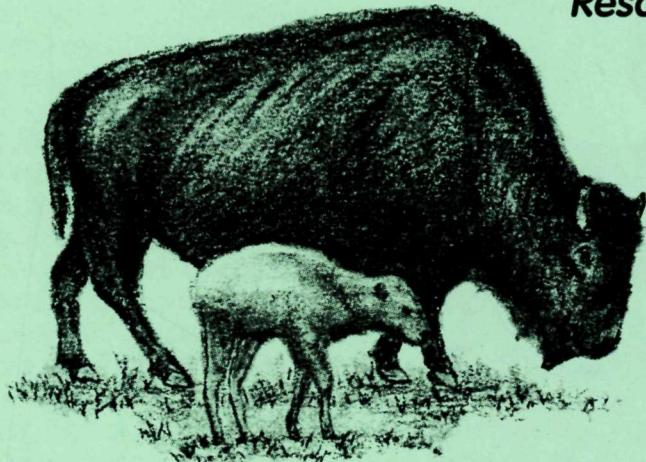


The Buffalo Chip



**Resource Management Newsletter
Yellowstone National Park
Early Winter 2002**



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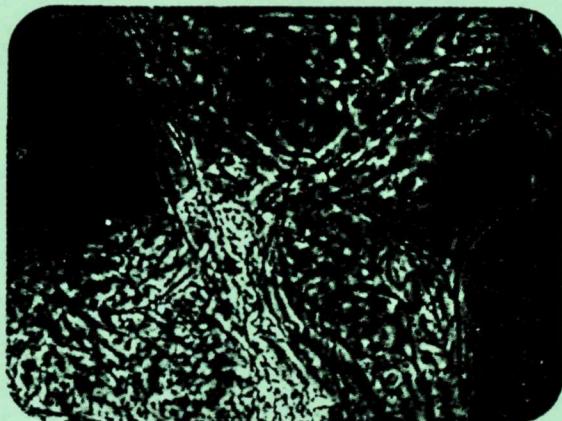
YELLOWSTONE'S UNCHARTED TERRITORY: THE 2002 THERMOPHILE SURVEY

by Ann Rodman & Kendra Maas

Thermal ecosystems have radically changed our knowledge of the origins of life, evolution, and physiological and phylogenetic diversity. Yellowstone National Park comprises and protects the largest intact and most varied geothermal basin in the world. These high-temperature ecosystems represent a nearly unexplored wealth of thermophile diversity that has the potential for remarkable scientific, social, and economic impact. For example, members of the *Order Aquificales* predominate in some of Yellowstone's near-neutral springs, and appear to be the *Bacteria* that are most closely related to the original organisms that inhabited Earth.

Thermophiles are the unusual heat-loving microorganisms that thrive in high temperatures and, in Yellowstone, extremes of pH. The park has been inventorying the chemical and physical characteristics of geothermal ecosystems for years, but still knows very little about the biodiversity, ecology, and distribution of the thermophiles within them. In 1996, the list of thermophiles in Yellowstone included only 35 species. In 2000 and 2001, park staff searched the scientific literature for information about Yellowstone thermophiles and found references to 406 unique organisms in 105 different pools, meaning that fewer than one percent of Yellowstone's thermal pools have been studied for thermophiles! In 2002, the park began a collaboration with Portland State University and the University of New Mexico on a multi-year field/laboratory project to create a baseline inventory of the microbial communities from geochemically, physically, and biologically varied areas throughout the park.

During spring 2002, we tested field collection protocols and fine-tuned laboratory techniques on 18 samples taken from thermal areas around the park. Until the early 1990s, measurements of microbial species diversity were restricted



to organisms that could be grown in petri dishes as single species cultures. It is generally accepted that only a small portion (<1%) of microorganisms can be grown under these conditions. However, this restriction has

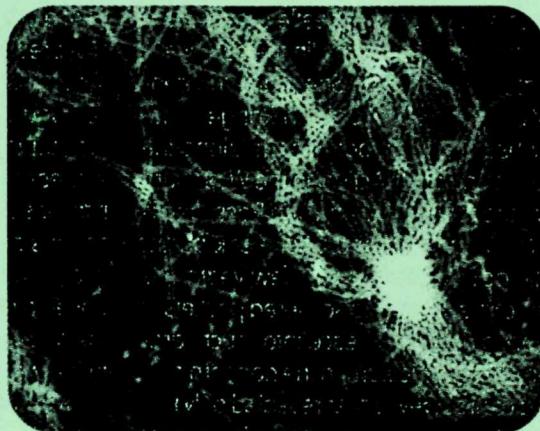
been partially alleviated with the development of molecular techniques utilizing small pieces of ribosomal RNA (16S rRNA) that uniquely characterize microorganisms without needing to grow them in the laboratory.



From top:
1 & 2) Thermophiles from a bacterial mat sampled in September 2002. Both photos are from the same mat; the difference is the type of microscopy used.

3) Thermophiles members of the "black filaments" group, collected in September, 2002, from Calcite Springs.

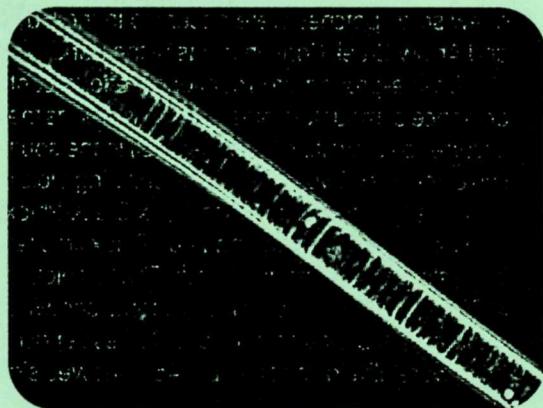
4) Cyanobacteria from the order Oscillatoriales, collected in September, 2002 from the Chocolate Pots thermal area.



We were able to amplify the gene sequences in 15 of our 18 samples. After amplification, individual genes (representing individual organisms) were sorted, and 71 unique sequences were determined. These 71 sequences were compared to all sequences in GenBank, a large database of gene sequences hosted by the National Institutes of Health. Fifty-eight of our sequences matched a known organism in GenBank. Some of the remaining 14 are new, previously unknown organisms, and some are just corrupt data.

In summer 2002, we used a database of pH, vent temperature, location and photographs for over 6500 thermal features to choose 300 sampling locations representing a full range of pH/temperature combinations distributed throughout the park. Between June and September we collected 216 samples, ranging in pH from 1.7 to 9.3, from 5 of the 12 major thermal areas. We collected pH, temperature, an exact location, digital photographs, and biomass samples at each location. This fall, using the methods described above, we are extracting the DNA from 80 sample sites (as compared to the 18 samples that were analyzed in April). The results we get this fall will set the priorities for sampling next summer.

The process of inventorying the biological characteristics of Yellowstone's thermal areas is crucial to developing a thorough understanding of what kinds of organisms we have and how they change over time. Our knowledge of these sites is sparse at best, and especially urgent considering the natural (low aquifer re-charge, landslides, floods, and seismic activity) and anthropomorphic (researchers, visitors, potential oil, gas, and geothermal drilling) threats that can alter these ecosystems and change the make-up of microbial communities. Until a baseline inventory is complete, some novel or unique organisms will have incomplete protection simply because their existence is not known.



MOUNTAIN PINE BEETLE & WHITEBARK PINE IN YNP

by Roy Renkin

Beginning in 1999, small, scattered pockets of red-needed whitebark pine were observed throughout the park. Aerial reconnaissance and fire monitoring over the succeeding two years indicated that mountain pine beetle activity dramatically increased. During the week of September 9, 2002, a forest insect and disease aerial survey was formally conducted over the park. Both Larry Meyer of the USDA Forest Health Protection Group (Region 1) and Roy Renkin from Yellowstone National Park participated in the survey. While the data from that survey effort are being compiled, a few qualitative observations on beetle activity in whitebark pine stands are worth mentioning.

