Yellowstone Science

A quarterly publication devoted to the natural and cultural sciences

Did the media get it wrong?
Profiling Park Visitors
Wildlife and Humans
Bugs and Fire

Volume 2 Number 2

Social Studies

Though much of the research that goes on in Yellowstone has significant social consequences, relatively little research here is directly aimed at society. We probably understand Yellowstone's wonders a lot better than we understand the people who pay the bills to care for the place.

The good news is that studies of human activities in and around Yellowstone—archeology, anthropology, ethnography, demography, economics, history, sociology, and soon—seem to be catching up a little. In this issue, for example, we highlight some recent studies that analyze how the park's resources and their management are perceived and enjoyed by the American public.

Alistair Bath gives us an intriguing look at visitors: who they are, where they come from, and what they think about what they see. Gail Compton takes the investigation a step further, focusing on the startling breadth of attitudes visitors have about park wildlife (and about their fellow visitors). Conrad Smith, in perhaps the most provocative interview we've yet published in *Yellowstone Science*, explores the winding and occasionally perilous path that information must travel to get from the park to the public.

As the greater Yellowstone area becomes more and more settled and used by humans, studies like these take on ever greater importance; how well we understand the human element of the region's ecology and economy will determine how well we care for the whole setting.

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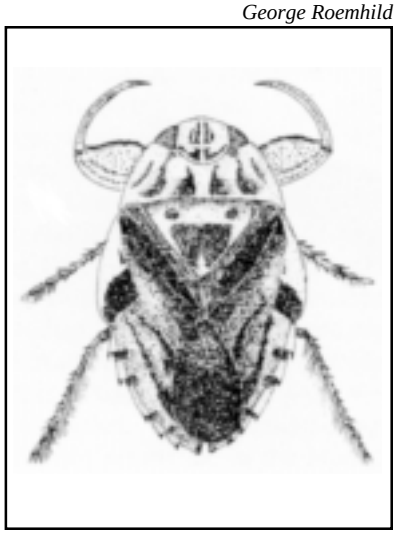
Volume 2 Number 2 Winter 1994

George Roemhild



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On the cover: Park visitor Ellen Thompson Sessions, who will be celebrating her 88th birthday this August, enjoying park wildlife in the 1930s. See the articles on pages 5 and 15 for research on visitor attitudes toward the park and its wildlife. Photo courtesy of Renee Evanoff.

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Yellowstone Science is published quarterly, and submissions are welcome from all investigators conducting formal research in the Yellowstone area. Editorial correspondence should be sent to the Editor, *Yellowstone Science*, Yellowstone Center for Resources, P.O. Box 168, Yellowstone National Park, WY 82190.

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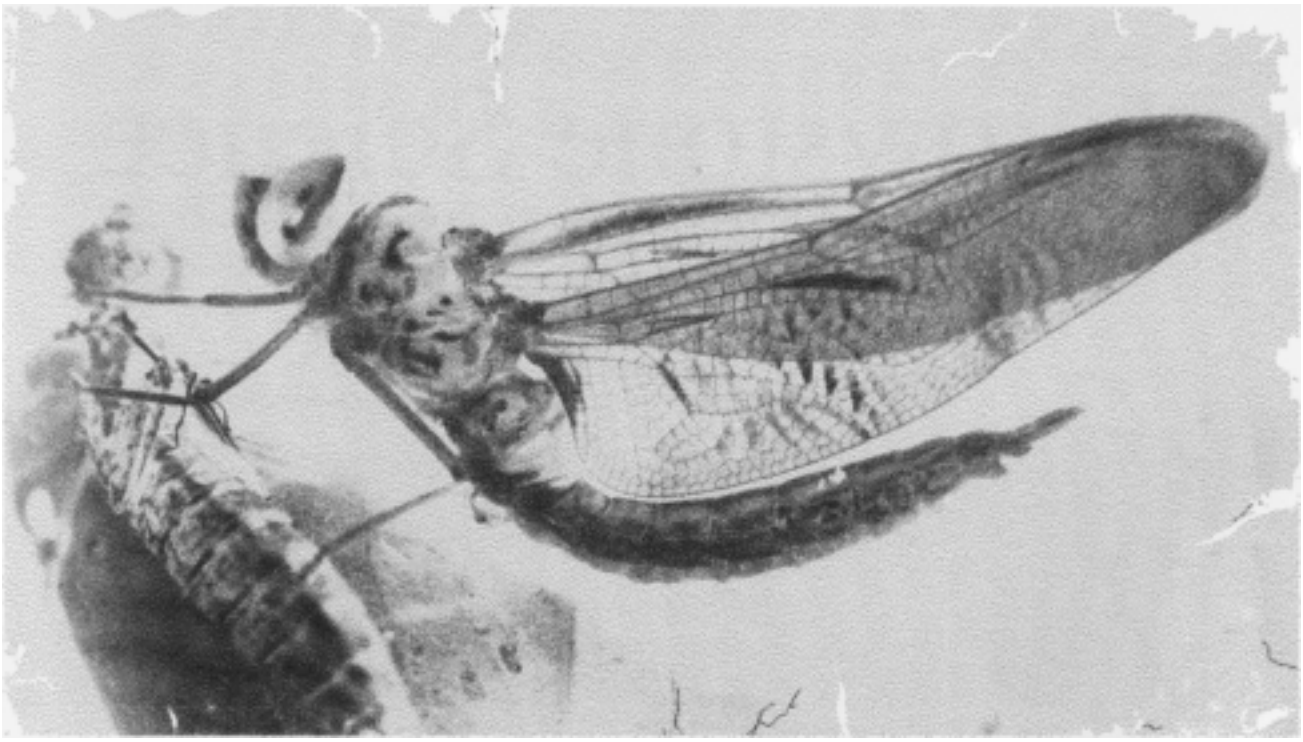


Aquatic Insects and the Fires of 1988

Did the fires affect species diversity?

by George Roemhild

In 1890, Dr. William Forbes collected the first aquatic insects that we know were collected in Yellowstone National Park. A lot of people have continued his lead, and we now have a bibliography of more than 130 papers describing and listing the insects of this area. Altogether, we have records of about 800 terrestrial and 400 aquatic insects. This sounds like a lot of bugs, but it is certainly only a small percentage of the actual number of species living and breathing in America's oldest park.

The insects that seem to get the most attention are those that have some ecological, economic, or esthetic importance. For instance, we know that there are 23 species of mosquitoes in the park, and this is probably very close to the total number. The name of one, *Aedes excrutians*, gives us a clue as to why they have been given priority attention. For the same general reasons, we know that there are 36 species of horse flies in the park.

In a more pleasant vein, however, we also have an extensive, and, I expect, quite complete list of the butterflies of Yellowstone; almost 250 species of these bright and pleasing insects live in the park.

The group of insects that holds my attention are those born of water. Aquatic insects are important to all of us for several reasons. A most important use of this group is as indicators of water quality. Insect species are partitioned into their respective ecological niches because their needs are best fulfilled in those particular circumstances. If the environment is changed, by pollution, for instance, the species in that niche will change because their needs are no longer satisfied under the changed conditions.

