



concern about the genetic diversity of this population; is there a problem? If so, how do we resolve it? This new technology is going to help define the genetic diversity of bears here and everywhere else. As long as everybody is speaking about this only on theoretical levels, we'll never resolve it. My theory and computer model will always be different from your theory and computer model. We now have technology that will get us past that and specifically identify the issues.

YS: Give us an example of the issues.

MF: There are many, and they relate directly to management. Understanding the genetics of these bears is going to help us a lot in studying the bears feeding at these alpine moth sites. In order to know how these bears live, and therefore what is needed for their conservation, we need to know more about their social hierarchy and behavior. If we have a way of keeping tabs on some of them with a GPS, and we know the lineage of these individuals, we can learn a lot.

Once we have a technique for identifying individuals, we can better understand social interactions. Unlike studies that start with an identifiable individual bear and go forward in time through its offspring, we can go backward to that bear's ancestors. Of course the holy grail of the DNA research is that we can extract DNA from any part of the animal, including scat, and the holy grail is to do a noninvasive, economical, population

census than heretofore has been done.

For example, when we see a subadult bear on a moth slope, and that bear moves within 30 feet of a sow nursing her cubs, and the sow doesn't react defensively, what does that tell us about the relationship between the subadult and the sow? At present, all we can do is wonder if maybe the subadult is a former cub of that same sow, and so she isn't threatened by it. Once we get the genetics to the point where we can know the relationships of these bears, and the GPS will help us define their activities and their habitat use, we can apply those things to all kinds of management situations.

YS: Something that used to be said a lot more than it is now is that Yellowstone's grizzly bears have been studied enough: 10 years by the Craigheads, more than 20 by the IGBST, and more than 10 by your Yellowstone Grizzly Foundation. If that viewpoint is still worth arguing over at all, it appears that what you're saying here is that we've only begun to integrate all the different kinds of knowledge we need if we're really going to understand how to protect the bear.

SF: There's even more to it than that. It isn't just trying to understand the bear as we see the bear today. We're trying to understand a bear that's been subjected to amazing pressures in the past century, probably like nothing the species encountered in its previous 10,000 years.

For starters, there's all the change that

has occurred recently in this bear population. In the past 30 years, the grizzly bears have gone from a dump-fed population to a free-ranging population, a radical alteration in eating habits and nutrition. At the same time, fisheries management changed and the cutthroat trout population has recovered and is now an important native food source. And now there are lake trout in Yellowstone Lake, threatening to change that food source again, for the worse. Ungulate management has changed completely since the 1960s, from a time when bison and elk numbers were kept very low to a time when they're very high; research by the IGBST and by us has documented how the bears have worked to adjust to those new food sources. It's only been 20 years ago that sport hunting for grizzly bears stopped in the Greater Yellowstone Ecosystem; closing that hunting season certainly changed mortality patterns and may have changed bear behavior. Any one of these things can be regarded as a big shock for a wildlife population, and the Yellowstone grizzly bears have experienced them all at once. We think the bears are still adjusting to those events, and if they do tend toward some equilibrium, they're not there yet.

But then look at it in the long view. Plot out the last 10,000 years of grizzly bear presence in North America, and then plot out the human population on the same time line. The human effects have always been there to some extent, but look at the changes in the past 150 years. I think it would be very naive to assume that the Greater Yellowstone grizzly bear population, after everything we've put it through, has its ecology and behavior all sorted out and is at some kind of equilibrium. We've seen these bears learn and change steadily for the past two or three decades. Why would that stop now?