Except for the Pitchstone Plateau region, all of the high-elevation mountain ranges and plateaus supporting an overstory of whitebark pine show some level of current mountain pine beetle activity. Intensities are greatest in the southeast quadrant of the park, where large continuous tracts of red-needed whitebark pine were repeatedly observed on the Two Ocean Plateau and in the Absaroka Range along the park boundary. Les Koch of the Wyoming State Division of Forestry confirmed the situation is similar to the south and east of the park boundary as well. Numerous smaller pockets of mountain pine beetle activity were similarly observed in the Red Mountains (in the southcentral portion of the park, including Mt. Sheridan), the centrally-located Washburn Range, the Gallatin Range in the northwest, and the Absaroka-Beartooth Range along the northcentral boundary of the park. Activity in the Washburn Range is evident from the road over Dunraven Pass, and is most intense in the Mt. Washburn and Cook Peak areas. With continued beetle activity over the next few years, it is anticipated that many of the small and scattered pockets of red-needed whitebark pine will coalesce into much larger and contiguous patches, particularly in the northern portions of the park. The aerial survey further revealed only limited mountain pine beetle activity in lodgepole pine, where a few small patches were observed in the Hayden Valley and Arrow Creek Canyon areas of the park.

On-the-ground fire monitoring efforts confirmed the presence of mountain pine beetle (as well as the scattered occurrence of white pine blister rust) in the southeast portion of the park. Two vegetation monitoring plots installed in the whitebark pine zone on the Lynx Creek-Phlox Creek divide for the 2001 Falcon and 2002 Phlox fires reveal some interesting conditions and trends. The first plot, established in 2001 in a pure whitebark pine stand, shows a density of mature whitebark pine trees at 231 trees per acre. All of the trees were alive at the time, but 46% showed signs of bee-

tle attack. The second plot was established in a mixed whitebark pine-Engelmann spruce-subalpine fir stand in advance of the 2002 Phlox fire. Here, mature whitebark pine densities were recorded at 260 per acre compared to 70 Engelmann spruce and 59 subalpine fir per acre. Of the whitebark pine, 56% were red-needed and dead. Of the remaining whitebark pine, 52% showed evidence of incipient beetle activity and will probably die within the next year. Interestingly, 69% of the Engelmann spruce were standing dead and the remaining 31% all showed signs of Spruce and/or Western Balsam Bark Beetle activity, whereas 99% of the subalpine fir were alive and unaffected. The 2001 Falcon fire plot did not burn, but the 2002 Phlox fire plot was consumed by crown fire. Both of the plots will be revisited in the 2003 field season.

It appears that Yellowstone's whitebark pine stands are experiencing levels of mountain pine beetle activity that last occurred during the early 1930s. The first mention of "bark beetles" in the park occurred in 1925 near the Dunraven Ranger Station (at Dunraven Pass), where 42 infected whitebark pine trees were felled and burned in an attempt to control what was later identified as mountain pine beetle activity. Continued beetle attack of whitebark pine in that area, along with beetle activity in lodgepole pine in the southwest corner of the park, resulted in widespread survey and control (via felling/burning or standing/burning techniques) utilizing CCC crews in 1934-35. Concern was expressed that much of the park would become "denuded" if the insects spread from the whitebark pine into the continuous stands of lodgepole pine. By the late 1930s, however, mountain pine beetle activity subsided, but experienced a resurgence in lodgepole pine in the late 1960s. By the mid-1980s, much of the lodgepole and whitebark pine in the western half of the park had been affected.

Many folks locally have recently been asking, "Why is current activity greater in whitebark than lodgepole pine?" According to preliminary research by Dr. Diana Six at the University of Montana, whitebark pine appears to be experiencing a greater degree of cumulative drought stress as revealed by lower sapwood moisture content compared to lodgepole pine. Low sapwood moisture results in a decreased ability for living trees to produce pitch and expel the adult beetles as they bore into the tree. It may be that more beetle activity in lodgepole pine will occur if drought conditions continue over time. 

GEOLOGISTS' NOTEBOOK

by Hank Heasler, Ralph Taylor, & Sue Nava

Feeling the Earth move? Tell someone!

From October 1 through December 10, the Yellowstone area has experienced 871 earthquakes. This is a significant increase over past earthquake activity. For example, in August and September, there were a total of 171 earthquakes.

Have you felt any of the over 800 earthquakes that have shaken Yellowstone since October? If you have, then the Yellowstone Volcano Observatory wants to hear from you!

You can easily report what you have felt using the Internet (<http://pasadena.wr.usgs.gov/shake/imw/>). When accessing this Internet page, you can either click on a list of specific earthquakes or you can click on the unknown earthquake form to fill out the questionnaire. The information you submit becomes part of a national database.

Felt reports provide valuable data on the ground acceleration and also give information on the amplification of earthquake motions at local sites. These reports supplement the data derived from seismic instruments and provide continuity of information from the older, larger historic earthquakes.

If you would like to make your report over the telephone, please call Hank Heasler, Yellowstone National Park Geologist at 344-2441.

Alaska quake seems to trigger Yellowstone jolts

The magnitude-7.9 earthquake that rocked Alaska on November 3 apparently triggered scores of earthquakes here in Yellowstone, some 2,000 miles away.

By 8:30 a.m. on that day, about 17 hours after the Alaskan quake, more than 200 small earthquakes had been detected occurring in clusters throughout the Yellowstone area. The quakes were recorded by the Yellowstone seismic network operated by the University of Utah Seismograph Stations.

Clusters of small earthquakes in time and space are common in Yellowstone. However, the clusters of Yellowstone earthquakes following the Alaskan mainshock extended across much of the park and were not concentrated in a single location. The smallest events were of magnitude less than 0, and the largest of about magnitude 3. NPS rangers at Old Faithful and Canyon Village reported feeling some of the earthquakes. During November 2002, 594 earthquakes

were located in the Yellowstone region. 85% of the November shocks occurred from November 3 through 12, and were located throughout the park.

While the data are preliminary, they suggest that the Yellowstone earthquakes may have been triggered by the passage of large seismic waves generated by the Alaskan earthquake. The apparent triggering is suggested by the fact the Yellowstone activity began within a half hour of the Alaska earthquake, which hit at 3:12 p.m. MST Nov. 3 (1:12 p.m. local time in Alaska).

Scientists once believed that an earthquake at one location could not trigger earthquakes at distant sites. But that belief was shattered in 1992 when the magnitude-7.3 Landers earthquake in California's Mojave Desert triggered a swarm of quakes more than 800 miles away at Yellowstone, as well as other jolts near Mammoth Lakes, Calif., and Yucca Mountain, Nev.

The small Yellowstone quakes are not considered to pose a threat to the public, but are of great interest to scientists who want to confirm if they were triggered and understand how. Earthquake activity in the Yellowstone region returned to background levels by November 13th.

Hydrothermal response to the November swarm

Questions arose concerning the effect of the November earthquake swarm on Yellowstone's hydrothermal features. Electronic temperature data loggers have been deployed to quantify eruption intervals and changes in water temperature, and for two weeks after the November 3

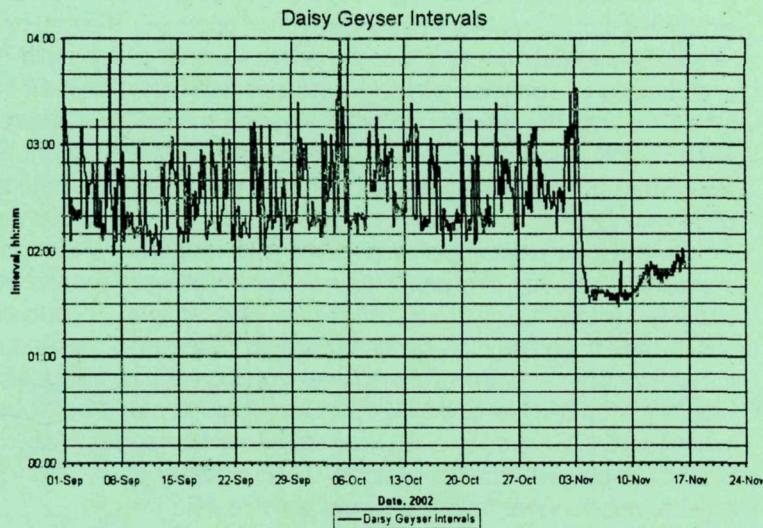


Figure 1. Daisy Geyser eruption intervals (in hours:minutes) versus date.

Alaska earthquake, temperature data were downloaded for the following thermal features: Daisy, Castle, Old Faithful, Grand, Rift, West Triplet, Lion, North Goggles, and Plume Geysers.