Another reason these insects matter to us is because of their intimate relationship with fishes. They are our sportfishes' favorite food, and fishermen have utilized that relationship to build a whole industry based on presenting a fish with an imitation insect hiding a hook.

A third reason for caring about and

studying aquatic insects is the same reason we study geysers or grizzly bears—we need to understand our co-dwellers on this planet. Canada came to this conclusion about ten years ago, and has since conducted a biological survey to document what is around them. It is my understanding, and my hope, that the United States will undertake a similar project in the near future.

I first collected aquatic insects in Yellowstone National Park in 1979, with lesser efforts in 1980 and 1981. All the major streams were sampled: Yellowstone, Madison, Firehole, Gallatin, Snake, Lewis, Gardner, and Lamar Rivers, and Specimen, Bacon Rind, Grayling, Campanula, Lava, Slough, Pebble, Soda Butte, Elk, Cascade, Aster, Otter, Obsidian, Thumb, Tower, Dunraven, Elk Antler, Weasel, Arnica, and other creeks. Ponds, lakes, and pools were also sampled. All specimens from these collecting efforts are in the Montana State University Collections.

From that time until 1992, I identified bottom samples for the U.S. Fish and Wildlife Service project in the park. These samples were mostly from small backcountry streams, in which these fisheries researchers were interested. As a result of my involvement in this project, in 1991, it was decided to collect and build up a representative collection of insects for the Yellowstone Park Museum Collection.

Essentially all the same spots were sampled in 1991 and 1992 as were sampled in my earlier survey. These samples, about 1,000 of them, are in the Museum Collection at Mammoth Hot Springs. More sampling is being done during 1993.

About the end of 1992, we decided that some useful information might be revealed if a comparison were made between the species of insects found in the earlier survey and those collected more recently, after the extensive and infamous fires of 1988. The major question: had the fire changed everything, or was the aquatic environment relatively unaffected?

My hunch was that there would be little change, since the samples I had taken for Fish and Wildlife Service personnel had shown few obvious changes, and I had found that those samples taken after the fires contained large amounts of charcoal; this was actually activated charcoal that had been red-hot when it hit the water. I think that it had acted as an effective absorbent of noxious gases and chemicals created by the fire, with the result that the aquatic insects appeared as abundant and diverse as before the fires.

To test my idea, it was decided to compare the species taken in earlier samples to those present in the postfire samples. Three groups were selected for this comparison: stoneflies, mayflies, and caddisflies. These groups were chosen because they are ubiquitous, easily collected, and easily identified, and each group has a large number of species.

Having a large number of species was important to our study because we intended to use a technique that fisheries managers use to estimate the total population of fish in a given body of water even though only a small percentage of the fish are captured for the study.

It works like this. A number of fish are caught, marked (usually a fin is clipped), and released back into the water. A few days later, a second sample of fish is caught from the same water. Some will be marked, and some won't. If the second sample represents a truly random sample of the fish population in that body of water, then the total number of fish in the body of water can be calculated by means of this formula, where *N* stands for the total fish population:

$$N = \frac{\text{Number of fish caught and marked X number caught in second sample}}{\text{Number of marked fish in second sample}}$$

The reason we need groups of insects with large numbers of species is because we modified the above formula, substituting a whole species of insect for an individual fish. For the purposes of this exercise, a species is one unit in a population of stoneflies, mayflies, or caddisflies. If a species was taken in both the early and the postfire sampling periods, then it was considered a recapture. This allows a comparison of species and, in addition, an estimate of the total number of species of these groups in the park. As far as I know, a recapture formula has not been used like this before, but the results appear plausible.

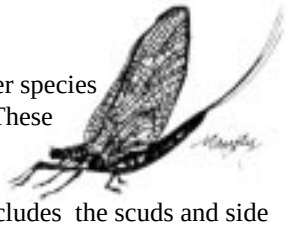
What are the changes that the 1988 fires imposed on the aquatic environment? First, as the data in the table suggest, there don't seem to be large changes in the number or diversity of the insect populations over the park as a whole.

Second, we can expect local changes

Table 1. Numbers of species of three common aquatic insect orders collected in Yellowstone National Park before and after the 1988 fires.

	Number of species collected 1979-1991	Number of species collected in 1991-1992	Number of species common to both collection periods	Total of species collected in both periods	Theoretical total number species
Stoneflies (*Plecoptera*)	47	58	40	65	68
Mayflies (*Ephemeroptera*)	28	32	21	40	43
Caddisflies (*Trichoptera*)	74	69	38	104	142
Totals	149	159	99	209	253

Other Aquatic Invertebrates in the Park



Our surveys turned up large numbers of other species besides stoneflies, mayflies, and caddisflies. These come from several orders besides the insects.

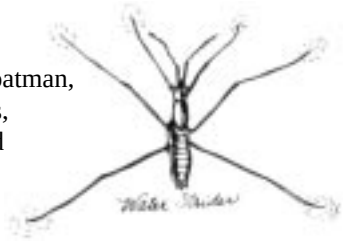
Amphipoda. This group includes the scuds and side swimmers (known as shrimp to some fishermen). Two species were identified, mainly in aquatic vegetation.

Gastropoda. We suspect the park has six species of these aquatic snails, and we have identified four of those.

Pelecypoda. There are probably about six species of fingernail clams in the park, and two species of Margaretiferidae mussels.

Insecta. As mentioned in the text, there are about 400 species of aquatic insects known. The table on page 3 lists the totals for the stoneflies, mayflies, and caddisflies, but many others are found in the park.

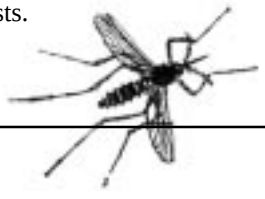
The Hemiptera, which include water boatman, backswimmers, water striders, shore bugs, creeping bugs, and others, are represented by about 25 species.



The Odonata, or dragonflies and damselflies, are represented by about 45 species.

The Coleoptera, or beetles, have not been widely collected in aquatic environments, and about 20 species are known in the park.

The Diptera, or true flies, are represented by more species than are all other aquatic insects combined. We have more than 200 named dipterans, mostly mosquitoes, craneflies, horse flies, ephyrids, black flies, and others. But an extremely large group of dipterans, the Chironomidae (or midges) remains uncollected and unidentified. One authority on midges has stated that "natural lakes, ponds, and streams have at least 50 and often more than 100 species." The midges are also numerous as individuals as well as species; pond bottoms may support as many as 50,000 per square meter. Given Yellowstone's diverse aquatic habitats, we can easily visualize 500 or more species as resident in the park. Only a few people in the United States are versed in "Chironomidae-ese" well enough to identify species. Thus we have generously left a big piece of research for future entomologists.



Renee Evanoff

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to occur because we have an enormous shift in the types of food resources available to insects in specific locations.

For example, some insects are "grazers" that feed on algae, diatoms, and other green plants. These foods occur in streams or ponds that are open to sunlight that allows the plants to photosynthesize and grow. Another group of insects feed on dead plant matter in the stream, because there is no sunlight reaching the water to grow green plants, a situation typical of shaded streams. Obviously, we have fewer shaded streams now than before the fire. We should, therefore, lose some of the leaf- and log-feeders, and have an increase in the grazer-herbivore group.

