

# The Buffalo Chip

Resource Management Newsletter

Yellowstone National Park

January-February 2002



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## ARE THERE LYNX IN YELLOWSTONE?

By Kerry Murphy and Tiffany Potter

After decades of persecution and habitat modification drastically reduced its numbers, the lynx (*Lynx canadensis*), a secretive, forest-dwelling cat that depends upon snowshoe hares for food, was federally listed in 2000 as a threatened species in the conterminous U.S. People value this unique cat for its beauty, life history, and morphological adaptations. Ecologically, lynx are sensitive indicators of natural and anthropogenic environmental change. Consequently, their presence or absence can reflect the integrity of northern forest ecosystems.

Historical records show that lynx have occupied Yellowstone National Park (YNP) in the past. More recently, telemetry data have indicated that lynx visit YNP, and hair-snare data have shown that they occur within 25 miles of the park's boundaries. However, until 2001, no survey had been conducted in YNP to verify the presence of a viable, resident lynx population.

In 2001 we initiated a multi-year survey to determine if lynx were present in YNP. The

survey utilizes three detection methods: ground-based snow tracking; airplane-based snow tracking; and hair-snare (DNA). In total, fieldwork for the survey includes three winter (snow tracking) and three summer-fall (hair-snare) seasons, January 2001 to October 2003.

*Identifying prime lynx habitat:* During the design phase of the project, we used a GIS-based analysis and the scientific literature to identify forests dominated by spruce-fir, lodgepole pine, and Douglas fir. These forests, called prime potential lynx habitats (PPH), have the highest potential to support snowshoe hares and lynx. Our survey effort is concentrated mostly in these cover types.

*Ground-based snow tracking surveys:* We are attempting to find lynx tracks by searching transect routes on skis from January to April 2001-03, using established snow tracking protocols. We have identified 33 snow tracking routes in PPH, directing most

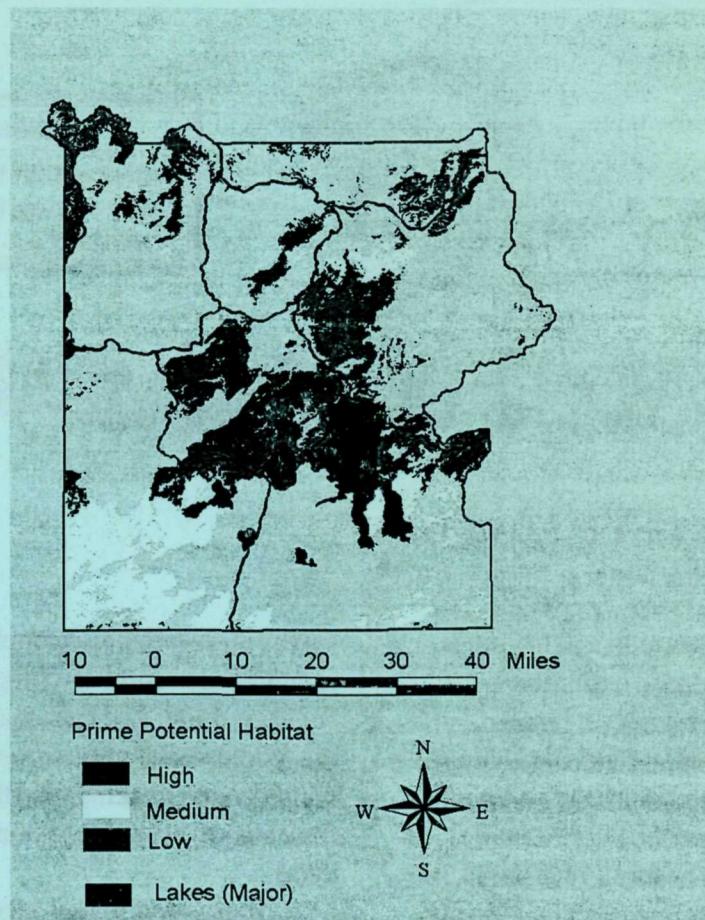
effort toward areas that were accessible by snowmobiles or ski trails, and toward terrain that was relatively free of avalanche-prone terrain. Our goal is to survey each route between one and six times over the course of the three-year project. "Formal" surveys are conducted at least 12 hours after a snowfall (to allow tracks to accumulate), but before tracking conditions deteriorate due to the formation of crusts in the snow. We record tracks of rare carnivores such as lynx or wolverine, tracks of their prey (e.g., snowshoe hares), vegetation cover types, and snow tracking conditions encountered along a transect. We (and ranger staff) also conduct "informal" surveys as searches for tracks of rare carnivores along the above or other transect routes, without deliberate

efforts to record detailed information on prey, cover types, and snow conditions. Informal surveys require less time to complete and cover greater distances than formal routes. We identify and document carnivore tracks using measurements, plaster casts, and/or photographs.

From January to April 2001, we completed 28 formal snow-tracking surveys ranging from 0.6-9.3 miles in length and totaling 78 miles. We also completed 17 informal snow tracking surveys ranging from 0.52 to 129 miles in length, totaling

208 miles. Transects were widely distributed throughout YNP. During this winter we have completed one survey near the east entrance to YNP, two on the east side of Yellowstone Lake, one at Mary Mountain (central YNP), and two in the Gallatin Range.