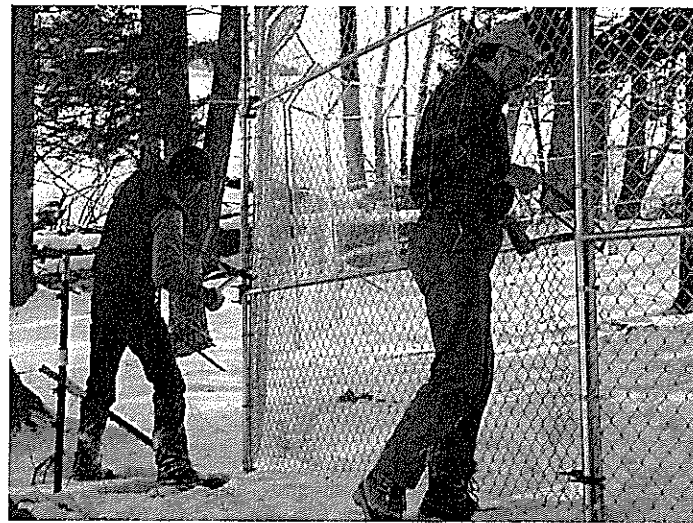
Grizzly bears should continue to surprise us with behavior we haven't seen before, but it shouldn't surprise us that they continue to surprise us. Whether it's their use of fish or elk calves or army cutworm moths, or whatever is going to happen next that we haven't imagined yet, we will still be in a very dynamic relationship between bears and people for a long time, until we're dead and long beyond that.

Wolves Released: Learning Accelerates

In the previous issue of *Yellowstone Science*, we reported the arrival of 14 wolves from Alberta in Yellowstone. Eight were placed in acclimation pens on January 12, and six more were added on January 19. The acclimation period of approximately two months was a time of learning both for wolves and humans. For the wolves, there was a period of a week or so during which they tested and fought the pens (through chewing and digging) until determining that getting through the fences was not possible. For the humans, the arrival of the wolves began a great experimental and educational process, which will continue for the duration of the restoration effort and beyond.

The wolves were usually fed twice a week. A variety of road-killed wildlife (elk, deer, and moose) and wildlife killed in management control actions (bison) was collected for wolf food. The same mule-team/sled combination used to transport the wolves to the pens was used to haul the meat. At no time during the acclimation process was there any indication of habituation of the animals to human presence; they invariably became agitated when people approached the pen, and their obvious inclination was to keep as far as possible from humans.

The wolves showed no disinclination to eat, however, and cleaned up the carcasses quickly. Efforts were made to remove as much of the nonedible material from the pens when the wolves finished, in order to reduce the chance of attracting scavengers. This became a potentially important matter in February, when unseasonably warm weather led to the emergence of some of the park's grizzly bears; radio collared bears were located within a few miles of pen sites, but no tracks of bears were observed near pens. Tracks indicated that mountain lion, coyote, and elk did investigate the Crystal Creek pen, and one other animal investigated a little too closely. On January 31, biologists taking meat into the Soda Butte pen found the remains of a red fox that had somehow gotten in, probably attracted by the meat. This fox became



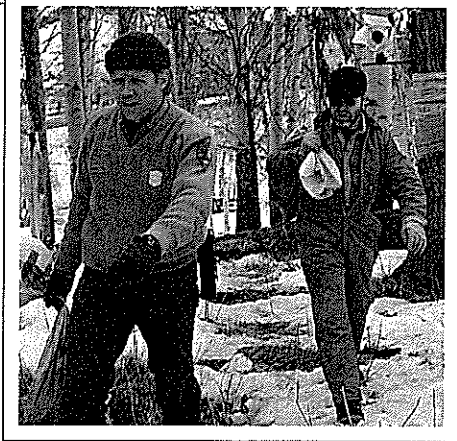
NPS Photos

Above: NPS Wolf Restoration Project Biologist Doug Smith (left) and U.S. Fish and Wildlife Service Ecologist Dave Mech cutting an opening in the Soda Butte pen. Right: NPS Wolf Restoration Project Leader Mike Phillips (left) and U.S. Fish and Wildlife Service Northern Rocky Mountain Wolf Coordinator Steve Fritts carrying meat to the Crystal Creek pen site.

the first known predation by Yellowstone's new wolves.