Come to think of it, that's about what will happen in the terrestrial environment.

George Roemhild, Professor Emeritus of Entomology at Montana State University, is well known both to entomologists and to fishermen for his long career and many publications relating to aquatic invertebrate population dynamics, community succession in ponds, mountain lake limnology, and other subjects. Among his many publications is the volume Aquatic Insects of Montana.

NPS Photo Archives

Visitors and Wildlife

New information on attitudes, risk, and responsibility

by Gail W. Compton

The more than three million visitors to Yellowstone National Park each year could be considered part of the park ecosystem because they have substantial effects on all other elements of the ecological setting. We know relatively little about these important effects, or about the attitudes of these millions of visitors. For the last two years, Eastern Michigan University has studied visitors to Yellowstone National Park to determine their knowledge and attitudes about human-wildlife interactions in the park.

In June of 1992 and 1993, groups of students conducted written surveys and face-to-face interviews with 1,213 park visitors. The purpose of the studies was to determine possible courses to ensure the safety of both visitors and wildlife.

The visitors surveyed were equally divided between males and females and similarly distributed by age. They were from 50 states and 15 foreign countries. An interesting picture emerged and some useful and tentative assumptions can be made.

The surveys and interviews were conducted at Tower Fall, Canyon, Old Faithful, and Mammoth. There were no differences in the results from the interviews and surveys, nor was there a significant correlation between age, gender, or state or country of residence. The results for both years were generally consistent, except in some cases where slightly different information was sought.

The following is a summary of the results of the two studies combined.

1. How many times have you been to Yellowstone (including this trip)?

The majority (57 percent) were on their first visit, with 78 percent on their first or second visit. Fifty-nine respondents had visited the park ten or more times.

2. How much time will you spend in the park?

About half of the visitors would be in the park for two or fewer days. Seventy of the 1,213 visitors would stay ten or more days. Seven percent of the respondents were to be in the park for less than one day. The large majority of these respondents were surveyed at Old Faithful; it seems that some come to the park only to see this one famous park feature.

Interagency Grizzly Bear Committee/Center for Wildlife Information

3. Do you think animals pose a risk to humans in the park?

Seventy percent believed that animals posed low or no risk. Another 21 percent considered the risk moderate, while only seven percent of the visitors considered the risk extreme. It is interesting to note that while most of the messages aimed at visitors stressed personal safety, few visitors perceive a significant risk from wildlife in the park.

4. Which animals in the park do you think cause the most injuries to humans?

Of the visitors who responded to this question on the written survey, a majority (57 percent) chose bears, the animals generally perceived as the most dangerous, while fewer than 18 percent chose bison. Four visitors believed that the wolf caused the most injuries!

5. When you are away from your vehicle, what do you think is an appropriate distance for viewing bears?

This question was asked in different ways in the 1992 and 1993 studies. In 1992 the question was asked as phrased above, while in 1993, respondents were given the option of checking "don't know." When asked in the 1993 study if they knew park regulations for the appropriate distance to maintain for bears, 66 percent chose "don't know." Of the 34 percent who did indicate a distance, more than half indicated a distance closer than the park regulations of 100 yards. More than half of that group indicated less than 30 yards as being a safe distance!

In the 1992 study, visitors were asked the appropriate distance for viewing bears without providing the "don't know" choice. A majority (64 percent) knew the appropriate distance is 100 yards or more. But that leaves an alarming number (36 percent) without the correct information. More than 20 percent believed that 100 feet is sufficient, while more than nine percent indicated 50 feet or less. Twelve people apparently felt safe within ten feet of a bear!

NPS Photo Archives

Public fascination with Yellowstone wildlife dates from the park's early years, when visitors discovered that unhunted animals would tolerate much closer interaction with humans. Bears were usually the foremost attraction, partly because their appearance at park dumps was so reliable. Today's visitors have inherited a legacy of confusion over their relation with wild animals, a legacy partly the result of more than a century of experience in Yellowstone.

6. When away from your vehicle, what do you think is an appropriate distance for viewing animals other than bears?

This question was also asked in different ways in the 1992 and 1993 studies. In the 1993 study, when given the "don't know" option, 64 percent indicated that they did not know the park regulations. Of the 36 percent who chose to indicate the distance, more than half indicated a distance closer than the park regulations' 25 yards.

In the 1992 study, which asked for appropriate distances without providing the "don't know" choice, 73 percent knew the appropriate distance for animals other than bears. But this leaves 27 percent misinformed, with an alarming 5 percent who believe that ten feet is sufficient. More than ten percent believe that 25 feet or less is appropriate. Again, it seems that there is a potentially dangerous misinformed minority.

7. Do you think humans cause harm to animals in the park?

Seventy-six percent answered yes to this question, while the remaining 24 percent chose no. The most common human behaviors indicated as causing harm to animals were, in order of frequency, feeding, getting too close, teasing, yelling, scaring, destroying habitat, littering, and improper trash disposal.

This finding is significant because it indicates that a large majority of park visitors are concerned about the safety of the wildlife, apparently more than they are concerned about the safety of visitors. Messages aimed at protecting wildlife seem to be a fertile area for education.

8. What are your sources of information for proper viewing of animals in the park?

IGBC/CWI

Interpretive exhibit on grizzly bears.

This question was asked in two different ways. In one, visitors were asked to indicate whether six specified sources (park signs, visitor centers, park rangers, park pamphlets, park newspaper, and prior research) were very helpful, somewhat helpful, not helpful, or not used. Park signs was the source of choice, with 95 percent of the respondents indicating they were helpful. Visitor centers and park rangers, when used, were indicated very positively. It is significant that almost 17 percent of respondents either did not find the park newspaper helpful, or did not use it.

Even more interesting were the results of the 1993 study in which an open-ended question asked visitors their sources of information. For this question, in which there was no prompting of possible sources, only 25 percent volunteered the park newspaper, with approximately 15 percent each choosing park pamphlets, visitor centers/park rangers, park signs, park pamphlets, and other literature.

9. Why do you think others get too close to wildlife in the park?

In an attempt to get more honest and complete answers, visitors were asked to speculate about the motivation of others who get too close to animals. It is interesting to note that there was little hesitation in answering this question, indicating that everyone is aware of people getting too close. Sixty percent suggested that the motivation was curiosity, to photograph, and because they appreciate animals—generally noncritical reasons.

Twenty-one percent attributed the behavior to ignorance or stupidity. Some five percent believe that some visitors think the animals are tame or that Yellowstone is a zoo.

10. What could the National Park Service do to protect the safety of visitors and animals?

Some 47 percent indicated that they didn't know, that there is nothing to do, or that the Park Service is doing a good job. Others suggested more education

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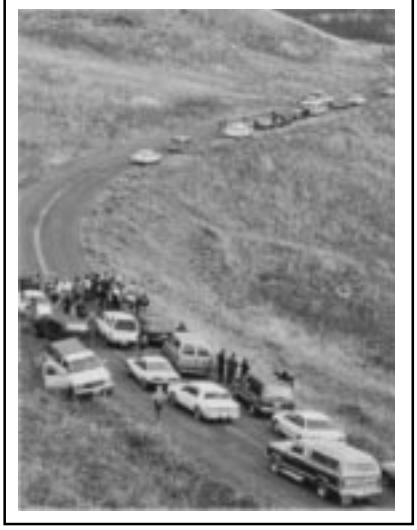


Top: Park employees in the 1930s with captive bear cub. Middle and below: modern "bear jams" testify to our continued fascination with wildlife.