Analysis of the temperature data showed that Old Faithful, Grand, Rift, West Triplet, and North Goggles did not show noticeable changes in activity during the two weeks following the Alaskan earthquake. Daisy Geyser showed unmistakable changes, shortening its intervals by nearly an hour (see Figure 1). Castle reacted by lengthening its inter-

vals for at least a week. Changes in Lion and Plume were less definite.

Close examination of the Old Faithful data revealed no definite change in behavior at the time of the earthquake. The mean interval for the two weeks following the quake were slightly longer (about 56 seconds) than that for the previous two week period, but changes of that magnitude are not uncommon. A more sophisticated analysis may show a slight change, but if present, it is a subtle change. 

YELLOWSTONE CONTINGENT TRAVELS EAST TO MEET WITH AFFILIATED SIOUX TRIBES

by Rosemary Sucec

On October 14-19, 2002, Yellowstone National Park inaugurated a tradition of holding one of its two yearly government-to-government consultation meetings away from the park and at locations where affiliated tribes live and can easily attend. The first meeting, at Pierre, South Dakota, was centrally-located enough to enable 30 representatives from affiliated Sioux tribes (including the Cheyenne River Sioux Tribe; Flandreau Santee Sioux Tribe; Lower Brule Sioux Tribe; Oglala Sioux Tribe; Sisseton-Wahpeton Sioux Tribe; Spirit Lake Sioux Tribe; and the Yankton Sioux Tribe) to attend.

In the days following the meeting, the Yellowstone contingent, consisting of assistant superintendent Frank Walker, YCR director John Varley, cultural resources branch chief Sue Consolo Murphy, wildlife biologist Rick Wallen, and cultural anthropologist Rosemary Sucec, traveled to the reser-

vations of the Cheyenne River Sioux Tribe, the Lower Brule Sioux Tribe, and the Oglala Sioux Tribe to meet with tribal members at their request.

The purpose of these visits was to allow park managers to get better acquainted with individual tribes and their various issues, and to see if opportunities exist to work with tribes in areas of mutual interest. At each local meeting, NPS managers discussed the park's management philosophy, provided information, answered questions, and then received suggestions from tribal members in regard to what might be done to further foster mutual interests.

Issues discussed, and suggestions from tribes

Pierre government-to-government meeting

Issues discussed: (1) management of Yellowstone's bison herd, particularly transmission of brucellosis by elk, bison, and cattle; (2) getting seronegative, live bison to tribes through quarantine and how the process would work; (3) the possibility of tribes' creating refuges of genetically pure Yellowstone bison outside the park; and (4) reports from and discussions with each of the Sioux tribes about their bison herd practices, including number of bison in herd, source, size of pasture, and how buffalo are used, e.g., ceremonies, powwows, commercial hunts, etc.

Sioux tribes suggested the following: (1) incorporate cultural significance of buffalo, as well as information about tribes, into park educational materials; (2) convey in the educational information that buffalo herds exist and are managed outside the park by tribes as well as other national and state parks, and speak to the health of the national bison population; (3) take tribes up on the



John Varley, Charlie Quiver, Frank Walker, Rick Wallen, Sue Consolo Murphy, & Elaine Quiver in front of the Oglala Sioux Tribe headquarters.

offer to help ensure the genetic integrity of the Yellowstone bison population by providing refuges for them; (4) help tribes find a way to obtain bison carcasses to feed tribal people; (5) provide internships at Yellowstone in programs such as the Bison Ecology and Management Program; (6) exchange natural and cultural resource staff between the park and tribes; (7) provide interdisciplinary training opportunities; (8) provide technical assistance to tribes, e.g., processes for recordation and monitoring of cultural sites; (9) institute tribal monitors for ground disturbing work at the park; (10) involve tribal youth in educational programs at the park; and (11) allow harvesting of plants and minerals at the park.

Eagle Butte meeting (Cheyenne River Sioux Tribe)

Issues discussed: (1) nuances of the Interagency Bison Management Plan, (2) vaccination; (3) the status of knowledge on brucellosis transmission among elk, bison, and cattle; (4) the desire and ability of Cheyenne River Sioux Tribe to obtain genetically pure, seronegative Yellowstone bison and provide a refuge for conserving these bison; and (5) interest in obtaining bison carcasses to feed tribal people.

Suggestions: (1) provide information about how to obtain bison carcasses to feed their people; (2) provide literature on the genetics of Yellowstone bison; and (3) stay in touch regarding the opportunity to receive Yellowstone bison.

Lower Brule Sioux Tribe Reservation meeting

Issues discussed: (1) adverse impacts of the construction of the Big Bend Dam along the Missouri River on the Lower Brule and, in response, the mitigative measures being taken in cultural and natural resources management (70% of the tribe was forced to relocate when the bottomlands were inundated); (2) the tribe's recently assumed management responsibility for the Army Corp of Engineers recreation sites along the river within reservation boundaries (they asked for our input in how best to manage these areas); (3) the tribe's establishment of one of the first scenic byways on its reservation, a highway that overlays the 1806 Lewis and Clark Trail; and (4) the tribe's establishment of a NEPA-type process after realizing that it lost more than 300,000 trees in one construction project.

Suggestions: (1) Frank Walker offered suggestions for managing recreation sites and the new buffalo interpretive center. He suggested contracting with a concessionaire that would provide interim, on-site management until the

Tribe was sufficiently trained to assume long-term management; (2) The Tribe wants to develop a natural resources inventory and management plan for the reservation. John Varley provided suggestions for accomplishing the inventory and also provided information on getting access to historical data collected on natural resources prior to the dam's construction; and (3) Sue Consolo Murphy and Rosemary Sucec discussed with Scott Jones, director of cultural resources and public affairs officer, the Lower Brule's comprehensive archeological survey along the Missouri River, their cultural resources management plan, and cultural resources management at Yellowstone.



Scott Jones, Director of Public Affairs and Cultural Resources for the Lower Brule Sioux, orients the Yellowstone delegation on tribal issues and history.

Pine Ridge Reservation meeting (Oglala Sioux Tribe)

Background: Before park personnel left on this trip, concern was expressed about the possibility of Yellowstone encountering hostility at Pine Ridge because of the tensions between Badlands National Park and the Oglala Sioux Tribe. Questions were raised about whether the visit should occur. The reception at Pine Ridge was positive overall as we met with three tribal council representatives (Johnson Holy Rock, Theresa Two Bulls, and Donna Salomon), the BIA superintendent (Phil Bowden), and members of the Grey Eagle Society (including President Oliver Red Cloud, Elaine Quiver, and Joe Swift Bird).

Issues discussed: Some members of the Grey Eagle Society criticized NPS policies. The Grey Eagles assert 1851 treaty rights at Yellowstone and at other parks, pointing out that Lakota people were stewards before the NPS. Therefore, frustration was expressed with the NPS for exerting control in a manner that prohibits what are perceived to be customary hunting, collecting, and other rights on park-lands. Yellowstone was asked for help in addressing these

and issues outside of its jurisdiction (Badlands South Unit, land exchanges, railroad rights of way, etc.). Frank Walker acknowledged the difficulty and complexity of these issues and our interest and effort in understanding them and taking action if appropriate. The meeting concluded with an expression of appreciation for Yellowstone's representatives coming the long distance and listening, an action that was perceived as foundational to a good relationship.

Other issues discussed at Pine Ridge included (1) wick-ups and their management; (2) the interest in receiving bison carcasses to feed Oglala people, (3) the desire to educate youth at the park and with the elders about the role of Yellowstone resources and land in Lakota traditions; and (4) a planned bus tour by elders and youth to the park once funds could be raised. Frank Walker offered to match dollar for dollar what they raise for their trip to Yellowstone.

Suggestions: (1) provide information about how to obtain bison carcasses to feed Oglala people; (2) develop an educational program through which Oglala youth can come to the park and learn about the role of Yellowstone resources in Lakota traditions; and (3) allow collecting of plants and minerals within YNP.

Decisions

Those who attended the week-long engagement with Sioux tribes have already begun preliminary discussions about developing a plan to accomplish some of the suggestions provided to the park. For example, among others, a job description is being crafted to offer internships in the Bison Ecology and Management Program. With the Division of Interpretation, we will be coordinating efforts to involve youth and elders of affiliated tribes into the park's environmental education program. The park also is committed to engaging in internal dialogue about the collection issue. To inform that discussion, the park, in partnership with Grand Teton National Park, sought and received funding to study the extent of historical resource use by American Indians.