Thus far, we have detected one probable (east of Yellowstone Lake) and one possible (Mary Mountain) lynx track during snow tracking surveys. We have also identified tracks of wolves, red foxes, martens, coyotes, grizzly bears, black bears, river otters, and bobcats. Tracks of red squirrels, weasels, and martens are usually abundant where we survey. Tracks of snowshoe hares are less common in habitats dominated by lodgepole pine compared to sites that principally support Engelmann



*Map by YNP lynx project.*

spruce and subalpine fir.

*Air-based snow tracking surveys:* We also survey PPH for lynx sign by traversing transects using Super Cub airplanes. This technique has been successfully used to detect, inventory, and monitor mid-sized carnivores in other areas and permits observers to quickly survey remote areas and large blocks of PPH. A drawback is that tracks in dense conifer forests may easily be missed. Transects consist of straight flight lines crossing PPH at two-mile intervals. We identified

11 transects across PPH, ranging from 17 to 241 miles in length and requiring between one and four hours of survey time. Combined, all transects in YNP total 1,015 miles in length and require about 17 hours of flight time to complete. We evaluate suspected lynx tracks on the ground after detecting tracks from airplanes.

To date, we have completed four total air-based snow tracking surveys in northwest, southeast, and east-central YNP, totaling 506 miles in length. We made several direct observations or saw tracks of grizzly bears, coyotes, and bobcats. No lynx tracks were detected using this method, but sign of red squirrels, snowshoe hares, and martens were readily identified from the air.

**Hair-snare survey:** During late summer and early fall 2001, we attempted to detect lynx by attracting them with scent and visual lures to sites containing hair snares. This approach, commonly used in the western United States and Canada, is often referred to as the National Lynx Detection Protocol. We stratified PPH in YNP into 3 major sampling units, plotted 2x2-mile grids in each area, and identified 30-50 "transect" sites per area as the intersections of north-south grid lines. The hair snare transects, each comprised of five snare stations (sites), are the sampling units. Each station was revisited twice at approximately two-week intervals.

From July to October, we deployed and revisited 32 hair-snare transects (160 snare stations) on the east side of YNP, sampling a 200-

mi<sup>2</sup> area (14 x 14 miles). In all, we collected 154 sets of hair samples: 38 from hair snares, 26 from nearby trees, and 90 from the ground near snares. Samples contained from one to more than fifty hairs. Hairs were labeled and stored in vials containing a desiccant and sent to a U.S. Forest Service laboratory in Missoula, Montana, for species-level and, if possible, individual-level identification. Laboratory results are expected during this winter.

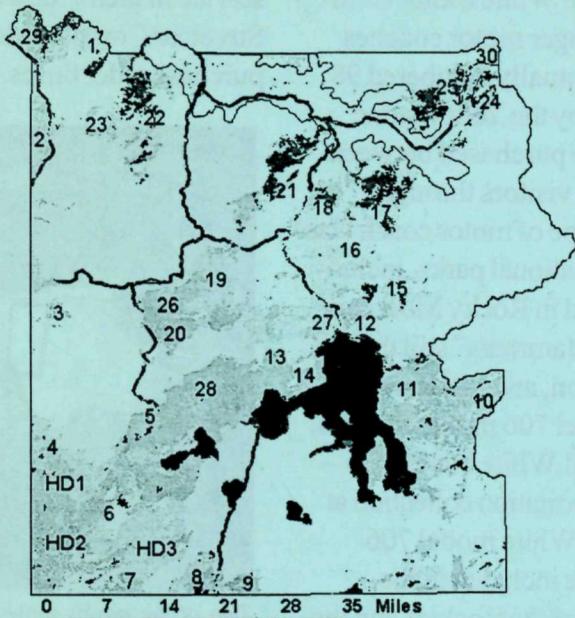
**Lynx sightings and follow-up investigations of tracks:** We also routinely investigate lynx tracks reported by park visitors or staff by examining tracks ourselves when possible, or at least interviewing observers to evaluate the reliability of their sightings. Please report direct observa-

tions of rare carnivores using a *Rare Animal Observation Form*, available at Yellowstone's visitor centers. If you find a suspected lynx track, please report it ASAP to Tiffany Potter (307-344-2506 or via park radio) or Kerry Murphy (307-344-7944).

In sum, our survey is providing important information to managers concerning the status of the lynx in Yellowstone. Data concerning the presence and distribution of lynx in Yellowstone will be vital to conserving threatened lynx in the Greater Yellowstone Ecosystem, as YNP is large in size and centrally located in the ecosystem.

We would like to thank Doug Kraus, Mike Campbell, Mike Curtis, Kerry Gunther, and Jim Halfpenny for their contributions to the production of this article.

### Lynx Ground Survey Areas



Map by YNP lynx project..