The last legal hurdle for release of the wolves was cleared on March 19, when United States District Court Judge William Downes denied a motion for a preliminary injunction against the release. The motion was filed by James and Cat Urbigkit, concerned citizens from Wyoming, on the grounds that the Department of the Interior did not adequately consider the possibility of an existing wolf population, which might be harmed by the introduction of additional wolves. It has long been the position of the U.S. Fish and Wildlife Service and the NPS that because no pack activity and only isolated possible sightings of wolves have occurred, there was no reason to believe that a resident wolf population existed. This case and two others still pending will go to court later this year, so there are still legal challenges to the freedom of the wolves.

At 3:45 p.m. on Tuesday, March 21, the gate of the Crystal Creek pen (containing six wolves from the first shipment) was locked open, and meat was placed near the entrance to draw the wolves' attention to the opening. Over the next few days, the wolves showed



great reluctance to approach or pass through the gate. This behavior was repeated to a lesser extent by the three wolves (two females from the first shipment and one male from the second) at the Rose Creek pen, which was locked open at 4:45 p.m. the next day. Learning from these experiences, biologists did not even try using the gate at the Soda Butte pen (which held five wolves, all from the second shipment); they just cut a hole in the fence right away, at 4:01 p.m. on Monday, March 27. The openings at all three pens were equipped with remote sensors, in hopes that the wolves' departure would be signalled to biologists, who also could track the wolves' movements with the radio collars that all the wolves are wearing.

The wolves' reluctance to rush to freedom the moment the gates were open created a good bit of confusion and even anxiety in some circles, resulting in some unfortunate and uninformed media stories (including one by radio commentator

Paul Harvey) about “welfare wolves” that were accustomed to the public dole and unwilling to fend for themselves. However unjust such remarks may have been to human recipients of welfare, they missed the point of how interesting all this was. The wolves had begun our education.

A number of factors may have contributed to the wolves’ hesitancy. Wolves in all three pens tended to avoid the area of the gates even before they were opened, apparently associating that part of the pen with the humans who moved in and out of the gate twice a week with food. The gate, whether open or closed, was still in what the wolves probably saw as the humans’ part of the pen. Another factor may have been the wolves’ own skill at learning

the limitations of the pens when they first arrived. After two months of circling the pens and learning exactly where they could move, it may have taken a few days for the wolves to recognize what the open gate meant. With these thoughts in mind, and hoping to make the wolves’ departure from the pens as comfortable as possible, biologists returned to the Crystal Creek pen on Thursday, March 23, and cut a second opening in that pen, near the wolves’ “comfort zone” (that area where they spent their time), some distance from the gate.

How wolves perceived the pen became a subject of much discussion among biologists and other staff. These wolves had never been exposed to such an enclosure, much less to any openings in it. As Yellowstone Center for Resources Assistant Director Wayne Brewster observed, “We don’t know that they view that hole as a way to go *out*; for all we know they might see it as going *into* something else.” And, as Wolf Project Leader Mike Phillips said, “We don’t know what the wolves see or whether they even know that the gate is open. We don’t know if they know what open *is*.”

The more important issue, however, was not the time the wolves spent decid-

ing to leave the pens; it was what that time meant. It meant, the biologists generally agreed, that at least to some extent the acclimation process had worked and the wolves were not inclined to start immediately on a long-distance hike. It was believed to be very important that the wolves be able to make their own decisions when they left the pens. If they rushed from the pen because of human presence, there was fear that this initial “flight stimulus” could increase the

How to Help the Wolves

Public enthusiasm for the wolves has expressed itself in many ways, including a number of unsolicited donations from individuals, and a number of inquiries from people wanting to make such donations. A procedure has been established through which tax-deductible donations may be made; all money will go directly to supporting wolf restoration. Checks should be made payable to the Yellowstone Wolf Recovery Fund, and sent to the Yellowstone Association, P.O. Box 117, Yellowstone Park, WY 82190.

chance they would move a long distance.