General observations

The consultation meeting and visitations by Yellowstone National Park were successful. Comments characterized park personnel as "sincere," "caring," "interested in input from tribal people," and "willing to listen and learn." A

Lower Brule Sioux representative referred to the government-to-government meeting at Pierre as one that "inspired dialogue to build projects together." An Oglala Sioux representative (Oliver Red Cloud) said "the NPS ought to do more of this face-to-face, not these paper wars." The chairman (Michael Jandreau) of the Lower Brule Sioux Tribe said, "It is not often that you see federal managers so committed to helping tribes develop."

The topic of greatest interest was management of the Yellowstone bison herd. The meetings and visits provided an opportunity to have in-depth discussions about the complexities of interagency management, something letters or literature cannot fully address. Rationales for decisions were provided and discussed, as were agencies' management philosophies and practices, as well as Yellowstone's ecology, fundamental to an understanding of park actions. Tribes are extremely interested in receiving live bison, and options for how that can happen were explored for the first time since the ROD was signed, clearly pleasing those we visited with. Tribes are desirous, too, of bison meat to feed their members. Information about how to obtain carcasses will be provided to all of those with whom we met.

Another strong motif was the critical role that Yellowstone can play in keeping Lakota traditions alive. Oliver Red Cloud lamented, "our youth don't understand what the buffalo is anymore. The buffalo is the life of our people." All of the tribes with whom we visited emphasized the need to use the park as a classroom to teach their youth about the environment that re-

mains essentially the same as when their ancestors were here, as well as to teach youth about the animals at Yellowstone, especially the buffalo, that are keystone to traditional Lakota lifeways, histories, and ethics.

This trip represented an investment of time and financial resources, and Yellowstone National Park and the National Park Service benefited from the goodwill it engendered among the Sioux tribes. By going to where they live, we got better acquainted with our tribal affiliates and their issues in the relaxed setting of their home ground, shared knowledge beneficial to tribes and their development, collectively came up with new possibilities in bison management, and are about to embark on partnership projects that will be mutually enriching. 



Altwin Grassrope and YNP Assistant Superintendent Frank Walker behind tribal headquarters of the Lower Brule Sioux Tribe.

LETTERS FROM ANTARCTICA

by Darren Ireland

Back in September, Darren Ireland, formerly of YNP's Bear Management Office, left Yellowstone to pursue his Master's degree at Montana State University. In October, he set out for Antarctica to begin the first of three seasons of field research studying Weddell seals with advisor Bob Garrott. What follows are his first three missives sent to the folks back home, describing what it's like to live, work, and conduct biological research in the remote climes surrounding McMurdo Station. Just because we thought they were interesting. We also thought that those of you wintering in the interior might enjoy Darren's Antarctic perspective!

October 16

Hello All,

I'm now safe and sound in Antarctica with a few minutes to catch my breath so I figured I should write. The



port planes (above) were rather uncomfortable, but they did provide us the chance to explore Christchurch and a small amount of the coast nearby during the four extra days we were forced to spend there.

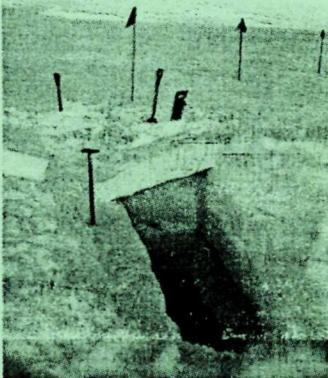
The down time in NZ was nice but frustrating at the same time. Since we arrived in McMurdo last Monday (below), things have been quite hectic. The equipment we use in our field camp is stored in several different places under the care of different departments, so it takes some time finding it and figuring out whom to ask for what kind of supplies. None of that is too exciting so I won't go into it. Most



of the exciting things we have done revolve around our "field safety training" courses. Our first course was on Sea Ice Travel. We drove around on the sea ice as

they taught us all about pressure ridges and tidal cracks and how to "profile" a crack to determine its stability and therefore what kind of vehicle you can drive over it. Basically it involves a whole lot of drilling in the cracks with ice augers and measuring the depth of and distance between each hole. Most of the cracks we run into are not "active" at the time, so they don't actually have water in them (although a couple do) but the ice in the middle may not have mended fully yet, and its depth determines its strength.

The other big training we have completed was the "Happy Camper School." This involved spending most of one day, that night, and most of the next day out on the ice and snow. We built a variety of shelters, everything from basic snow trenches to Sierra Design tents. Cooked our dinners and then slept in whatever type of shelter you could get into. The weather was very kind to us in that there was very little wind the day we set up camp and it stayed calm most of the night. Temperatures during the day were around -5 to -10°F, and at night it dropped to -20°F. Around 1 or 2 in the morning the winds picked up to 20 knots, which made getting up less than appealing. I slept in a snow trench with a sleeping shelf cut into the side (above) and was quite comfortable, except when having to get up to answer nature's call. We all survived the night without injury, although a couple of us have sore throats. The gear they provided us was more than we would have had in a true emergency situation, but the whole idea was to show people a few basic survival techniques and convince them that it is possible to make it if things go wrong.



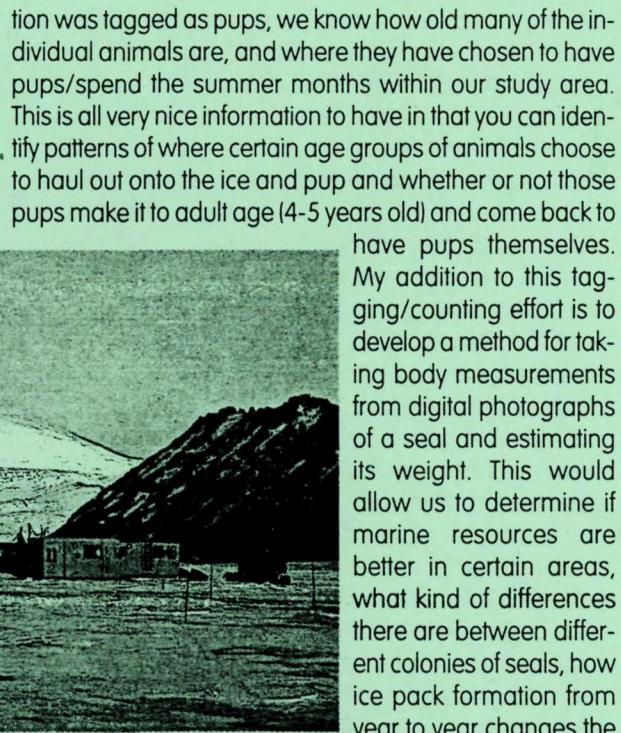
Life in McMurdo is very much like living on a college campus. The Galley is open for three squares a day and everyone in town shows up so you can actually make a lot of contacts and get a fair amount done during meals. I'm rooming with one of my advisors in a typical college dorm room with bathrooms down the hall. We have now pulled all of our equipment together and will be loading it into our fish huts tomorrow to be dragged out on the sea ice where we will be working and living for the next two months. I have seen a couple seals at a distance but none up close yet. Needless to say we are anxious to get to work. We have a helicopter flight scheduled for Wednesday to visit an island a ways to the north of us that we normally can't get to. With some of the changing ice conditions (which I'll explain in a later email), seals have started utilizing that area so we want to check it out. There are also penguins there so hopefully I'll be sending you some good photos of them.

November 4

Hello Again,

Quite a bit has happened since I last wrote, including a couple days of 60 mph winds that kept us inside (except when the outhouse almost blew away and we had to go strap it down more securely). Now that the weather is great, the weighing sled I have been trying to use has broken, so I am stuck in town with time on my hands until I can get it fixed. For those that did not hear exactly what I am doing down here, the whole weighing sled thing might be confusing, so I'll explain.