# WHAT HAS YELLOW WHEELS AND WINTERS IN SHRINK-WRAP? BUSES IN BAGS!

By Elaine Hale

Some of you may have noticed the new additions to Amfac's Gardiner warehouse parking lot last fall, where eight yellow, antique buses joined the one that Amfac uses to transport summer guests. The vintage White Motor Company model 706, 14-passenger motor coaches were part of a fleet that eventually numbered 98 buses originally purchased by the Yellowstone Park Company. They were purchased between 1936 and 1939 to transport visitors through Yellowstone. This same type of motor coach was also used by several other national parks, including the blue buses once used in Rocky Mountain National Park and the red "Jammers" still used at Glacier. Zion, Bryce Canyon, and Mt. Rainier also purchased White model 706 motor coaches, and the Grand Canyon used White buses of a different model. The transportation collection at YNP already includes two White model 706 motor coaches, and they are included in the collections at the Museum of the Rockies and the Montana Historical Society.

## Research into the Yellowstone Park

Company's fleet vehicle records, completed by Robert Goss of Gardiner, Montana, and Bruce Austin of Crestline, California, revealed that the Yellowstone buses were listed on the park's insurance records until 1954, sometime shortly after which they were sold to private individuals. The Skagway (Alaska) Streetcar Company purchased some of the buses, and with very little alteration (they did not even remove the YNP license plates), and some attention to routine maintenance, used them to transport visitors. The Skagway buses were given names: "Cripple Creek," "Hollywood," "Great Falls," "Little Rocky," "Big Rocky," "Monty," "Mason City," and "Yellowstone." John Varley, Director of the Yellowstone Center for Resources, ran across the buses while in Skagway about five years ago, and brought back photographs of the fleet.

Despite the fact that the Skagway buses (now fondly referred to by their Yellowstone friends as the "Skagway Ladies") were in great shape and appeared to have many more years of service in them, the owners of the Skagway Streetcar Company decided to sell them and purchase older buses. Bruce Austin, a private



*Two of the park's newly-acquired historic buses wait for summer in Amfac's Gardiner lot.*

philanthropist who has assisted Yellowstone's archives and museum in acquiring rare items, and a member of the Motor Bus Society, apprised the park's Acting Superintendent, Frank Walker, and its cultural resource staff of the availability of the buses. At a cultural resources conference in Santa Fe in December 2000, Barbara Pahl of the National Trust for Historic Preservation, together with Austin, gathered some YNP staff together with Kate Stevenson, Associate Director for Cultural Resources, and some of her staff; and Glacier staff involved in the restoration of the "Jammers." The group discussed the Glacier project and rallied support for bringing the Skagway Ladies back into service in YNP.

From that point on, many people became involved in the efforts to bring the buses home to Yellowstone. Interested staff from Yellowstone's

YCR, Maintenance, and Planning divisions met to discuss numerous possibilities for obtaining and using the buses. But before that happened, money was needed. It was a dark day, indeed, when we learned that private interests were prepared to purchase all eight of the buses for their own use. Acting Superintendent Walker stepped in, took a ride in an identical bus operating in West Yellowstone, weighed the situation, and decided the park should purchase the buses.

Yellowstone's Business Management (formerly Concessions Management) Office took the lead and, working with Amfac, sent mechanics to inspect the buses. Finding them in good condition, the park bought all eight and assigned them to AmFac's care. Before we knew it, the deal was done, and the Skagway Ladies were heading for their home turf. The first two buses, "Mason City" and "Yellowstone," were delivered to Gardiner on October 8, 2001. Bruce Austin and

some of the YNP staff gathered to celebrate the event. Soon after, the remaining six buses joined the parking lot crew. Originally, Amfac had planned to store the antique, canvas-roofed buses on the third floor of their storage building, but its mechanical lift is not operational at this time. The biggest concern was that winter snow accumulation would damage the soft roofs of the buses, so Amfac covered them with white protective fabric.

At present, we do not know which of Yellowstone's locations are being considered for these grand old ladies' return to duty in Yellowstone, but they will provide visitors with a quality historic experience and be a welcome addition to the landscape wherever they are used. We should all be proud of the efforts of such a wide variety of people, both from outside and within the NPS to make historic buses in Yellowstone a reality.



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## COOPERATIVE AERIAL WILDLIFE SURVEYS SCHEDULED FOR NORTHERN YELLOWSTONE & VICINITY

By Mark Biel and Tom Olliff

Look! Up in the sky! It's a bird! It's a plane! No—wait—it's a biologist in a plane! What are they doing flying around up there? Chances are that they're counting pronghorn antelope or mule deer, or counting and classifying bighorn sheep or the northern Yellowstone elk herd.

The Northern Yellowstone Cooperative Wildlife Working Group will again conduct regular wildlife surveys from both fixed wing airplanes and helicopters during winter 2001-2002 and fall 2002. These surveys, conducted since 1989-90, are used to estimate the minimum population of elk, mule deer, bighorn sheep, and pronghorn in the area and to classify herds according to age, sex, and class.

The Northern Yellowstone Cooperative

Wildlife Working Group consists of biologists and managers from the National Park Service, Montana Department of Fish, Wildlife and Parks, U.S. Forest Service, and U.S. Geological Survey. The Working Group grew out of the recognition that close cooperation is necessary to manage wildlife species that range inside and outside of the park in northern Yellowstone and the Gardiner Basin.