(16 percent), more enforcement of rules (10 percent), more signs (6 percent), more rangers (5 percent), and limit visitors (3 percent).

Conclusions

Problem behavior of park visitors around wildlife seems to have two causes: lack of information and improper attitude. This study clearly indicates that a potentially dangerous minority do not have the information they need. Especially worthy of note is that only a small percent of visitors perceive that they are at risk from wildlife, while a substantial majority believe that humans present a risk to the animals.

Visitors' responses about their sources of information are enlightening. While there is substantial and important information in the park newspaper, there is reason to doubt whether the information has the desired effect. One of the handicaps of the newspaper is that as soon as visitors receive the materials, they enter the park and are bombarded with the incredible sights and experiences of Yellowstone. It is not surprising that no one in the vehicle wants to miss that experience by reading the paper.

In addition to the sources of information, the content of information might be changed because of this study. Most of the appeals are to people to be cautious for their own safety. Yet with 75 percent who believe that humans harm wildlife, there seems to be an excellent opportunity for appealing to that concern. If the message is communicated that those who approach wildlife too closely are endangering this national treasure, then social pressure may be brought to bear on behavior.

Problem attitudes are difficult, but not impossible, to change. In general, this is a country that admires and encourages risk. Thus, visitors who leave the road to pursue animals may be at least partially motivated by the challenge and by the assumption that observers are admiring them. The fact is that if one visitor approaches and the animal moves away, all the rest of the observers are deprived of the opportunity to enjoy the animal. Combining that idea with the general perception that humans pose a risk to wildlife, it would be possible to design messages that would use peer pressure to encourage proper behavior. Thus, a visitor who approaches too closely may be aware that others are disapproving instead of admiring. A campaign to promote such attitudes could be effective.

The findings of this study indicate the importance of studying the human as well as the natural elements of the ecosystems, and merit further study by researchers in many disciplines.

NPS Photo Archives

Top: Risks of overfamiliarity with wildlife are a long-standing park problem. Below: As park management has gradually evolved to be less manipulative of wildlife populations, scenes like this have become rare.

Gail W. Compton is Professor of Communication at Eastern Michigan University, Ypsilanti, Michigan. *He was assisted in carrying out this study by 19 honors students from the same university, and by the Center for Wildlife Information.*

NPS

Conrad Smith, September 1993

Yellowstone and the News

What went wrong in the fires of 1988?

Jim Peaco/NPS

In 1988, Yellowstone managers learned just how much the American public cares about the park. As the fires of that year grew, and as media attention increased, a public and political fire storm developed like nothing else in the history of Yellowstone, perhaps not in the history of the National Park Service. The public learned almost everything they knew about the fires from the media, who learned most of what they said from a variety of information sources. Somewhere in the process, many people now agree, something went wrong.

Conrad Smith is a professor of journalism at Ohio State University with a special interest in environmental issues. As the summer of 1988 progressed, his curiosity about the way the fires were being reported led him into a progressively more involved study of how the media responds to "natural disasters." This work has resulted in a number of papers, as well as his book Media and Apocalypse, *published in 1992. The following interview took place on September 20, 1993, during a break in the fire conference. Ed.*

YS How did you get interested in Yellowstone and the fires? What made you want to undertake this study?

CS It started way back with the Hebgen earthquake in 1959. I was nineteen, and was camping with my parents up on the Beartooth Plateau and we woke up one morning and heard that there was an earthquake near the park that had been felt for 500 or 1,000 miles. We hadn't felt anything. I was kind of curious about the discrepancy, and my father, being a geologist, packed us all up and we drove over to West Yellowstone. He chartered a plane, and I flew with him and a CBS reporter to look at the slide that had buried the campground and killed people. After that I collected copies of the Bozeman and Billings newspapers, and for years and years I carted those papers around with me, because I planned to do something with them. I finally lost them one time when I moved.

But one thing I remember is that one of the accounts of the number of deaths summed the observations of three different people who had flown over the area. Rather than make it clear these were the same bodies being counted three different times, they just added it all up and got a nice impressive death toll. I had no idea I was going to end up teaching journalism; I ended up with an undergraduate degree in physics. I was always fascinated by this kind of thing

because my geologist parents talked about how the media did a relatively poor job of reporting this or that story about some geological issue.

Another experience increased my interest. In 1987 I had been in the northern California Siskyou Mountains. After I left, I read about these terrible wildfires that burned hundreds of square miles where I had hiked. So I went back in 1988 and climbed Preston Peak, the highest mountain around, expecting to see all this terrible ravishment of fire. I could see Mount Shasta about 80 miles to the southwest. I could see the Pacific Ocean 35 miles to the east. But in all of that vista I could just see one ridge a few miles away that looked burned. I couldn't make sense of this. The press had said hundreds of square miles had burned. I could see about 10,000 clearcuts, but I couldn't see any evidence at all of fire.

Then, in July I was with a group of volunteers that did trail work on Avalanche Peak in Yellowstone. It happened to be July 13 through 23, which coincided with the big growth of the fires. In fact, July 23 was when Grant Village was evacuated and when the fires first became national news. At night we would go over to the saddle on Avalanche Peak and look at what is now known as the Clover Mist Fire. One night three of us slept on the top of Avalanche Peak, and even at night we noticed that you could see the fires. It was kind of like fireworks; they'd brighten up and die down, again and again.

When I got back home I followed the media account. It started out just as curiosity, but I'd been to Yellowstone lots of times and I kind of knew the area, so I noticed some minor mistakes. An article in the *Chicago Tribune*, for example, referred to Craig Pass as the highest point in the park's road system. I happened to know that other passes are higher. That was no big deal, but it made me wonder: how about the rest of the story? How many factual errors were there?

I was curious enough that I found the names of about 100 sources, news sources that were named in stories about the fires, and I sent questionaires to them. I was curious if they saw the clip of the story in which they were named, and what their reaction was to the way the reporter used the information they'd given them.

Then I got the names and addresses of 89 reporters whose by-lines were on stories about the fires, and I sent them a questionaire about how the fires were covered, and I got back 20,000 words of unsolicited comments. This is unheard of in a mail survey. It just doesn't happen. So obviously there was intense interest, both on the part of the media people and on the part of the sources named in their stories, in how the fires were reported. There was also a fairly strong feeling on the part of many that fires had been very badly reported. What started out as kind of idle curiosity ended up being a major research project.

Jim Peaco/NPS

YS Your analysis of all of that was pretty quantitative. Can you describe that?

CS I sent out the survey to reporters and sources, and then I assembled what I called panels of experts. For example I got all of the television reports and put them on VHS cassettes. I persuaded about 12 people—five incident commanders, three or four fire behavior experts and fire ecologists and so on——to evaluate each of the television stories in terms of accuracy and completeness in a numerical score between one and five.

YS Any surprises there?