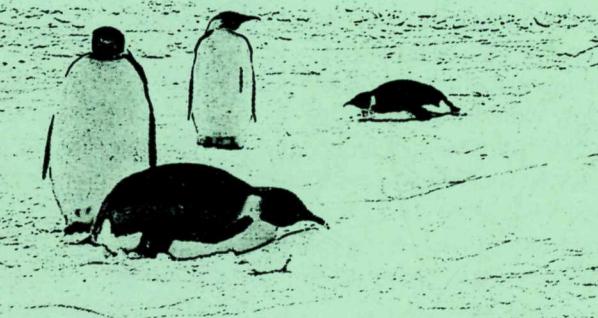
The project I am working on has been tagging and counting Weddell seals in the region around Ross Island since 1968. We are continuing that work by tagging all the newborn pups this year, tagging any unmarked adults we find, and doing 5 or 8 counts of all the seals we can find in the study area. Because a large portion of the popula-



tion was tagged as pups, we know how old many of the individual animals are, and where they have chosen to have pups/spend the summer months within our study area. This is all very nice information to have in that you can identify patterns of where certain age groups of animals choose to haul out onto the ice and pup and whether or not those pups make it to adult age (4-5 years old) and come back to have pups themselves. My addition to this tagging/counting effort is to develop a method for taking body measurements from digital photographs of a seal and estimating its weight. This would allow us to determine if marine resources are better in certain areas, what kind of differences there are between different colonies of seals, how ice pack formation from year to year changes the

health of the animals, how much weight a female loses to her nursing pup, and whether that pup survives, etc., etc. The problem is that getting actual weights on the first bunch of seals, so that I can create the predictive equation using measurements from the photos I take of those seals, is quite challenging. They have a weighing sled on skis that can be pulled behind a Snow-Cat type machine (parked at the right hand edge of camp at left), but doing this packs a lot of snow into the scale, rendering it difficult to keep calibrated/healthy. So I am working on that issue as well as developing an alternate way of weighing and coaxing the animal onto a weighing device.

A few days ago we made a helicopter flight to an island a ways north of our study area. Due to changing ice conditions in the McMurdo Sound area (of which our study area is a part), we have heard rumors that some of our animals have begun hauling out on the ice around this island to pup. We did not find many seals near the island this year (which is good news for our population work), but we were visited by a few emperor penguins (left) that have a rookery on the island (even better than finding seals). Other than



November 13

Hello All,

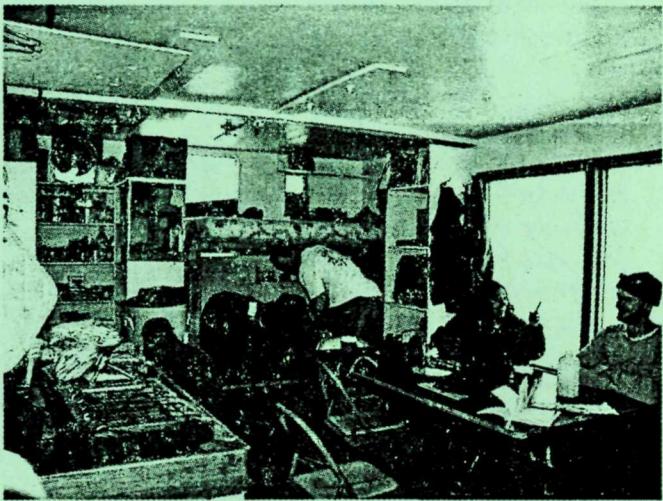
I thought I would describe what our living conditions are like out on the ice. I sent a couple photos of what the camp looks like from the outside, but here are a few from the inside. My bunk (below) is in the kitchen hut where we obviously do all our cooking, etc. It works out well for midnight snacks, but it also means I don't get to sneak away from the group to go to bed early since we usually sit around the table chatting or working in the evenings. There is also an equipment hut with work benches, etc., where I store and fix my camera and boom equipment, and where we keep all the camp tools and seal tagging equipment. The other two huts are bunk huts with four beds in each. The huts vary in size from about 8x10 to 12x16 feet. The windows either have plywood covers or wool blankets that can be draped over them to shut out the light at night. The sun is relatively high in the sky 24 hours a day now. When we first arrived in early October, it would still get dark at night, but not quite dark enough to see any stars. Now it is constantly pretty bright out, even during the blizzards.

Our usual routine is to have breakfast around 7am, which is pretty similar to the average breakfast in the states (except for the powdered milk on the cold cereal and all the fruit is canned). Every four or five days we census the whole local seal population. For this, we split into two groups and work through the various colonies until we meet somewhere in the middle. The first census took about 13 hours, mostly due to some poor weather conditions in the middle of the day; the second one only took about 7 hours. Both



playing with seal pups (above) while trying to get their mothers to follow us onto the scale, the penguins have been the highlight of the trip.

Our camp is set up 15–20 miles from McMurdo station, so we get the occasional visitor from town when we need more fuel for our heaters or something breaks down that we can't fix ourselves. There are a few seals that haul out onto the ice near the station itself, so we stop in for a night about once a week. However, with my weighing sled being problematic, I have been in town a little more frequently than I would like. The camp has an optophone hook up, basically a phone line that is transmitted via VHF radio signal back to town where it then gets fed into a normal phone line again, so we have a telephone out at camp. It is rather odd when it rings, but does provide us with very slow internet access (i.e., 12K on a good day!) We cook for each other and sit around the table working/talking until we finally realize that it's very late, even though the sun is still up (the sun is above the horizon 24 hours a day now). Anyway, hope you enjoy the photos and I would love to hear from you if you get a chance to write.



times we counted about 770 seals. The days in between are spent visiting the colonies again to tag any untagged animals that we ran across during the census. Depending on how the day is going we may tag a few during the cen-



sus, but usually we don't have a lot of time to spare. I usually ask one person to work with me taking photos and trying to weigh the seals (when the weighing sled is working) on the non-census days. All of this can be disrupted by weather (as it is currently), so you are never completely sure of what you're going to be doing the next day. So if you wake up in the morning and your hut is shaking in 50mph winds, you go back to sleep.

We usually have a couple candy or granola bars in our pockets that we snack on through the day as lunch. If things are going well that day and the weather isn't too bad, we will have some soup or a hot drink from the thermos in a food bag we also bring along. On the cold and windy days it seems best to just keep working and moving instead of taking the time to get hot food out and becoming cold in the process. When tagging and censusing, and thus covering a lot of ground, we get around on snowmobiles. If I am photographing and pulling the weighing sled

around, we travel in the tracked vehicle. At the end of the day someone usually just decides to make dinner that night and someone else will help out if needed. We actually have an outdoor grill for burgers, steaks, halibut, swordfish, and salmon. All frozen of course, but very good nonetheless and much better than I ever expected to get while here. There is also a little oven box we can set on top of the two burner propane Coleman stoves we cook on inside the hut, so brownies, cake, and pizza are occasionally made as well. Obviously we aren't going hungry down here. For drinks we use glacier ice. It has many bubbles compressed into it so when it melts it effervesces air from the atmosphere thousands of years ago (this phenomenon being filmed at left). We don't maintain much of a cooking/cleaning schedule, it just gets done. Same with other chores like moving the outhouse, drilling grey water holes, chipping out the ice-hole where the underwater camera is mounted, etc.

I don't believe I have mentioned the underwater camera before. It is mounted through a hole in the ice close to the holes that the seals use to breathe and haul out on the ice. We can turn it on in the evenings and watch the action on a TV in the kitchen hut. The camera can be controlled (i.e., pan, tilt, zoom, focus) from a remote unit in the hut as well. We haven't seen much yet, but the pups are just now getting big enough to start swimming so the underwater activity should pick up. The TV has a built-in VCR, so we are trying to record any fun activity we witness. All of our power comes from two solar panels mounted to the roof of the kitchen hut. The panels charge batteries stored inside the hut, which from time to time we run down pretty close to failure if we are all charging our laptops at the same time.

Next year they plan on mounting a small wind generator to the hut as well. Apparently it can produce the power of four solar panels if the wind is decently strong, which it often is when the sun isn't shining. That's about it for life at camp. I hope life in the states is going well for all of you and I look forward to hearing from you.

Take care,
Darren



The sun sets over McMurdo station, Antarctica.

MOUNT EVERTS: A STUDY IN CRETACEOUS SURF & TURF

by Elaine Hale

Mount Everts, the silent sentinel, looms over the north entrance road that curves its way into Yellowstone National Park. Situated in the north park boundary area, the 2,500 foot uplift composed of 95 million-year-old Cretaceous rocks provides myriad landscape vistas and multiple cultural and natural resource management challenges. The landscape, although visually formidable due to its steep slopes and sparse vegetation, is dotted with thermal springs and populated by an impressive array of wildlife. The geologic and paleontological mysteries buried within the stratigraphic layers of the uplift add seasoning to the biologic diversity. Landslides, rockfalls, and erosion caused by turbulent spring runoff and storm events add elements of instability to the mix.