Aerial flights are a more temporally- and economically-feasible method of collecting data on wildlife populations that inhabit rugged and potentially dangerous terrain, and cover large areas, than ground surveys conducted by personnel on foot over several days. The long-term data collected from these flights are used to calculate minimum population estimates and classify the ungulate herds that inhabit not only Yellowstone

National Park but also the lands outside the park under the jurisdiction of state and other federal agencies. This data is used by the Northern Yellowstone Cooperative Wildlife Working Group to assist state agencies with setting take limits for hunting seasons and to track populations of concern such as the pronghorn antelope and bighorn sheep.

The purposes of the group are to:

- (1) Provide for an exchange of ideas and methods for biological studies and management actions;
- (2) Consider all subjects pertaining to ecology, management, data collection, basic research, habitat, land acquisition, and human development within the northern Yellowstone winter range as possible topics for discussion or study;
- (3) Cooperate in conducting regular population monitoring efforts, including aerial surveys, to document the numbers, movements, and distribution of major ungulate species on the northern range;
- (4) Maintain a prioritized list of study topics related to the northern Yellowstone winter range;
- (5) Provide technical input and review of northern range research and management projects;
- (6) Disseminate information and data generated by Working Group activities;
- (7) Use the advice and assistance of outside partners to help design, implement, and review potential projects;
- (8) Maintain an option to evaluate major land use and management actions that affect the northern range and provide informed comments or recommendations to the appropriate parties; and
- (9) Cooperatively preserve and protect the long-term integrity of the northern Yellowstone winter range by increasing scientific knowledge of its species and habitats.

Cooperative wildlife surveys to occur this winter and into 2002 include:

**Northern Range Elk Count:** On December 21, 22, and 23, biologists flew in Piper Super Cub airplanes to count the number of elk inside and outside the park between the Lamar Valley, Six Mile Creek on the east and Yankee Jim

Canyon on the west. Total time was 17 flight hours. The objective was to count all elk observed in specified elk count units located in the northern Yellowstone winter range. Biologists use the count to estimate the minimum northern range elk population. The estimated minimum population based on this flight is 11,969. This number compares with estimated minimum populations of 13,400 in 2000 and 14,539 in 1999.

**Elk Classification Flight:** This flight, estimated to take 10 flight hours over the course of two days, occurs in January and March using a helicopter because it is necessary to hover while classifying large herds of elk. The objective is to count and classify a representative sample of the elk population. Bulls, cows, and calves are counted and classified in all or part of a specified sub-sample of elk count units. Sample count units are selected from the entire northern range in a manner comparable to previous late winter surveys. These data allow biologists to calculate late winter season bull/cow ratios and cow/calf ratios. National Park Service personnel usually conduct this survey.

**Winter Mule Deer Classification Flight:** This flight, estimated to take six flight hours, occurs between December 1 and January 10. For the same reasons listed above, a helicopter is used. The objective is to classify a representative sample of mule deer (between 500-600) from Yankee Jim Canyon south to the park on both the east and west side of the Yellowstone River. Fawns, does, and bucks are counted and classified, and bucks are distinguished as yearlings or older bucks based on antler characteristics. These data give biologists a population trend for mule deer as well as post-hunting season buck/doe ratios, age structure of the herd, and winter fawn/doe ratio. This survey is usually conducted by Montana Fish, Wildlife and Parks personnel.

**Spring Mule Deer Count Flight:** This flight, estimated to take nine flight hours, occurs between April 15 and May 20 using a helicopter due to the necessity to hover while counting large herds of mule deer and classifying fawns and

adults. The objective is to count total mule deer observed in core mule deer winter range east and west of the Yellowstone River from the south end of Yankee Jim Canyon to Deckard Flats and along both sides of the Gardner River to Mammoth Hot Springs. From this count, biologists estimate the minimum mule deer population. When possible, mule deer are classified as to age and this data is analyzed to give a fawn/adult ratio estimate. This survey is usually conducted by Montana Fish, Wildlife and Parks personnel.

**Bighorn Sheep Spring Count/Classification Flight:** This flight, estimated to take six flight hours, occurs between April 15 and May 20 using a helicopter due to the necessity to hover while counting and classifying herds of bighorn sheep in rugged, remote terrain. The objectives are to count the number of bighorn sheep to provide a minimum population estimate and population trend and to classify those animals observed as lambs, ewes, or rams. This survey is usually conducted by Montana Fish, Wildlife and Parks personnel.

**Spring Pronghorn Population Count Flight:** This flight, estimated to take three flight hours, occurs between March 15 and April 15 using a Piper Super Cub airplane. The flight begins in the area of Mount Everts and continues to the Elk Plaza and Slide Lake areas within Yellowstone National Park. From there the area between Slide Lake and the Reese Creek bound-

ary and north to Yankee Jim Canyon is surveyed. Finally, the Carbella area north of Yankee Jim Canyon both east and west of the Yellowstone River is surveyed. The objective is to count the number of pronghorn observed to provide biologists with a minimum population estimate. No attempt is made to make any classifications. National Park Service personnel usually conduct this survey.