On Friday, March 24, the motion sensor at Crystal Creek registered a movement through the opening at 9:14 a.m., followed by several others over the next few hours. The group apparently began to move in and out of the pen at that point (wolf project biologists are still referring to the three pens’ inhabitants as “groups” rather than as “packs” because they may not really be packs yet; it is not clear how the wolves will sort themselves out socially, and the result may not be the same groupings they had in Alberta).

At Rose Creek, the motion sensor was acting up, and so it was less certain what the wolves were doing (and the sensors were also susceptible to being triggered by ravens or other animals), but for the first two days radio collar signals indicated that the wolves were either in or close to the pen. On Friday, March 24, biologists decided to cut a hole in this pen as well, but as they approached it (carrying a deer carcass to place outside the hole), they saw that the male, wolf #10, was standing on a hillside near the pen. As he saw them approach, he began an extended howl, and, as Phillips said, “when we realized he was outside the pen we dropped the meat and hightailed it out

of there.”

Within a few days, all three groups had moved several miles from their pensites, but were by no means settled down. On April 3, all but one of the Crystal Creek group were about 5 miles northeast of the confluence of Cache Creek and the Lamar River, and the other, a young male, was still near the pen. By March 30, the Rose Creek group had moved into Gallatin National Forest, about seven miles north of the

park boundary on upper Buffalo Creek, and stayed there a few days. By April 4, the young female had moved back south almost 20 miles, and was near the Crystal Creek Pen, while the older female and the

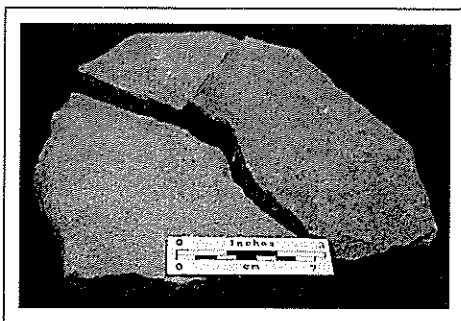
male were east of the confluence of Cache Creek and South Cache Creek. The Soda Butte group left the pen about two days after the hole was made in their pen, and spent most of their time along Soda Butte Creek and the Lamar River. This group left the clearest evidence of successful predation, taking and partially consuming two elk. There is no shortage of food, including large numbers of elk and other species, as well as recent winterkills.

And so the wolves are free, and are exploring the area. The longer they do so, the less likely they are to make the long and perilous excursions characteristic of some releases. It is a process of great fascination and considerable suspense; when the gates were open, the restoration process entered a dramatic new phase, in which the wolves make most of the decisions. Every day brings fresh news, and renewed interest in questions only the wolves can answer: Will they stay out of trouble? How will they deal with each other when they meet? Where will they settle? And, though biologists believe that the odds are not good so soon after the stress of being captured and held in a pen—will there be any puppies this spring?

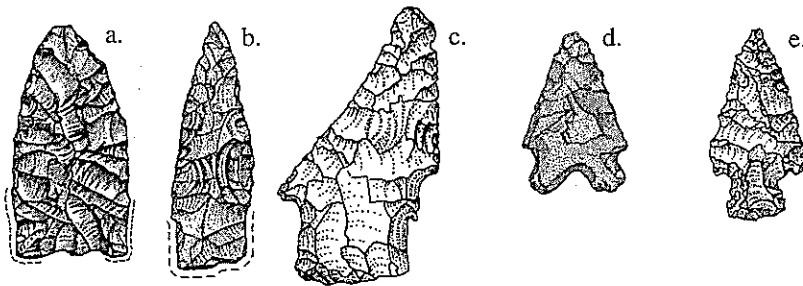
Blood Residues on Prehistoric Stone Artifacts Reveal Human Hunting Activities and Diversity of Local Fauna