Mount Everts is located on the Yellowstone Plateau, a broad mountainous uplift that averages 2400 m (8000 feet) in elevation, situated within the Middle Rocky Mountains of south central Montana and northwestern Wyoming. For the most part, this plateau formed through a series of volcanic eruptions and lava flows during the Cenozoic Period, long after Cretaceous sediments were deposited. Volcanic activity in the park is evidenced by numerous geysers, hot springs, mudpots, and even occasional swarms of low-magnitude earthquakes.

Mount Everts's elevation ranges from approximately 5300 feet to 7800 feet above sea level. As described by Edward T. Ruppel in his 1972 publication, *Geology of Pre-Tertiary Rocks in the Northern Part of Yellowstone National Park, Wyoming*, "Mount Everts forms the east wall of the Gardner Canyon and rises abruptly 2,000 feet from the river to an altitude of 7,841 feet at the mountaintop. At the top, the topography changes to an ice-scoured, gently rolling, eastward dipslope, developed on Upper Cretaceous sandstone, pocked with abundant glacial lakes, ponds, and bogs, and mostly covered with a veneer of glacial debris. The surface gradually drops eastward to Rescue Creek, where the Gardiner fault zone places Precambrian schist and gneiss against Cretaceous rocks. Northeast of this major fault zone a rugged topography, deeply incised by the Yellowstone River and its tributary

streams, extends eastward to Hellroaring Creek."

Several fault lines run in a northeasterly direction along almost the entire north-south trend of Mount Everts. Landslides and falling rocks are a common occurrence, the most recent being a rockfall event in December 1999. Previous slides occurred in 1893, 1912, 1918, and 1941. Surface vegetation consists of a sagebrush grassland community with a few scattered pines on the hill slopes. Conifer forests are present on the higher elevations. The Mount Everts area is presently home to bison, elk, bighorn sheep, deer, antelope, grizzly and black bear, mountain lions, coyotes, and most recently wolves. Many birds and other small mammals are also abundant.



Mount Everts.

The Mount Everts region holds significant fossil resources. The west and north faces of Mount Everts have outcrops of Landslide Creek Formation, Everts Formation, Eagle Sandstone, Telegraph Creek Formation, Cody Shale and Frontier Sandstone. The eastern slope reveals outcrops of Madison Group (Mississippian, about 350 million years old), Ellis Group and possibly Morrison Formation (Jurassic, 200-150 million year old) rocks. Mesozoic (containing Triassic, Jurassic, and Cretaceous formations from 240 -70 million years old) sedimentary rocks are well exposed in Yellowstone's northern range, especially on Mount Everts. Both marine and non-marine Triassic, Jurassic, and Cretaceous fossiliferous units are present there. The Late Cretaceous sections are up to 4,000 feet thick and many fossil localities have been identified within these units. The Cody Shale, in particular, is thought to contain abundant fossil remains. Previous studies of these Cretaceous rock units need to be expanded upon to gain a bet-

ter understanding to the potential for fossil resources. Both marine fossils and terrestrial plant and animal fossils have been recovered in these sediments on Mount Everts in close proximity to each other and just below the Eagle Sandstone deposits. Although some limited fossil resource surveys have been completed on a small portion (less than 1%) of the fossil bearing areas of Mount Everts, further study was needed. The purpose of the current project is not only to provide proper recordation of the fossil resources, but also to provide an in-depth study of the stratigraphic sequences occurring in the Mount Everts fossil region.

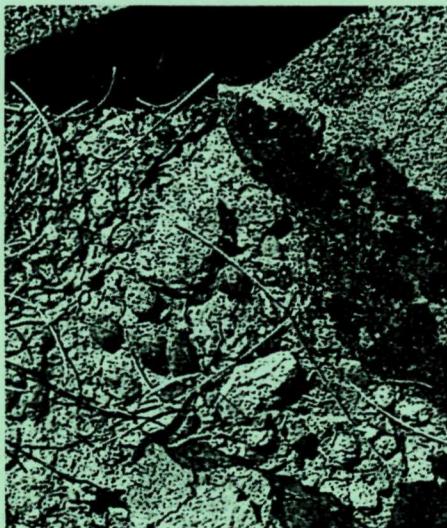
The Mount Everts project

In April 2000, YNP submitted a proposal to NPS funding sources to conduct a two-year research project providing a paleontological inventory and multidisciplinary assessment of the stratigraphy and depositional character of Mount Everts. The systematic scientific survey of the rock formations within the rich, fossil-bearing, Cretaceous deposits will provide information to better map and understand the layers of sediments exposed on the uplifted face of Mount Everts. Survey and recovery of marine and terrestrial index fossils, dateable bentonite, and fossil pollen will help to establish the age and extent of the sedimentary units. Expert analysis of collected fossil specimens and the strata from which they were recovered will improve our knowledge of the age and relationship of the depositional units on Mount Everts. Paleontological locality forms, photographs, and topographic coordinates (UTMs) will document and provide baseline information for each significant fossil locale.

Prior to initial field investigations, archival research was conducted to determine available information about the area and new avenues of research that would be most beneficial. Paleontologists and geologists with previous experience in the region and on Mount Everts were also contacted. This process had dual benefits: It helped us identify and synthesize previously published information and also helped us locate scientists with diverse specialties wishing to participate in further research. YCR's Elaine Hale, the project's director, was granted a scientific research and collecting permit for the Mount Everts study.

The team

The study team included Dr. William Cobban, Paleontologist Emeritus with the US Geological Survey (USGS) and renowned expert on Cretaceous index fossils; Dr. Scott Wing, paleobotanist with the Smithsonian Institution; Dr. Thaddeus Dyman, USGS geologist; and Dr. Karen Porter, Senior Research Geologist for the Montana Bureau of Mines and Geology, who was concurrently conducting stratigraphic studies of the same formations just north of the YNP boundary. The Mount Everts project also provided YNP and the Montana Bureau of Mines the opportunity to collaborate with other field experts, resulting in a positive expansion of both research studies. Other participants included USGS geologist and palynologist Dr. Douglas J. Nichols; Dr. Gail Wiggett of the California Energy Commission; Ken Takahashi, computer specialist with the USGS. Vincent Santucci, paleontologist with Fossil Butte National Monument and author of *The Yellowstone Paleontological Survey*, worked with the crew in 2001. Julia Fitzke and Elaine Hale rounded out the group, while YNP geologist Dr. Hank Heasler and Cheryl Jaworski, seasonal research geologist and professor of geology at Laramie County Junior College, participated in a portion of the fieldwork.



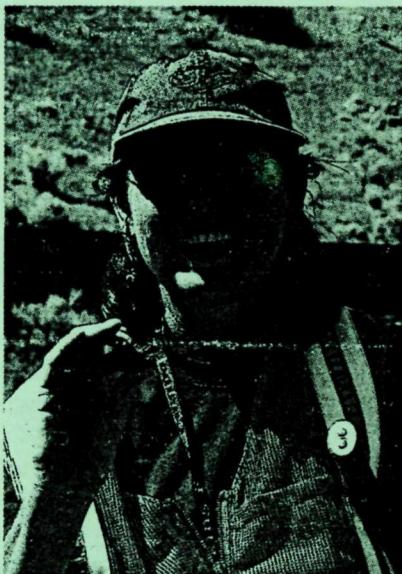
Small pocket of coal on Mt. Everts, useful for fossil pollen samples.



The survey team.

Fieldwork

During the 2001 field season, depositional environments were identified and fossils collected to support the environmental determination. In 2002 the crew investigated the stratigraphic units in detail. Standard paleontological and geological field recording methods were used to identify and document the fossil localities and the stratigraphy.



Project Director Elaine Hale holds up a specimen.

atalogued and made available for further research and educational displays. Those few fossils not significant to the collection can be used by YNP interpretation.