**Late Fall Pronghorn Population Composition Flight:** This flight, estimated at four flight hours, occurs between August 1 and November 20 using a Piper Super Cub airplane. The survey area is identical to the spring pronghorn population count flight, with the exception of including areas near Tower Junction where pronghorn have been routinely observed the past few years. This flight was initiated due to concerns over the observed decline in the Yellowstone pronghorn population. The objective is to count groups of pronghorn observed and then classify the males and fawns. The total number of females is obtained by subtracting the combined total of fawns and males from the group size observed. Not all pronghorn are counted. The total number counted and classified is then shown as a percent of the spring population count from earlier in the year. From this data, biologists can estimate the number of adult males per 100 females and fawns per 100 females. National Park Service personnel usually conduct this survey.



## NATIONAL PARK SERVICE ANNOUNCES NEW SUPERINTENDENTS FOR YELLOWSTONE AND GRAND TETON NATIONAL PARKS

On December 14, 2001, new superintendents were named to Yellowstone and Grand Teton National Parks. Suzanne Lewis, a 22-year veteran of the NPS, will manage Yellowstone National Park, and Steve Martin, a 26-year NPS veteran, will manage Grand Teton National Park

and John D. Rockefeller, Jr., Memorial Parkway. Lewis and Martin will assume their new responsibilities in February 2002.

"The selections of these individuals were approved by Interior Secretary Gale Norton because of their successful records working in

collaboration with others to accomplish community conservation objectives," said Regional Director Karen Wade.

Suzanne Lewis is currently the superintendent at Glacier National Park, where she manages over 1,013,000 acres, a staff of approximately 525 during the height of the summer season, and an annual operating budget of over \$11 million. She began her NPS career as a seasonal park ranger in 1978 at Gulf Islands National Seashore. During her 11-year tenure there, she served in a variety of positions including park technician, park



New YNP superintendent Suzanne Lewis.

historian, supervisory park ranger, and management assistant to the superintendent. Chosen in 1988 for an international assignment to the Republic of Haiti, she assisted the United Nations' efforts to preserve, protect, and educate Haitians in the preservation of cultural resources.

In 1989, Lewis was appointed acting superintendent for Christiansted National Historic Site and Buck Island Reef National Monument in the U.S. Virgin Islands. She was selected in 1990 as the first superintendent for the newly-created Timucuan Ecological and Historic Preserve—a 46,000 acre national park in Jacksonville, Florida. Lewis served as the superintendent for the Chattahoochee River National Recreation Area in Atlanta, Georgia, from 1997 to April 2000, where she managed one of the busiest national recreation areas in the United States, with more than 3.5 million visitors annually.

Ms. Lewis earned her B.A. (Magna Cum Laude) in American History in 1978 from the University of West Florida. During her Senior Executive Service Candidate Development Program, Lewis completed assignments with the Interior Secretary's Special Assistant for Alaska, the Office of Management and Budget, and the Walt Disney World Corporation. Throughout her NPS career, Lewis has received numerous awards, including the National Parks and Conservation Association Park Manager of the Year for Partnerships in 1994. She was also awarded the Woman of Distinction Award from the Girl Scout Councils of America in 1997.

Steve Martin is currently superintendent of Denali National Park and Preserve where he is responsible for all aspects of the management of the 6.2 million-acre park. The park has 100 permanent and 200 seasonal employees and an average annual budget of about \$15 million.

Prior to assuming the superintendency at Denali, Martin was superintendent of Gates of the Arctic National Park and Preserve, an 8.2 million-acre park encompassing part of the Brooks Range of northern Alaska. He moved to Alaska from Yellowstone National Park, where he was chief of concessions. Prior to that assignment, Martin was chief of resource management and visitor protection at Voyageurs National Park in northern Minnesota. Before Voyageurs, he was the north district ranger and Old Faithful district ranger at Yellowstone. Martin began his career in 1975 as park ranger at Grand Canyon National Park, where he supervised the Colorado River field operation.

Mr. Martin earned his B.S. in Natural Resource Management from the University of Arizona in 1975. He has received many awards for his supervisory and management accomplishments, most recently the Department of Interior Meritorious Service Award.

Welcome, Suzanne and Steve, and congratulations to Yellowstone's current Acting Superintendent Franklin C. Walker, who has been named the park's new Assistant Superintendent!

## YELLOWSTONE PROPOSES TO BUILD HERITAGE CENTER

By Sue Consolo Murphy

Yellowstone's museum, archives, and library collectively protect more than five million items—treasures such as the first paintings and drawings ever made of what is now the park, including works by noted artist Thomas Moran; more than 90,000 photographs, including some taken by William Henry Jackson and others illustrating park history and resources from the days of trappers and the earliest explorers of the region; American Indian artifacts; natural science collections documenting the park's wildlife, plants, and geology; historic vehicles, including stage-coaches and the first bus in Yellowstone's fleet; an archive documenting the management of the park from its inception through U. S. Army administration to the present; and a library containing most of the rarest publications on Yellowstone.

For decades, this growing collection has been primarily housed in the basement of the Albright Visitor Center, a building not originally designed for any of its current uses and one that, despite its historic character, has major deficiencies for those uses today. In 1989, the park was cited by the Office of the Inspector General for the poor preservation conditions of its museum collection and archives. The park's 1997 Collections Management Plan and subsequent Collection Condition Surveys confirmed the findings of the OIG and called for improved preservation conditions and public access. The collection is actually scattered among five facilities, all of which are cramped and lack environmental controls and adequate fire protection. The limited space also severely restricts use by the general public and more than 1,000 researchers who seek direct access to the collections each year. These researchers produce books, articles, films, videos, web sites, and other media that educate millions of people about Yellowstone.