The archeological profession has recently developed yet another technique for filling in our understanding of life in prehistoric Yellowstone. Kenneth Cannon, an archeologist with the NPS's Midwest Archeological Center, in Lincoln, Nebraska, writing in *CRM* (This stands for Cultural Resource Management) 18(2) and *Park Science* 15(2), reports that it is now sometimes possible to determine what kinds of animals were being killed (and presumably) consumed by ancient people, through the study of blood residues on their tools. The analysis technique has been developed and is conducted by Dr. Margaret Newman of the University of Calgary. Cannon explains that "the technique used is a modified version of crossover immunoelectrophoresis (CEIP) analysis, used by the Royal Canadian Mounted Police Serology Laboratory (Ottawa) and the Centre of Forensic Sciences (Toronto) for identification of residues in criminal cases."

Analyses of 78 stone tools (points, drills, flakes, scrapers, and a metate, or grinding stone) collected from various spots along the west and north shores of Yellowstone Lake in the past few years resulted in positive results (that is, identifiable traces of blood) from 23. Bison, deer, elk, sheep, rabbit, bear, felid (cat), and canid blood were all identified. The technique will not yet allow for identifying individual species within a group, so that it is not possible to determine, for example, if the bear was a grizzly or black, or the canid was a coyote, fox, or dog.



A sandstone metate, or grinding stone, from near Steamboat Point along Yellowstone Lake, tested positive for elk blood.



Five Yellowstone Lake-area projectile points that tested positive for various mammal species' blood antisera: a) Late Paleoindian obsidian point, 9,000 years BP, tested positive for bear; b) Late Paleoindian chalcedony point, circa 9,000-10,000 years BP, tested positive for rabbit; c) chert Cody knife, about 9,000 years BP, tested positive for bison; d) basalt Oxbow-like point, about 5,000 years BP, tested positive for deer; and e) obsidian corner-notched point, 1,380-1,500 years BP, tested positive for canid. Dashed lines along base of first two points indicates extent of grinding.

These are exciting results for several reasons. For one, they hint at a subsistence based on numerous species. As Cannon wrote, "Diversity of faunal species, in contrast to the bison-dominated Plains economy, appears to be a hallmark of prehistoric mountain economies." However, Cannon tells *Yellowstone Science* that the sample size is too small to be conclusive on this question.

Another reason these finds are interesting is that they suggest yet another way we can learn more about which species of mammals were present in Yellowstone's past. There has been great disagreement and misconception about the prehistoric wildlife of the Yellowstone area, and these artifacts provide a rare glimpse at what animals were present and being killed by humans. Knowing which animals were flourishing also tells us certain things about the plant communities they would depend upon, which suggests the character of the climate at the time, and so every little piece of information is at least suggestive of many other elements of the setting.

A third reason is the nature of the evidence. For example, a sandstone metate, a tool usually associated with the grinding or processing of plant parts, contained elk blood, suggesting it was perhaps used in the making of some sort of pemmican. It also appears that coarser materials, such as sandstone and cherts, may make the most promising preservers of blood. Cannon explained that "the capillary action which embeds the residue in the stone tool may be more effective on coarse-grained materials."

In response to our request for additional information, Cannon provided us

with a list of ages for some of the artifacts. These dates ranged as far back as 9,000 to 10,000 years before present (BP) for an obsidian point with rabbit blood, 9,000 years BP for a chert knife with bison blood, and 8,500 to 9,000 years BP for an obsidian point with bear blood. Deer are represented at 2,500, 4,500, 5,000, and 7,000 years BP.

Lake Trout Workshop Offers Harsh Realities

On February 15-17, the NPS and the U.S. Fish and Wildlife Service (USFWS) hosted a special workshop of nationally known managers and ecologists to consider the lake trout crisis in Yellowstone Lake. As readers of our Fall 1994 issue will recall, lake trout, a nonnative fish, have been discovered in Yellowstone Lake, where they pose a serious threat to the native cutthroat trout.