CS The stories during the peak coverage period, that is the stories that made the the front pages and the leading television news, were rated much less accurate, significantly less accurate than stories produced when there wasn't quite so much deadline pressure and quite so much drama involved. This has interesting implications, because if it holds for other stories, it means that the stories coming out when the news is hot are much less likely to be accurate. This suggests that the higher on the public agenda a news item is, the less accurate it is, which is kind of a scary phenomenon, if it holds over a broad range of stories. I don't know if it does.

YS In your analysis you observe that stories did get more accurate as the fires went on, and after they were over.

CS I think two things were going on there. I think some reporters who kept covering the fires began to learn something. Eventually, if a reporter is curious, and good journalists by definition are curious, that reporter is going to get a broader base of knowledge and is going to have more of a context. I think most reporters had no context at all. Fire burned warehouses, they burned national parks—what's the difference? But as the reporters kept covering the story, and talked to people who knew something about fire outside of the urban context, I think they became more educated and were more able to write good stories.

The other thing is, if the fire came to Old Faithful today, there would be tremendous pressure to get a dramatic story right now. If I'm doing a retrospective story in the spring, it doesn't matter if it's published today or next week, so there's more time. I think that even very

good journalists often do bad work on tight deadlines, especially if they're covering a beat that doesn't give them much context. I don't know any reporter in the country, before 1988 or after 1988, who covered wildfires as a beat, though some did cover Yellowstone as a beat, much like Bob Ekey from the *Billings Gazette*, who did some very good reporting. Some covered environmental issues as a beat. Diane Dumanoski from the *Boston Globe* often does well in that area.

YS How would you describe the kinds of mistakes that were made? What were the significant kinds of mistakes that were made?

CS I can do that with one word: context. No context, insufficient context. You might get a tremendously accurate description of how many acres were included in the burn area, but what does it mean? The fire made a 3,000-acre run today. That may be completely accurate, but does that mean everything burned? Does it mean some of it burned? Does it mean that it's going to change the forest forever? Does it mean it's not going to change the forest at all? What are the implications of it? Is this bad, is this good? Should the fires have been allowed to burn? Should the fires have been extinguished? Could the fires have been extinguished? What ways could the fires have been extinguished?

There are so many questions that go unanswered if it's purely descriptive instead of analytical, and most reporting, being an immediate account of recent events, is descriptive. But that's the greatest flaw of reporting, and I think in the Yellowstone fires it was an even bigger flaw because most reporters didn't have the background to go beyond how many acres burned and were accustomed to reporting fires in the context in which they are always bad, and destroy things.

YS In one of your papers you say they came here to report on the disaster. In their minds, it was a disaster before they got here to look at it. That was a given.

CS Of course it was a disaster story. Yellowstone burned down. Terrible disaster. First national park, the crown jewel, Old Faithful! In fact, there was a headline in the *Chicago Tribune*, "Old Faithful will never be the same," as if the fires evaporated the source of all the water and the geyser is dried out now.

YS You've broadened your study beyond Yellowstone. Your book compares media coverage of the Yellowstone fires, the Valdez oil spill, and the Loma Prieta earthquake. In all of that broader arena, do you see any change, any cumulative improvement in the average quality of environmental reporting, and if so did the Yellowstone fires in some measurable way contribute?

CS There have been more stories that at least mention the ecological aspects of fire after the Yellowstone fires than before. I recently looked at newspaper stories that mentioned fire and the word "ecology" in the three years before 1988 and the three years after 1988, not restricted to Yellowstone but in any context as wildfire. I found that about three times as many stories that appeared after the 1988 fires at least contained the word ecology. Of course, that's a pretty superficial test.

I think that some individual reporters had their consciousness raised. In the Exxon Valdez oil spill, for example, there was a reporter named Charles Wohlforth. He got better and better. He learned a great deal just by the process of being curious and asking questions. Over a period of six months or a year he acquired a great deal of expertise. So I think the really curious reporters, who are really interested in the subject matter, do have their consciousnesses raised by events such as the Yellowstone fires.

I also suspect that there are many more reporters who didn't learn very much. I remember walking into the Village Inn in Valdez, Alaska, when all of the national media came back because Exxon closed down its first summer's cleanup. They were telling war stories about Yellowstone and about how they almost got burned up and about how dangerous it was and how big it was, and I can assure you that none of the comments showed any great interest in the fires in any philosophical sense. That's very anecdotal and it may not mean anything. They were interested in the fires as journalistic war stories. I suspect that there are a lot of journalists who are really just ambulance chasers; they do it for the excitement and not for curiosity in the analytic sense, which I think motivates the best of journalists.

YS As a teacher of journalism, how do you inculcate the right values? How do you enlighten the potential ambulance chasers?

CS I teach aspiring television journalists. One of my colleagues says that the term "television journalist" is an oxymoron. There is some really good television journalism on the environment—ABC News, with Barry Serafin and Ned Potter reporting environmental stories, does a better job than the other two networks—but there's also a great deal of bad television journalism.

I find that the students who enroll in the broadcast news classes that I teach at Ohio State University often are motivated by what they perceive to be the glamor of being a television reporter, something in the way that you went to Hollywood and Vine to be discovered by MGM in an earlier lifetime. They're also motivated by the illusion that most television reporters make a great deal of money. My colleagues in the print media assure me that many of their students come with equally suspect motivations.

It's very difficult to overcome. Despite the fact that I got into this business for idealistic reasons, thinking that I could singlehandedly in a small way change the quality of television journalism, mostly think I fail to inculcate these values. If you do not have an intense native curiosity about everything in the outside world, if you are not insatiably and almost obsessively curious, I do not believe you can be a good journalist.

I found one very depressing fact in my surveys of journalists and sources. Because I had information on both, I could look at the background of journalists as a function of how accurate the stories were. I found out that the reporters who had formally studied journalism were considered less accurate by their sources than the ones who never had.

YS Let's assume that practically everyone involved in an event like the

Jim Peaco/NPS photos

Yellowstone fires, whether journalist or source, is fundamentally honest, and that they're all trying to do the right thing. Why does it seem to so many of us that it went so wrong? What happened? Why did we end up with so many sources feeling like they'd been abused, and so many reporters feeling like the sources had failed them?

CS In the first place it had to do with the culture we're all raised in. Fire is bad. Our culture doesn't distinguish between one fire and another. It's just one of the things we take for granted. I guess I'd call that category one.

Category two is logistics. There were some logistical problems. Say that you're a reporter assigned here. You check into a motel in a gateway community around Yellowstone and you find it has no telephone. The area is huge. The fires were burning in an area at least a hundred by a hundred miles. You can't get to them. There are no roads. You can't fly to them because the smoke is too thick. You can't get any hard information. So there were all kinds of logistic problems. The television people had to get to their satellite trucks. CBS had a satellite truck parked over at Red Lodge, Montana, and Bob McNamara would drive about 90 miles an hour over the Beartooth Highway from Cooke City to get the tape there. In an urban area, the logistics are very easy. But this was so diffuse; there were fires all over the place.