To address these deficiencies, Yellowstone has proposed to build a 32,000-square-foot

collections storage facility called the Yellowstone Heritage and Research Center. Working with museum specialists, park staff determined their collection storage needs, and, working with architects, explored various options for its siting. The Heritage Center, which is of phased design, will preserve current collections, allow for an estimated 25-year growth in important new collections, provide adequate access to the public, and include a modest space for changing exhibits.

In July 2001 the NPS Development Advisory Board recommended approval of such a facility, and the NPS line-item construction budget for 2002 includes \$6.1 million dollars for the first phase, which includes storage for all but oversized objects (such as historic vehicles and large furniture), a new library, some work space for visiting researchers, and staff offices. Future (presently unfunded) phases will provide for the preservation and display of the historic vehicle collection and for added research and lab facilities for the numerous scientists who conduct studies in Yellowstone each year. An estimated \$6-8 million will be needed for future phases, for which the park hopes to secure private donations and grants.

An environmental assessment to examine the alternatives and impacts related to this facility was released in January 2002. To accommodate the needs of the large collection, managers considered rehabilitation of existing buildings and new construction on sites outside the park as well as in Mammoth Hot Springs. Partnerships with museums and universities outside the park were also explored, but regional museums lacked space to accommodate even modest portions of Yellowstone's collections, or would levy significant annual fees to do so, and all qualified institutions who could care for the collections are a great distance from the park. Moving the collections outside the park was deemed a poor choice for

the researchers and members of the general public using the collections who, generally, are already in the park working on projects. Potential partners agreed that Yellowstone's collections should remain in the park, but new construction within the Mammoth Hot Springs historic district was of concern to historic preservation specialists and others.

The preferred alternative is to locate the Heritage Center on already disturbed park land, a former gravel pit adjacent to the town of Gardiner, Montana, about five miles north of park head-

quarters. Construction is likely to commence in late 2002 or early 2003, and an architectural and engineering contractor is preparing designs. Completion of the first phase of the Heritage Center is anticipated in 2004-05, at which time the existing archive, library, and museum collections can be moved into the new facility.

Public comments related to the proposal may be sent through February 25, 2002 to Heritage and Research Center Project, Planning Office, P.O. Box 168, Yellowstone National Park, Wyoming 82190.



## THE BISON ROD: A BRIEF Q&A

By Glenn Plumb

The recent release of the Record of Decision for Yellowstone's Joint Bison Management Plan has left many people with questions about the history and future of bison management in Yellowstone, and about what implementing the plan will entail for both the park's bison and its managers. Here are the answers to a few of those important questions:

### **Q. Who is responsible for managing bison?**

A. The wild bison in Yellowstone are the direct descendants of the last wild bison in the United States. This population was recovered from near extinction by intensive management in the early 1900s inside Yellowstone National Park. These wild bison live primarily inside Yellowstone National Park, but like other wildlife such as elk, pronghorn, bears, mountain lions, and other free-ranging species in the Greater Yellowstone Area, bison seasonally seek lower elevation habitats on lands adjacent to the park in Montana, Idaho, and Wyoming. Under the new Joint Bison Management Plan, the National Park Service retains jurisdiction and management responsibility when bison are inside Yellowstone National Park, and

the respective agencies of Montana, Idaho, and Wyoming have jurisdiction when bison utilize habitats in those states. When bison leave the park and enter Wyoming, the Wyoming Game and Fish Department has management responsibility and maintains a limited bison hunt outside the park. Management responsibility for Yellowstone bison in Montana was transferred from the Montana Department of Fish, Wildlife and Parks to the Montana Department of Livestock in 1995. In Idaho, the state Department of Agriculture is responsible for bison.

### **Q. Where and when will bison be allowed to utilize public lands adjacent to Yellowstone National Park?**

A. Under the Joint Bison Management Plan, free ranging bison are immediately allowed to occupy three areas adjacent to the park: the Eagle Creek/Bear Creek area that lies north of Gardiner, Montana; and the Cabin Creek Recreation and Wildlife Management Unit and Monument Mountain Unit of the Lee Metcalf Wilderness along the park's northwest boundary. Bison in these areas are not subject to capture, testing or hazing. During winter 2001-02, the signatory agencies to the Joint Bison Management Plan

(NPS, USDA Forest Service, USDA Animal and Plant Health Inspection Service, Montana Department of Livestock, and Montana Department of Fish, Wildlife and Parks) have agreed to allow up to 100 seronegative bison (e.g. bison that have tested negative for brucellosis antibodies) to utilize some public lands adjacent to the park in the West Yellowstone, Montana, area. While no bison are allowed north of the park and west of the Yellowstone River this winter, the agencies have agreed to begin to allow a limited number of seronegative bison on public lands west of the Yellowstone River, north of Gardiner, Montana, and south of Yankee Jim Canyon during winter 2002-03, after a bison management plan has been developed with the Royal Teton Ranch.

**Q. How many bison are there?**

A. Based on the most recent population-wide survey conducted by the NPS in November 2001, there are approximately 3,500 bison.