Survey highlights

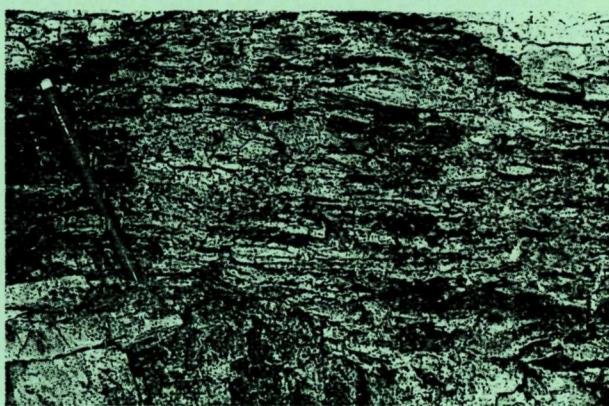
One surprising discovery we made while tromping around on Mount Everts was the presence of fossil leaf sites, indicating land, where we previously thought we had found marine fossils. We collected fossil pollens that indicate which areas (stratigraphic units) were under water (yes, underwater plants bloom and produce pollen too!), and which areas contained non-marine or land plants. Because plants evolved through time, we can use them as proxy indicators to identify stratigraphic units that relate to particular times in the Cretaceous Period (early = 145 million years ago, middle = 100 mya, or late = up to 65 mya). We are actually fine-tuning our knowledge from 88 mya to 76 mya on particular areas of Mount Everts. Fossil clams, inoceramids, gastropods, and cephalopods also tell us the age and nature of the layers of sediments. We are still waiting for results from laboratory processing of bentonites collected to establish correlations to the other means of dating the sediments. The report will also address trace fossils found on Mount Everts, because they tell us about

the environment in which the sediments were laid down (such as calm sea beds with worms, or animal tracks across delta mud, etc.) After analysis of field samples is completed, the results can be interpreted and included in the final report.

The report

The report will be published digitally with interactive hot links to visual aids such as photographs, charts, graphs, and maps. Our goal is to provide information about Mount Everts that is easily understood by the general public, is illustrative of the geologic processes that formed the layered deposits, and describes the types of indicator fossils we found that tell us when it was part of the great inland sea and when it was dry land.

The introduction will give a brief description of the project, followed by a general description of the geology of Mount Everts and the Cretaceous Period, when the sediments were deposited. The next chapters will include a general discussion of the stratigraphy, including detailed paleontological discussions about fossil clams, leaves, pollen and trace fossils. Sections of the report are currently being drafted, but we hope to have the final CD ready for distribution in late May 2003. Printed copies will also be available, although not nearly as interactive as the CD. Copies will be available at the YCR, on request.



Coal pocket.

A WORD OF CAUTION

The protection of non-renewable fossil resources within Yellowstone National Park and all public lands is a major concern of all participants of this project. Fossil research involving collection of fossils is only permitted by qualified professionals who have applied for and been granted a research permit through the government permitting process. The possession of a rock hammer, or other excavating tools in YNP is against YNP, NPS, and federal regulations. It is against the law to collect or remove any fossil resources from YNP.

THE WINTER USE FSEIS: JUST THE FACTS

On November 12, 2002, the Internal Review Draft of the Final Supplemental Environmental Impact Statement (FSEIS) for Winter Use was released to the states and counties serving as cooperating agencies with the National Park Service. This has been a significant issue for the past decade and has always generated extensive interest; in recent years, that attention has been even more focused, controversial, and contentious. The November, 2000 Record of Decision for the Winter Use FEIS calling for the elimination of recreational snowmobile and snowplane use by winter 2003–2004 resulted in a lawsuit brought by the snowmobile industry and others asking that the decision be set aside. A settlement agreement resulted in the National Park Service's undertaking the SEIS soliciting more public comment and consideration of any new or updated substantive information not available at the time of the earlier decision (especially as it related to new snowmobile technology).

Goals for winter use

Goals for winter use in Yellowstone and Grand Teton national parks and the John D. Rockefeller, Jr., Memorial Parkway remain the same, as does the commitment to achieving them. They include: 1) providing a high quality, safe and educational winter experience for all visitors; 2) providing for visitor and employee health and safety; 3) preserving pristine air quality; 4) preserving natural soundscapes; 5) mitigating impacts to wildlife; and 6) minimizing adverse economic impacts to gateway communities.

Preferred Alternative: The framework for the preferred alternative for a sustainable future has been in the public arena since it was presented to the Cooperating Agencies on June 25, 2002. Details of the preferred alternative will be presented to the public in the Final Supplemental Environmental Impact Statement on February 19, 2003. The framework and its details are a package, with all components inextricably linked. The principal components of the package are: 1) reducing numbers of snowmobiles through daily limits; 2) implementing best available technology requirements for snowmobiles; 3) implementing an adaptive management program; 4) requiring guided access for both snowmobiles and snowcoaches; 5) allowing a reasonable phase-in period; 6) developing a new generation of snowcoaches; and 7) acquiring available funding for



In the future, all snowmobile tours may be guided.

implementation.

Daily limits

Total actual average daily use will be capped at the historical average for West Entrance and allow for minor growth and redistribution of use at the other entrances. Initial snowmobile daily limits are: North Entrance (Mammoth Terraces), 50; West Entrance, 550; East Entrance, 100; South Entrance, 250; Continental Snowmobile Divide Trail, 75; and Grassy Lake Road, 75. Total: 1,100. Snowmobile numbers could increase or decrease slightly over the existing historic average. Peak use would be dramatically reduced, and some use would be directed away from the heavily impacted West Yellowstone to Old Faithful corridor.

Best available technology

The NPS will work with manufacturers to develop snowmobiles that will reduce pollutants and sound. Current snowmobile BAT is believed to be the production, 4-stroke snowmobiles produced by Arctic Cat and Polaris (and possibly others). For winter 2003/2004, the NPS would set BAT as any snowmobile that is capable of reducing hydrocarbon emissions by 90 percent and carbon monoxide emissions by 70 percent.

Adaptive management

The objectives for monitoring and adaptive management are to assess the short and long-term effects of management actions on park resources. For each indicator, a standard either exists or is hypothesized (for adaptive management). Specific standards are set for each winter management zone. For each indicator, a monitoring method and intensity are prescribed. The SEIS will prescribe monitoring standards, methods and management actions for critical resources in winter management Zone 3, (the zone where snowmobiles and snowcoaches travel). Management actions are implemented if the standards are exceeded. The NPS will establish an "open forum" strategy for the dissemination of monitoring results, technical expertise, monitoring techniques and results of peer review.

Guided access

Training will be required for both commercial and non-commercial guides. Guides will be trained to avoid conflict with wildlife. During the phase-in period, the model will be tested starting with 20% non-commercially guided use, including a training program for certifi-

cation. Adaptive management techniques would be applied as experience is gained to adjust numbers within the limits as appropriate.

Phase-in:

The components of the new winter use plan would be implemented over the course of two to three winter use seasons, allowing communities, permittees, visitors, and concessioners time to adapt. During the phase-in period, existing commercial snowcoach operators would be encouraged to continue to increase their fleet size and snowmobile and other new operators will be encouraged to purchase coaches, achieve reduced snowmobile numbers, and shift to cleaner and quieter snowmobiles.

Year 1 (2003/2004): Implement daily limits; institute comprehensive monitoring program; require commercially guided operations to be BAT; encourage rentals and private snowmobiles to be BAT; complete concession contracting for commercially guided operations; establish training program for non-commercial guides; propose changes for following winter.

Year 2 (2004/2005): Retain daily limits; continue comprehensive monitoring program; require all snowmobile entries to be guided (80%/20%); require all snowmobile entries to be BAT; propose changes for following winter.

Year 3 (2005/2006): Implement changes, if required with regard to guiding, BAT, limits, monitoring program, hours of operation, etc.

Snowcoach development

The NPS will continue to support and help fund current research and development for new snowcoach technology; support exploration of ways to fund purchase of an initial fleet of new snowcoach vehicles through DOE, DOT, and FHWA grants; require that all snowcoaches meet BAT standards.

Funding

The National Park Service is seeking operational funding as well as one-time funds to focus on enhanced winter operations, implement a comprehensive monitoring program, replace equipment, and continue research and development of the next generation of snowcoaches.