Ecological reverberations through the Yellowstone ecosystem are predicted to be grave, with serious effects on a wide variety of native carnivores, including grizzly bears, bald eagles, pelicans, osprey, and many other species. Equally serious consequences face the regional sport fishery, a multimillion dollar industry, if the lake trout are as effective in decimating the native trout of Yellowstone Lake as they have been in several other large western lakes.

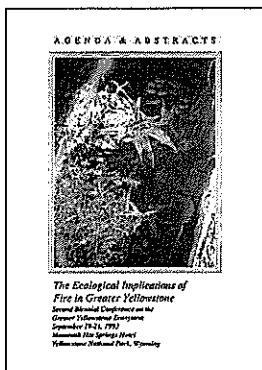
The workshop participants were asked to consider several interrelated questions, including the risk posed by the lake trout and the probable current status of the lake trout based on investigations to date. The workshop, which was chaired by Dr. Jack McIntyre, retired U.S. Forest Service bi-

ologist, reached consensus or near consensus on many important points, concluding that the lake trout are well established in the lake, with at least three age classes known (represented by fish of 8, 12, and 17 inches in length), and probably at least a few larger brood fish producing these younger fish. It seems probable, however, that none of the offspring of the largest fish have yet spawned, and when that happens the lake trout population will grow rapidly in size.

The workshop participants concluded that if the lake trout are not suppressed in some way, in 20 years they will cause a 50 to 80 percent reduction in the cutthroat trout, and that if they are suppressed, they will cause a 10 to 30 percent reduction. It was pointed out that in several other lakes where lake trout were introduced on top of native cutthroat trout populations, the native fish were eventually reduced to 10 percent or less of their original numbers. Dr. Robert Gresswell, workshop participant and longtime Yellowstone Lake researcher, said that with no protection for the cutthroat trout, only a relict population would remain, and "in terms of the ecology of the Yellowstone Lake ecosystem, it would be turned upside down."

Unfortunately, there is no known way to eradicate the lake trout, so containing them would have to be a permanent fixture in the Yellowstone aquatic resources management program. As McIntyre put it, "It's a forever kind of project." A management plan is currently being developed, and we will report on that in a future issue.

Fire Conference Abstracts Available



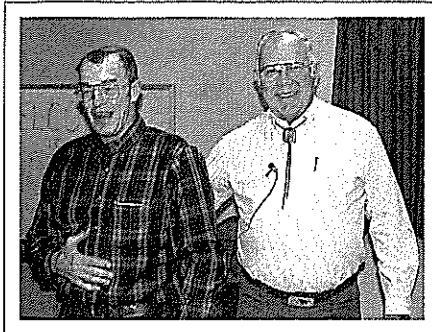
For those not willing to wait for the publication of the proceedings of our September 1993 conference "The Ecological Implications of Fire in Greater Yellowstone," the 48-page *Agenda*

and *Abstracts* of this conference is available from the Yellowstone Association, P.O. Box 117, Yellowstone National Park,

WY 82190, for \$2.95. This booklet, which was given to all registered attendees at the conference, contains the agenda as well as the abstracts of 72 papers presented during the two-day conference.

Jerry Mernin Wins Wilderness Management Award

Mike Murray



Jerry Mernin (left) and NPS Rocky Mountain Regional Director John Cook following the presentation of Jerry's Wilderness Management Award.

Many Yellowstone researchers and friends will be pleased to hear that longtime Yellowstone Ranger Jerry (Gerald E.) Mernin has received the first annual NPS "Individual Champion of Wilderness Management" Award. The award was presented to Jerry by Rocky Mountain Regional Director John Cook on February 7 during the winter Resource Management Workshop at Mammoth.