**Q. How were bison managed before the State of Montana became involved over disease concerns?**

A. Between 1901, when 25 bison were counted in Yellowstone National Park, and the mid-1960s, bison management occurred primarily inside the park and included intensive husbandry that increased the population to a high of 1,350 in 1954. The NPS periodically reduced the population, which reached 226 in 1964. In the mid-1960s, the NPS initiated a policy wherein man-

agement control of bison population size stopped. The Yellowstone bison population continued to increase through the 1990s, reaching a high of 3,956 bison counted in winter 1994-95. In 1996-97, severe winter conditions and other factors, such as large herd numbers, resulted in a major movement of bison outside the park, and management removals conducted by Montana and NPS totaled 1,084 (32% of early winter population). Between 300-400 bison also died that winter as a result of severe weather-induced winter-kill.

A limited number of bison have always sought lower elevation habitats outside the park regardless of winter severity. During the mid 1980s and early 1990s, Montana maintained a limited bison hunt outside the park. Bison hunting in Montana was discontinued in 1989 after receiving intense negative public reaction. In 1995, the State of Montana conveyed management authority for bison from the Department of Fish, Wildlife and Parks to the Department of Livestock.

**Q. Is there a population limit for bison?**

A. The Joint Bison Management Plan provides that some bison outside the park in the western boundary area or near the Stephens Creek boundary area may be captured and removed regardless of seropositive status if the late winter or early-spring bison population is above 3,000.



## CONE SEROTINY AMONG NORTH AMERICAN CONIFERS

By Roy Renkin

We are all familiar with the serotinous cones of lodgepole pine (*Pinus contorta*) and their contribution to postfire seedling establishment. Cone serotiny, however, is not limited to lodgepole pine, or even pines in general. A few other conifer species also demonstrate cone serotiny to varying degrees.

“Serotinous” was derived from the Latin word *serotinus*, meaning “coming late,” and is used to describe the cone behavior of delayed seed dissemination. In the case of most pine trees, cones take two years to mature. The cone scales “open” following maturation, and most of the seed inside the cone is shed over the next few

months. Once emptied, the open cones can remain on the tree for a variable length of time but eventually fall to the ground.

Serotinous cones, on the other hand, do not open when mature but are retained on the tree in the "closed" condition. Such cones can remain in the crowns for a few decades and require heat from fire, prolonged exposure to direct sunlight, or radiant heat to melt the resins holding the scales closed. Trees that produce serotinous cones can also produce cones that open upon maturity, and may have a preponderance for either kind.

Following lodgepole pine in the notoriety of cone serotiny is jack pine (*Pinus banksiana*). Jack pine is found in the boreal forests of northern New England and the Great Lake States, and across much of Canada to the foothills of the Rocky Mountains. Another boreal inhabitant sometimes found in close association with jack pine, the black spruce (*Picea mariana*), has been described as having a "semi-serotinous" cone. In this species, seeds are usually shed within four years after the mature cones open, but viable seeds have been found in 15-year-old cones. Fire and semi-serotinous cones have combined to produce some even-aged boreal stands of black spruce.

Pitch pine (*Pinus rigida*) in the eastern

United States, and pond pine (*Pinus serotina*) and sand pine (*Pinus clausa*) in the southeast U.S. can also produce serotinous cones. Interestingly, pitch pine has also demonstrated delayed seed germination for up to one year as well as the ability to re-sprout from the base following an above-ground disturbance.

Some pines in California also employ the closed cone behavior. Monterey pine (*Pinus radiata*) and bishop pine (*Pinus muricata*), both very restricted in distribution to the west-central coastline of California, and the more widespread knobcone pine (*Pinus attenuata*) all produce serotinous cones. The giant sequoia (*Sequoia gigantea*) similarly produces a cone that may remain closed for up to 20 years!

One Central American pine that is found in the extreme southeast Arizona and southwest New Mexico, the chihuahua pine (*Pinus leiophylla*), also joins the list of serotinous cone producers.

It appears that cone serotiny evolved among conifers found in those regions where geology and climate interact with fire as a predominant disturbance factor. It is likely that serotinous cone behavior exists on other continents, like Australia or the Mediterranean region of Europe.

## ...NEWS BRIEFS...

### Man & Woman Found Guilty of Collecting Elk Antlers

On January 3, 2002, Yellowstone National Park Acting Superintendent Frank Walker announced that Robert Janz, 23, and Jessica Gannon, 20, both of Joliet, Montana, pled guilty on December 13, 2001, before U.S. Magistrate Judge Stephen E. Cole in Mammoth Hot Springs, to the charge of collecting and removing elk antlers from Yellowstone National Park.

On July 24, 2001, NPS agents received information from the Billings office (Region 5) of Montana Fish, Wildlife and Parks regarding the

possible theft of antlers from Yellowstone National Park by Janz and Gannon. In cooperation with Montana Fish, Wildlife and Parks, an investigation revealed that Janz and Gannon were in possession of about 191 pounds of elk antlers that were removed from Yellowstone National Park in June of 2001. Janz also collected antlers from the park on several other occasions during the past few years.