Sources are the third category. There were two types of source problems. One, the reporters did not know what sources would be the most helpful, and two, there were problems with the organized effort to get out the information. Something that was astonishing to me, looking at all of the sources named in the stories I read about the Yellowstone fires, is the extent to which reporters used easily available sources and not necessarily the sources with the most expertise. For example, Stephen Pyne, who wrote the book about the cultural history of wildfire in this country, was contacted five or six times during the whole summer, and in his one television interview, on CBS "Nightwatch," they wanted scandal, not information. There was a tremendous lack of enterprise.

For example, the Intermountain Fire Sciences Lab, in Missoula, is well known in the fire community as doing some of the best research about wildfire, but partly because reporters thought of this as a disaster story rather than as a science story, no reporter ever seems to have called up the Intermountain Reseach Lab and said I'd like to interview somebody. Some of the individual fire lab people, like Dick Rothermel, were interviewed, but hardly at all, and all kinds of fire experts, like Bob Mutch of the Forest Service, who pioneered natural fire in the national forests, were here in Yellowstone, but they just weren't contacted by reporters.

YS Could that have partly been the source's fault?

CS That's what I was coming to next. That's part two. There were three different kinds of information available. Each fire had an information system, the park had an information system, and the command center in West Yellowstone had an information center. As one of the reporters said, there were a few people who were very knowledgeable, and many who were not knowledgeable at all. I think that the press quickly lost respect for a large part of the formal information system.

YS How does that get fixed?

CS I'm increasingly convinced that the only way you can get good coverage of anything you're doing, and that includes science, is if you make an organized, orchestrated effort to court the media, and not during the big story, like Yellowstone, but years before. My example is the U.S. Geological Survey, (USGS) which has an office in Menlo Park, California, that's been courting media attention for 25 years. If that kind of relationship had existed, I think, between the media and the Forest Service, or the Park Service, or the Fire Reseach Lab in Missoula, I think the coverage would have been very different.

YS This Public Information Office in Yellowstone deals more routinely with more media than any other park on earth.

Jim Peaco/NPS

CS But routine is the important word there. I don't think it had dealt with fire in anything but a very small, very routine way. I'm talking about the scientific context.

Start with the Intermountain Fire Sciences Lab. Maybe a relationship could have been courted with the press, the way the USGS courted public attention because it wanted to get out the earthquake preparedness message. If for 25 years the Fire Sciences Lab had been courting the press in a very deliberate manner to get out the message, I think it would have gotten a lot more attention in this situation. The park's Public Informaton Office wasn't set up to do that; it was set up to handle the routine things, like car crashes and bear incidents.

YS There was this idealistic view among some people after the fires. In essence, they said to the agencies, "Well, if you'd developed some kind of tremendous incident command system, you could have rolled in here and taken over." But how would you ever maintain that kind of operation in the federal government where you don't have enough Yellowstone fires to justify it?

CS I don't think you could.

YS That's the point. How do you stay prepared to handle so many media, hundreds of media, six satellite vans behind the administration building at once, all that demand for attention?

CS It's awful easy to see things that no one could have seen at the time. For example, I think the biggest mistake was bringing in all kinds of people who had no experience dealing with the media, and some who apparently had no knowledge of wildlfire. I think that that really hurt the credibility of the park. Even at that, the credibility was still strong until after Black Saturday, August 20. I think that was when everything unravelled. The media coverage before that point wasn't that critical, on the whole. This idea that the fire policy was the reason so much burned didn't occur very much until after Black Saturday.

YS That really got entrenched.

CS Well, it's a great story. The Park Service committing arson? That's a great story.

YS It certainly sold well. But let's get back to your reasons things went wrong.

CS In the traditions of journalists, conflict is a story. You will never read a story about how today in the United States 6,000 commercial flights landed safely. They just don't do that. Scandal is a story, and all things being equal, scandal is interesting, and conflict is much more likely to be news than lack of conflict.

The fires were seen as a disaster story, and the conventions of journalism caused strange things to happen. In the first place, you had to have a victim; you can't have a reportable disaster without victims. So you'd interview the person who owns the motel in the gateway community such as Cooke City, and since victims are presumed not to have any axe to grind, what the victim said was taken at face value because victims were assumed to be impartial, to have no axe to grind. So the victim's comments about policy, or about the park being destroyed, were immune to another convention, which is journalistic balance.

Too often, the convention of "balance" only means that you get "both sides of the story," as if it's presumed that the story only has two sides. But the tradition of balance in journalism could have at least countered a motel owner who is very angry, with a comment from someone in the park, explaining another perspective. Often that just didn't happen, because victims are exempt, apparently, from this journalistic tradition of balancing the story by reporting the different perspectives. And so these unbalanced comments from angry merchants in effect had the force of being factual rather than the strong opinions from some people who were experiencing a great deal of stress.

YS Obviously every element of this very complex story can't be in every newspaper article. But when your first papers were being published about this, with the analysis of the high error rates and how the public was misled by the journalism, the response was that people don't just see one story, they see ten stories, and gradually they get the whole picture.

CS There's a highly respected journalism scholar named James Carey, at the University of Illinois, who said that journalism is a curriculum and if one story is flawed it doesn't matter because the initial stories are just the first class. The curriculum is not completed until you get all the newspaper stories and the

magazine stories and the books about the topic. It's really a very well-written essay, but it is describing a very motivated, insatiable media consumer, not the typical person who probably follows news events pretty casually. The idea of news as curriculum has become a great copout for journalists.

The problem is that sometimes other stories don't follow the flawed one, and even if they do, people will form an impression based on the first story because they may not see the second story. So I don't think that idea about journalism being cumulative is a very good description of how the typical newspaper reader or television watcher follows events.

A student who goes through a typical journalism program, including the one in which I teach, is going to be looking at a lot of standard kinds of stories. They learn about the police beat, how to cover an urban fire, how to cover a trial, this kind of thing, but in most journalism curricula, students do none or very few projects where they go past an 800-word story about subject X, which you do today and then tomorrow it's forgotten. We do a poor job of whetting students' curiosity about the context of everything.

YS Why does it seem so hard to get journalists and scientists together?

CS There's a lot of distrust between them. I think that scientists are terrified that journalists will get it all wrong, and journalists, many of whom are kind of scared of science, are afraid that they won't understand. And so it's often difficult for scientists and journalists to work comfortably together, and also there's also a kind of a tradition in science of not seeking out the press. You're supposed to go through the peer-review process, and you're not supposed to talk about your work, and you can lose credibility among your scientific peers if you seek out the press. Yet the single thing that would do the most to improve the quality of science journalism is if scientists routinely, actively, sought out the media. I don't think it's going to happen.

YS So the reality is, we have insufficient sources of information, and insufficient ability to find what information there is. In the real world, what can be done? What kind of advice can you give to the new journalist coming to Yellowstone, or to any environmental story, and what kind of advice can you give to the beleaguered source?

CS To the journalist, I would say, try if you possibly can to spend a day before you go off to this location trying to get some background information. You're much more able to do it sitting in your office at the newspaper than you are trying to find a working pay telephone in the middle of a hurricane or an oil spill or whatever.

You've got to do some homework ahead of time. If you can't do that, and sometimes you can't, then you need to try to persuade one of the reporters back at the paper to be working behind the scenes to support you while you're out in the field. The reason that the *Washington Post* was the only paper that didn't get an enormously inflated death toll from the earthquake in northern California was because it had someone in D.C. making the calls to support the reporter out in the Bay Area.