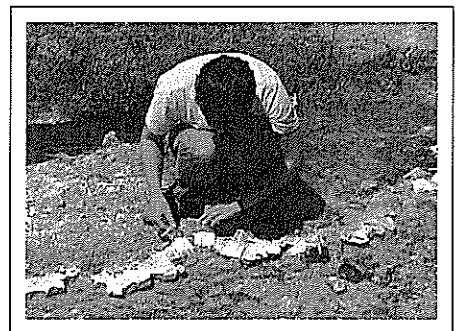
Among other things, Cook observed that Jerry "has energetically sustained his dedication to the park's backcountry throughout three decades of service in the same park. He continues to be actively involved in a leadership role in the evolution of Yellowstone's backcountry management programs, including minimum impact stock practices and the commercial outfitter program. Perhaps the most fitting tribute to this individual is to say that he is an outstanding example of a long tradition of dedicated backcountry rangers in Yellowstone, dating back to the days of the U.S. Cavalry."

In his nomination of Jerry, Yellowstone Chief Ranger Dan Sholly struck a more personal and equally persuasive note, observing that Jerry's "boots, chaps, and riding tack are comfortably supple from 'experience'; backcountry patrol cabins in his district are well maintained and reliably stocked with Rainier ale; his Stetson flat hat is a little bent from too

many October storms; he is known to travel the trails with a box of doughnuts that he 'made himself' and he knows many campfire tales that are not tales at all, but actual events in the history and lore of Yellowstone that he has been a part of."

Mernin, who, it might be added, occupies a similarly important leadership role in the frontcountry of Yellowstone, has been described as having achieved legendary status at an earlier age than any other Yellowstone ranger. He has been a district ranger for the past 17 years, currently serving in that capacity for the Snake River District.

Yellowstone Microbe Conference, September 17-21



Dr. Lynn Rothschild of NASA, Ames Research Center, using isotopic phosphorous to determine DNA replication in the pink filament community at Octopus Springs. Photo courtesy Bob Lindstrom.

Yellowstone has been much in the news about scientific discoveries relating to life in park hot springs, and for debates over the appropriateness of private commercial access to and development of these unusual resources. The first Yellowstone-related conference on these subjects, "Biodiversity, Ecology and Evolution of Thermophiles in Yellowstone National park: Overview and Issues," will be held at Old Faithful September 17-21, 1995.

The growing interest in thermophiles and in the "bioprospecting" associated with them has prompted this meeting, with the specific objective of facilitating research and communication. The symposium will address recent advances in microbial evolution research, microbial diversity and evolution, and biotechnological potential and management of these

resources.

Space is limited, so if you are interested in attending or in receiving more information, please contact Bob Lindstrom, Yellowstone Center for Resources, P.O. Box 168, Yellowstone National Park, WY 82190 (307) 344-2234, FAX (307) 344-2211, EMail: Bob_Lindstrom@nps.gov.

Some Recent Wildlife Counts and Surveys

A variety of recent wildlife censuses and surveys are in. The annual early winter elk census for Yellowstone's Northern Range, completed on December 21, 1994, resulted in a count of 16,791 elk. Of these, 5,249 (31 percent) were outside the park. Conditions were not the best for the count, because temperatures were warm and there had been little recent snowfall. The census is conducted by an interagency group, the Northern Yellowstone Cooperative Wildlife Working Group.

Beaver and their activities were also surveyed last year. In the summer and fall of 1994, NPS Resource Management Specialist Sue Consolo-Murphy and Biological Technician Robb Tatum surveyed about 251 miles of riparian areas, including 75 lakes and stream segments in the five major drainages of the park. They reported sightings of at least 20 individual beavers in 13 locations, and 44 active lodges. At least 28 lakes, streams, or stream segments had signs of both current and old beaver activity, indicating to Consolo and Tatum "persistent occupation by beaver" in many of the areas previously surveyed in 1989.

