the bear. The bear ran across Slough Creek and then continued on for about 200 yards and lay down. The ranger later saw the bear lift his head and paw into the air as he watched the animal for about an hour before being called away to another assignment.

The bear was found dead the next day, partially submersed in Slough Creek. Bear Management staff responded to the report. They found the bear’s intestines were protruding through a tear or puncture wound in his right side. A subsequent necropsy performed by Montana Fish, Wildlife and Parks also found singed hair around the wound. Park officials now believe the bear died after being inadvertently wounded by a single cracker round shot from a distance of 50–75 yards.

Cracker rounds have been used in Yellowstone, without incident, for over 20 years. Rangers are trained to shoot in the direction of, but not directly at, animals. However, the rounds are not ballistically precise. Wind or vegetation can alter their trajectory. Park staff members have begun a review of training techniques and staff proficiency requirements. The park is exploring the availability and use of other types of rounds in conjunction with adverse conditioning efforts.

SCOPING BEGINS FOR BISON VACCINATION PROGRAM

Yellowstone National Park is seeking public input as it begins a study on the feasibility of vaccinating bison in the park against brucellosis. Brucellosis is a chronic disease in Yellowstone-area bison that can re-

sult in multiple symptoms, including late-term loss of a calf. Yellowstone-area bison and elk probably contracted brucellosis in the early twentieth century from cattle once kept in the park to provide meat and milk for visitors in the days before refrigeration. About half the Yellowstone-area bison herd has been exposed to the disease. It has been speculated that bison could transmit the disease to livestock on lands adjacent to the park.

The National Park Service works in partnership with several other agencies to maintain a free-ranging population of bison and address the risk of brucellosis transmission to cattle under the Interagency Bison Management Plan. The plan calls for the park to develop an in-park program to vaccinate bison against brucellosis when a safe and effective vaccine becomes available, and when a delivery mechanism is developed to vaccinate bison remotely—i.e., without capturing or handling the bison. Park staff have been researching different delivery mechanisms over the past few years.

Under the National Environmental Policy Act, the park will prepare an Environmental Impact Statement

(EIS) to assess the effects of implementing such a vaccination program. As a preliminary step, suggestions and comments are being solicited from the public during a scoping period, when any interested individual, organization, or agency can provide relevant information or suggestions for consideration by park managers before the draft EIS is prepared and made available for public review. A notice of intent to prepare an Environmental Impact Statement was published in the *Federal Register* on August 3, 2004. The park has decided to extend the scoping period until October 2, 2004. Four open houses were scheduled to give interested groups and individuals an opportunity to learn more about this proposal and provide input to help identify the range of issues to be considered in preparing this Environmental Impact Statement:

A brochure on the remote vaccination proposal is available online at www.nps.gov/yell/remote-vaccination. Written comments may also be submitted by e-mail to YELL_Remote_Vaccinate@nps.gov or by U.S. Mail to: Bison Ecology and Management Program, Yellowstone National Park, P.O. Box 168, Yellowstone National Park, WY 82190. ♀

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