When I first heard about the Yellowstone fires, I called the natural resources department at my university and asked who's doing research on wildfire. They told me about the Intermountain Fire Sciences Lab in Missoula. I called Missoula and was talking to Steve Arno in about five minutes. If I could do that from Ohio, it seems to me that a reporter who really was interested in getting some context could do that from a working pay telephone at Old Faithful. It's easy to be a critic, of course. I'm not sure how much better I would have done if I'd been working under those constraints.

As to the sources dealing with the reporters, the first thing you have to understand is you may talk to the reporter for half an hour and may get one sentence or no sentences in the story, because a good journalist is going to talk to a lot of sources. Then, if you explain the topic the way you would to a scientific colleague, that's just not going to fly. The reporter's job is not to write an article that would appear in *Science* magazine. You have to do the best job you can to give a lay description, and you must expect even most of that not to show up in the story. You just have to keep trying. You have to put yourself in the mind of the reporter, who may have to have a 1,000-word story done an hour from now.

Jim Peaco/NPS

Who Visits Yellowstone?

by Alistair J. Bath

One of the least studied of all mammal populations in Yellowstone National Park is the modern human one. We know surprisingly little about current visitors, an unfortunate situation that some recent investigators have worked hard to improve. Alistair J. Bath has in recent years conducted extensive surveys of visitors and others interested in Yellowstone. In this article, he presents part of his Ph.D. dissertation research, which examined public attitudes toward, and knowledge about, fires and fire management in Yellowstone. We look forward to hearing more from Alistair about Yellowstone visitors. Ed.

This study is based on data collected while I lived in the park from April 1989 to July 1990. I gathered information from approximately 4,000 visitors and more than 1,200 residents of Montana and Idaho. All respondents were randomly selected and chosen to be representative of summer, fall, and winter Yellowstone visitors during 1989 and 1990.

Where do they come from?

Visitors to Yellowstone National Park come from all parts of the world, but most are from the United States. In the summer and fall many visitors also come from Canada, former West Germany, Switzerland, Britain, Australia, and France. Virtually all winter visitors are from the United States with only a few from Canada, and one each from Brazil, New Zealand, South Africa, Britain, Switzerland, and former West Germany. Throughout the entire year, individuals from many other countries (i.e. Venezuela, Norway, Israel, Czechoslavia, Spain, Italy, Denmark, Belgium, Holland) visited the park.

In this article, the patterns of visitation are discussed using data collected only from United States visitors. Sociodemographic characteristics, however, are discussed using data from all visitors. As my study randomly sampled visitors at gate entrances proportional to visitor numbers, it may be more accurate in documenting the characteristics of the Yellowstone visitor than previous studies.

In their 1990 study, researchers Robert Mings and Kevin McHugh suggested that visitors to Yellowstone National Park combined a trip to Yellowstone with other parks in the Rocky Mountain area. My study tends to agree; many visitors stated they were just driving through the park, spending relatively little time there. Yellowstone was not a destination point for them, but only one attraction on a western tour.

Many visitors did not realize the size of the park, and were not prepared to stay for any great length of time. In a 1989 study, Montana State University researcher David Snepenger found that almost 88 percent of all visitors stayed one (48 percent), two (24 percent), or three (15 percent) days. My study suggested that the length of stay was even shorter, with a large number of individuals just driving through. Snepenger's findings may have been influenced by his surveying heavily at the Old Faithful area. Mings and

Dramatic shifts occur from season to season in the origin of Yellowstone visitors. California provides more summer visitors than any other state, but virtually disappears from the statistical compilation in winter.

McHugh, who surveyed visitors staying at the Canyon Lodge, found that those visitors whose home state was farther away from the park travelled less frequently, but stayed longer than visitors who came from near the park.

In 1987, The President's Commission on America's Outdoors reported that the American public at large tended to travel shorter distances and recreate more frequently. I found the same to be true for Yellowstone's visitors. Most of the visitors, proportional to state population, were from the immediate area. Through each season (summer, fall, winter), most visitors came from Wyoming, Montana, Idaho, and Utah. In the winter, due to easier snowmobile access through the north and west entrances compared to the east and south entrances, more visitors were from Montana than Wyoming, proportional to population. Such results indicate the importance of Yellowstone National Park as an area for regional and local recreational use.

Mings and McHugh found that the number of visitors appeared to be positively related to population size of states and inversely related to distance from the park. They also found that population size of states and distance to the park accounted for 76 percent of the variation in visitation (that is, one could predict visitation from a given state based mostly on its size and its distance from the park). Similar findings were encountered in this study, at least for the summer and fall periods. Most visitors in the summer and fall came from California, and most other visitors came from the surrounding region (Montana, Utah, Wyoming, Idaho, Colorado).

In the winter, however, the pattern of visitation was different. California was not one of the top five states in winter visitation to Yellowstone Park. Most visitors came from Montana, with many from Minnesota, Washington, Utah, and Wyoming.

Have they been here before?

Many visitors to Yellowstone National Park in 1989-1990 were repeat visitors. During the summer, 45 percent of those visitors interviewed were first time visitors, while the remaining 55 percent had been to the park at least once before, but not necessarily recently. Similar results were found with visitors interviewed in the fall and the winter.

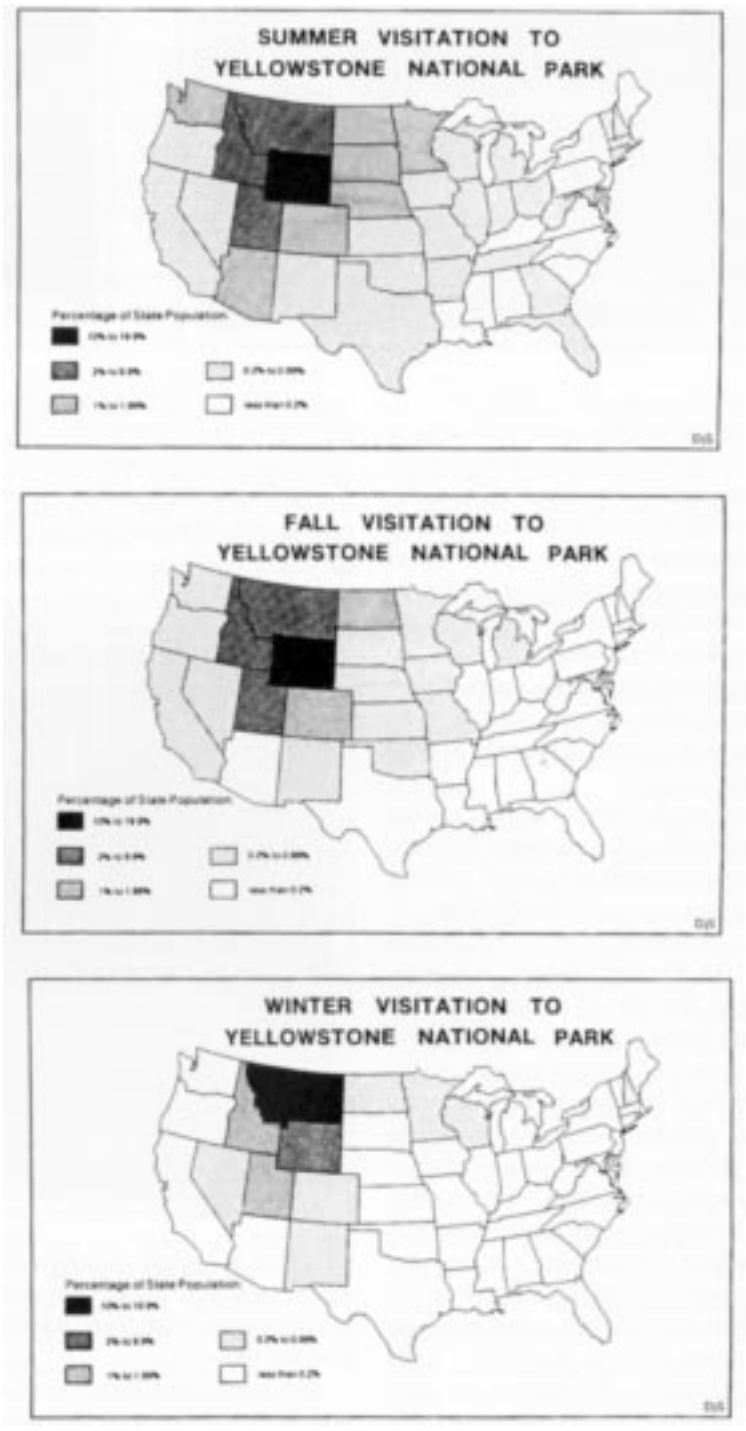
In the winter, the differences between first time and repeat visitors were more evident. Of those visitors interviewed in the winter, only 22 percent were first time visitors. Most (78 percent) had