The annual road-kill report is more startling than usual. Motorists in Yellowstone set a record in 1994, killing 148 large mammals. The average for the previous years since 1989, when records were first kept, was 108. The total of 148 amounts to something near a large animal a day during the park's peak tourist months. The most numerous species was mule deer (51 killed), but elk were not far behind (49). Coyotes were third most numerous (19), and moose fourth (12). The statistics suggest that simply being huge is little defense; drivers killed 11 bison. U.S. Highway 191, between West

Yellowstone and the northeast corner of the park, accounts for about 7 percent of the park's roads, but 39 percent of the road kills. The second highest road-kill rate was on the Madison to West Entrance Road, and next was the Norris to Canyon Road. The probable lesson is that the straight roads with the faster traffic have the highest kill rates.

Yellowstone Park's Bird Management Biologist Terry McEneaney reports that the 1994 Molly Islands Colonial Nesting Bird Census was conducted in mid-May, early June, early August, and early September. The Molly Islands consist of two small islands appropriately named Rocky Island and Sandy Island at the lower end of the Southeast Arm of Yellowstone Lake.

American white pelicans arrived very late this year, and initiated courtship and nesting immediately upon arrival. On Rocky Island, a total of 147 American white pelican nests were initiated, but only 40 pelican pairs were successful in rearing young to the fledgling stage. Double-crested cormorants, which typically nest on the highest points of the island, fared remarkably well. Only 10 of 80 cormorant nest attempts failed to produce young. Caspian terns also did quite well in 1994. A total of 22 ternlets fledged from 15 nests, while of the 151 California gull nest attempts only 140 pairs were successful in rearing young.

On Sandy Island, a total of 592 American white pelican nests were initiated, but only 90 pelican pairs were successful in raising young to the fledgling stage. Of the 45 double-crested cormorant nests that were initiated on Sandy Island, only 35 of those nesting pairs were successful in rearing young.

There were a number of surprises on the Molly Islands in 1994. There were a record high number of pelican nest attempts, yet the production was relatively low (210 fledglings). The low production could be a function of the low number of cutthroat spawning in the tributaries of Yellowstone Lake this year.

Old Faithful Eruption Interval Increases Again

Rick Hutchinson, NPS geologist in Yellowstone, reports that Old Faithful

Geyser's average eruption interval has continued to increase in recent months, and as of December 1994 was a record 79.11 minutes. For most of the park's history, the interval was around 66 minutes, but in the past 15 years it has almost always been more than 70 minutes, rising to 75 minutes more recently. Now, 57 percent of all intervals equal or exceed 80 minutes, and 100-minute intervals are no longer unusual.

Geysers are influenced by a variety of forces. In the case of Old Faithful, earthquake activity (both local and farther off) and changes in water temperature or supply may change the frequency or duration of eruptions.

Amazing as it may seem to people with healthy minds, vandalism is a continuing problem for people concerned with the future of Old Faithful, as a variety of foreign objects have recently been retrieved from the vent.

Plant Conference Proceedings Published at Last

We are inexpressibly relieved to report that the proceedings of our first biennial scientific conference, "Plants and Their Environments," have at last been published by the NPS Natural Resources Publication Office (a branch of the U.S. Government Printing Office). This 347-page volume contains 22 papers and 13 abstracts from the conference, which was held September 16-17, 1991, here at Mammoth Hot Springs.

Those who attended this conference may remember that all people who paid the full registration fee were promised a copy of the proceedings. By the time this issue of *Yellowstone Science* is printed, we hope to have contacted all registrants (or their heirs), and have a copies in their respective hands. If, however, you attended the conference and have not heard from us, please let us know by writing or calling Sarah Broadbent, Yellowstone Center for Resources, P.O. Box 168, Yellowstone National Park, WY 82190 (307) 344-2233.

The proceedings can be purchased by sending \$20.00 to The Yellowstone Association, P.O. Box 117, Yellowstone National Park, WY 82190. All proceeds will go to future conference costs.