Process

The Internal Review Draft of the FSEIS currently being reviewed by the Cooperating Agencies, National Park Service, and Department of the Interior is a pre-decisional working draft that will not be available to the public until February 19, 2002. The Preferred Alternative presented in the Internal Draft SEIS is not a decision, nor necessarily the final version of the Preferred Alternative that will appear in the FSEIS. The FSEIS that will be available on February 19, 2003 will also contain numerous edits, updates, and changes to what is currently on internal review. For additional information contact: Steve lobst, Grand Teton National Park: (307) 739-3414; Marsha Karle, Yellowstone National Park: (307) 344-2015; Cheryl Matthews, Yellowstone National Park: (307) 344-2010. 



Snowcoaches, as well as snowmobiles, will have to meet BAT standards.

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ERRATA

The Autumn issue of *The Buffalo Chip* included two errors that bear correcting:

1) The last two sentences of page 3 were truncated. The end of "Trick, or Treat?" should have read: "In years when limber pine produce an abundant cone crop it is not unusual to have bears coming into the Mammoth developed area and campground to feed on the cones. Hence, although limber pine seeds benefit bears nutritionally, they

also attract bears into these developed areas, ultimately resulting in bear-human conflicts and subsequent management actions."

2) On page 9, Ann Rodman was mistakenly identified as Yellowstone's archeologist. Ann Johnson is the park's archeologist. Ann Rodman is the park's Supervisory GIS Specialist. Both women were members of the survey team.

...NEWS BRIEFS...

EXPERIMENTAL ANIMAL DETECTION DRIVER WARNING SYSTEM INSTALLED

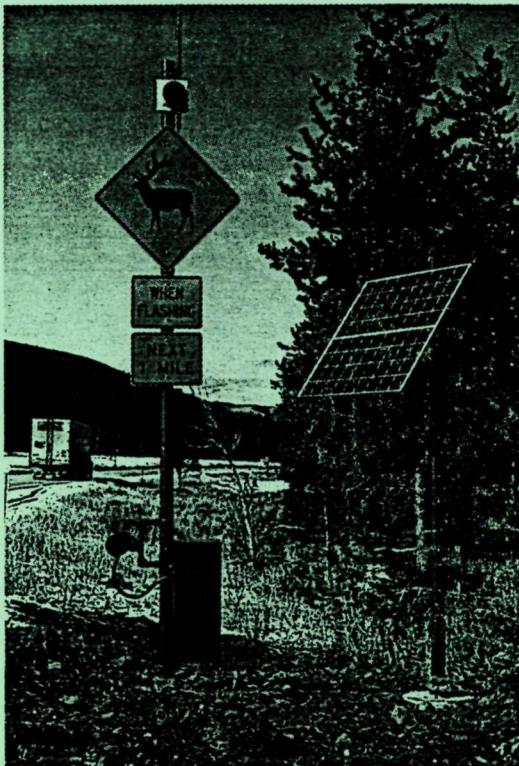
An experimental animal detection system that warns travelers about wildlife approaching a roadway was installed on a section of U.S. Highway 191 (between mileposts 28 and 29 in the Black Butte area) in Yellowstone National Park beginning Tuesday, October 22, 2002, through November 15, 2002. The system was designed by the Western Transportation Institute (Montana State University) and Sensor Technologies and Systems, Inc. This is part of a two-year study funded by 15 state Departments of Transportation, including the Montana Department of Transportation,

to look at ways to reduce and mitigate the impacts associated with animal-vehicle collisions (e.g., human injuries/fatalities, wildlife injuries/fatalities, property damage)

As wildlife approach the roadway in the study area, a continuous radar beam is broken, and flashing lights on warning signs are activated, alerting drivers of the possible presence of wildlife. The system is only activated by large wildlife like bison, elk, deer, and moose.

WONDRAK WINS MHS AWARD

The Montana Historical Society and *Montana: The Magazine of Western History* named YNP's Alice Wondrak the winner of this year's Burlingame-Toole award, given each year to the author of the best article submission by a graduate student. The award was presented at the an-



The animal detection system is in its experimental phase.

nual meeting of the Montana Historical Society in Havre on October 25. Alice's winning submission, "Wrestling with Horace Albright: Edmund Rogers, Visitors, and Bears in Yellowstone," is being published in *Montana: The Magazine of Western History* in two parts, beginning in Autumn 2002.



Alice Wondrak.

2003 GWS CONFERENCE ANNOUNCED

On April 14-18, 2003, the George Wright Society and National Park Service will co-sponsor "Protecting Our Diverse Heritage: The Role of Parks, Protected Areas, and Cultural Sites" in San Diego, California. This meeting will incorporate two of the country's leading conferences on parks and cultural sites: The George Wright Society Biennial Conference and Cultural Resources 2003, the National Park Service's flagship cultural resources conference.

The conference is scheduled to include four plenary sessions, 90 concurrent sessions, and a poster/computer demo/exhibit session, as well as workshops, special events, and field trips. The conference proceedings will be published. For information on attending the conference, go to www.georgewright.org/2003.html or contact The George Wright Society, P.O. Box 65, Hancock, Michigan 49930-0065 USA; 906-487-9722; fax 906-487-9405; conferences@georgewright.org.

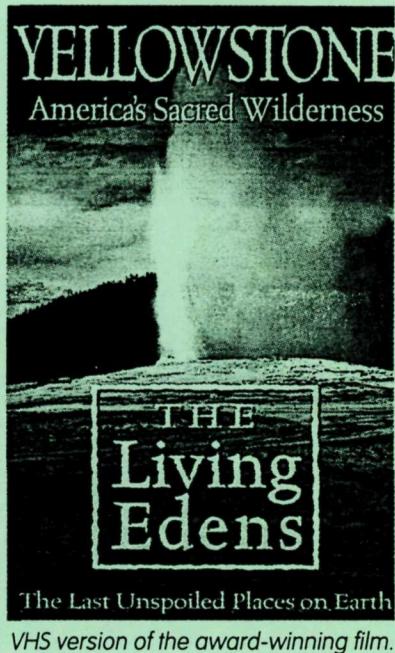
YELLOWSTONE FILM EARNS HIGH HONORS FOR LOCALS

"Yellowstone: America's Sacred Wilderness," a one-hour film first broadcast on PBS in January 2001, has brought important recognition to three people in the Yellowstone region. The film, part of PBS's "The Living Edens" series, was co-produced by filmmakers Hugh Miles, of Wimborne, Dorset, England, and Shane Moore, of Jackson, Wyoming, with additional filming done by veteran Yellowstone filmmaker Bob Landis, of Gardiner, Montana. YNP writer Paul Schullery wrote the script and narrated the film.

"Yellowstone" emphasizes the complexity of the ecological setting and features spectacular footage of predators and prey through the sea-

sons. The film has been recognized for its sympathetic and unflinching portrayal of predator-prey interactions and for its emphasis on the powerful effects of wild nature on the human spirit.

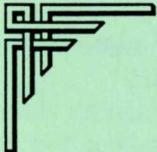
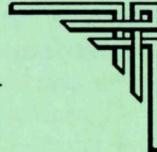
In September 2001, the film won the Best Cinematography award at the Jackson Hole Wildlife Film Festival in Jackson, Wyoming, where it out-competed 650 other films. In November 2001, the film won the Grand Prize at the Banff Mountain Film Festival in Banff, Alberta, Canada, as the best of the 250 films competing. In October 2002, at the biennial Wildscreen 2002 Film Festival in Bristol, England, Paul Schullery won the "panda" (as Wildscreen's awards are known) award for best script. "Yellowstone's" co-pro-



The Last Unspoiled Places on Earth
VHS version of the award-winning film.

ducer, Hugh Miles, was awarded the Wildscreen festival's highest award, the panda for Outstanding Achievement. Miles is among the world's best-known nature-film makers, and the award cited his "globally significant contribution to wildlife filmmaking, conservation and the public's understanding of the environment." The Wildscreen competition is regarded as the most prestigious in the nature film world; its pandas are often referred to as the "green Oscars."

"Yellowstone - America's Sacred Wilderness" is still occasionally rebroadcast on PBS. Copies of the film may be ordered from the Yellowstone Association through their website, at www.YellowstoneAssociation.org. 

The Buffalo Chip is the resource management newsletter of 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:


The Buffalo Chip
Yellowstone Center for Resources
P.O. Box 168
Yellowstone National Park, Wyoming 82190

Managing Editor
Roger J. Anderson
Editing and Design
Alice K. Wondrak
Editing
Tami Blackford

Cover illustration by Marsha Karle