Mr. Janz was ordered to pay \$3,000 restitution to the park, assessed \$10 to the victim/witness fund, and placed on probation for five years. Ms. Gannon was ordered to pay \$500

restitution to the park, assessed \$10 to the victim/witness fund, and placed on probation for three years. During their probation, both individuals are prohibited from entering Yellowstone National Park.

### **Winter Season Includes Operational Changes**

On December 17, Acting Superintendent Franklin C. Walker announced that a one-year operational program to help address winter issues in Yellowstone will be in effect this winter season. The changes include putting additional park personnel and volunteers on the snow roads, improving grooming and visitor education, and attempting to reduce employees' exposure to unhealthy and unsafe conditions. The operational changes do not limit the number of snowmobiles allowed in the park this winter season.

Walker noted that ongoing Winter Use Planning in Yellowstone National Park has identified some serious issues related to employee health and safety, human/animal conflicts, air quality, noise, and deteriorating visitor experiences, and that winter planning and preparation of a Supplemental Environmental Impact Statement are underway and will address these concerns in the long-term. The issues that have been identified, however, require interim, short-term actions this winter.

The changes are being implemented on the road segment between the West Entrance and the Old Faithful area, a 30-mile segment of road (out of the 180 miles that are open for snowmobile use). The first is designed to help reduce exposure of employees and visitors to high levels of air pollution and noise at Yellowstone's West Entrance Station: all West Entrance permits are being pre-sold at several locations in the community of West Yellowstone, including the Chamber of Commerce and various snowmobile rental outlets and hotels/motels. Visitors should plan to purchase their entrance passes at those community locations, rather than at the entrance gate. Also, additional express lanes are open for employees to check gate passes. This reduces idle time at the

gate and, hence, the accompanying tremendous build-up of exhaust fumes which has adversely affected the health of gate employees in years past. Pre-selling passes also gives park staff an opportunity to provide information to visitors in a more relaxed atmosphere.

In an effort to reduce disturbance of wildlife by wintertime motorized users, volunteers and park staff are presenting educational programs on low impact snowmobiling at the Chamber of Commerce, various hotels, and other facilities in the community of West Yellowstone. These presentations have been well-received so far. The park is also exploring the use of volunteers to serve as "hosts" within the park to help visitors better understand and use low impact snowmobiling techniques. Park staff are monitoring bison movements on the road between West Yellowstone and Old Faithful, and the speed limit between West Entrance and Old Faithful has been lowered from 45 mph to 35 mph in an attempt to reduce conflicts.

Because late night snowmobile use creates safety issues, potential wildlife/human conflicts, and decreases the effectiveness of grooming, Yellowstone will continue to recommend that all visitors not travel the roads during hours of darkness (specifically between 9 p.m. and 8 a.m.).

Rough snow roads reduce the quality of visitors' experience and create safety and health concerns for both visitors and employees. To help address this, Yellowstone is double-grooming the West to Old Faithful roads on many nights. The park will work with the town of West Yellowstone on an experimental program using a town groomer in the park during mid-day.

### **Yellowstone National Park Interpretive Publications Receive National Award**

On November 27, Acting Superintendent Frank Walker proudly announced that a series of eight self-guiding trail booklets produced by the National Park Service was recently awarded the grand prize at the recent National Association of Interpretation's annual Media Competition.

The award was announced on November 14 in Des Moines, Iowa, during the annual meeting of the National Association of Interpretation, a professional organization encompassing federal, state, local, and private institutions in which interpretation and education are primary missions.

Production of the self-guiding trail booklets was funded by a generous anonymous donation to the Yellowstone Association. The booklets are used by millions of visitors each year to explore the Upper Geyser Basin (including Old Faithful Geyser), Grand Canyon of the Yellowstone, Mammoth Hot Springs, Fort Yellowstone, Norris Geyser Basin, Fountain Paint Pots, Mud Volcano, and West Thumb Geyser Basin. The publications were cited for their excellence in design and appeal to a wide range of users.

### **Another Sewage Spill**

In late November, Yellowstone National Park officials reported that on Saturday, November 17, a sewage spill was discovered in the Lake Lodge area near Yellowstone Lake. Park staff estimate that approximately 50,000-250,0000 gallons of sewage bypassed the Lake Lodge lift

station into an old septic tank and infiltration ditch. The resultant, partially-treated sewage that did not soak into the infiltration ditch soaked through vegetation and entered a natural lagoon next to Yellowstone Lake. The lagoon is connected to the lake, but it is probable that all of the flow was contained in the lagoon and that no partially treated sewage actually reached the lake.

The sewage in the overflow system was apparently caused by grease that partially blocked the sewage in a manhole that goes into the lift station. The portion that did not go into the lift station went into the overflow pipe. The sewage system in this area is under construction to correct infiltration into the system, and the manhole serving the lift station was recently replaced. During the replacement of the manhole, the piping was incorrectly routed to the old overflow system instead of to three newer overflow tanks. The overflow pipe has now been completely disconnected from the system; the new overflow tanks, with an overflow alarm, have been connected to the system.

The incident has been reported to the Wyoming Department of Environmental Quality.

The *Buffalo Chip* is the resource management newsletter for Yellowstone National Park. It is published periodically by the Yellowstone Center for Resources.

We welcome submissions of articles or drawings relating to natural and cultural resource management and research in the park. They can be sent to:  
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