been to the park at least once before. A similar pattern was noted when examining data from visitors exiting the park. Although a large percentage were repeat visitors, most interviewed visitors (79 percent summer, 74 percent fall, 51 percent winter) had not seen the effects of the fire. Most respondents to the mail-back questionnaire that we sent to Montana and Idaho residents also stated that they had not seen the effects of the fire.

Why did they visit?

Reasons for visiting Yellowstone National Park varied. Most visitors in this study, in each season, stated that sightseeing was their primary reason for visiting the park. In the summer and fall, the next most frequent response was driving through. Wildlife viewing, viewing the effects of the fire, and geothermal (geyser) viewing were also mentioned by summer and fall respondents. Mings and McHugh also found that viewing fire effects was a common response, especially for those who live closer and make more frequent trips. Snepenger found that the most popular leisure activities were geyser viewing, viewing wildlife, sightseeing, and viewing the fire burn.

Winter visitors had different reasons for visiting the park. Although sightseeing was still the primary reason for visiting, snowmobiling, skiing, wildlife viewing, and geothermal viewing were also stated. Viewing the effects of the fire did not rank in the top five reasons for visiting the park in the winter. Visitors saw snowmobiling as a recreational activity within Yellowstone Park, rating it highly as a reason to visit the park in the winter. This importance placed by the visitor on the snowmobiling experience may be disturbing to park resource managers, who view the snowmobile strictly as a mode of transportation by which to view and experience the park's natural attractions.



States nearest to Yellowstone Park generally sent the highest percentage of their population to visit. Montana visitors outnumbered Wyoming visitors in winter due to easier access for snowmobilers through the north and west entrances.

Who were they?

For summer, fall, and winter visitors, data were collected on sex, education, and age. Data on the number of individuals and the number of children (under 18 years of age) per visitor group were also collected. Most visitors to Yellowstone National Park had more education than the general public, were predominately male, travelled in groups of two to four, and did not travel with children.

Approximately 82 percent of all visitors in this study had some postsecondary

Jim Peaco/NPS

Jim Peaco/NPS

Above left: the Old Faithful area from above on a busy summer day. Right: a winter crowd of snowmobiliers at the Norris Geyser Basin. Below: a winter scene in the park back before there was a winter season.

NPS Photo Archives

education. In his 1989 survey, Snepenger found that almost 80 percent of all visitor groups had one or more persons with at least some college education. This finding was also supported by Mings and McHugh. Most visitors in this research had higher education levels than the Montana and Idaho general publics. For example, 26 percent of winter visitors had masters or doctorate degrees, versus only 10 percent of the Montana and Idaho statewide general publics.

There were differences in sex and age characteristics of visitors and Montana and Idaho statewide general publics. There were more male than female visitors in all seasons (summer 65 percent male, 35 percent female), and especially in the fall (82 percent male, 18 percent female) and winter (80.5 percent male, 19.5 percent female). In the fall, hunters (hunting is predominantly a male activity) came into the park to view wildlife. Many were hunting in surrounding forest lands. In the winter, many groups of single males came into the park to snowmobile. These results are in contrast to those of Snepenger's, who found an equal breakdown of male and female visitors. Again, this could be attributed to the nonrandom sampling done by Snepenger in the Old Faithful area.

Most visitors to the park in all seasons were between 30 and 41 years of age. In the fall, there was a large percentage of older visitors (age 54-65), while in the winter there was a relatively small number of older visitors. A similar age distribution was found in the Montana and Idaho statewide general publics with the only noticeable difference being a greater proportion of respondents over 65. This is typical of mail questionnaires, where a higher response rate usually occurs from those respondents who are retired.

Although visitor group sizes varied greatly (1 to 60), most groups were between two and four individuals. The most common group size for all seasons was two persons. In the fall, approximately 60 percent of all visitor groups to the park consisted of two individuals. Due to group snowmobile tours in the winter, there were larger group sizes then. For example, 20 percent of the winter groups surveyed through handouts, and approximately nine percent of those interviewed in person, were between six and ten individuals. Few children visited Yellowstone National Park during any season, but especially during the fall and winter. During the summer, approximately 35-40 percent of visitor groups included children, while only about 10 percent included children in the fall and winter.

What did they think?

There was initially some concern about future visitation to Yellowstone National Park after the fires of 1988. These fears are not substantiated in this study. Most visitors in the summer (94 percent), fall (92 percent), and winter (99 percent) stated they would like to return to Yellowstone National Park, rating their trip between 7 and 10 on a 1-to-10 scale where 10 was "fantastic." Wildlife viewing was cited as the most enjoyable experience, while viewing fire effects, road conditions, and crowds were stated as the least enjoyable experience.

Viewing of the fire effects in the park did not reduce the overall satisfaction rating of most visitors. In fact, many visitors came to see the effects, and most visitors hold positive attitudes toward the fires. As Snepenger and his colleagues projected, visitation to Yellowstone National Park has continued to increase since the fires of 1988. The park will remain highly visited and treasured by all those who see it.

Alistair J. Bath is an assistant professor at Memorial University of Newfoundland, who has published several scholarly papers on public attitudes toward Yellowstone, with special emphasis on fire and wolves.

Mickey Anderson

Ranger Robert Mahn Dies

Many Yellowstone researchers will share Yellowstone's sorrow over the passing of East Entrance Ranger Robert Mahn, who died in a snowmobiling accident on January 17. Ranger Mahn was on a routine snowmobile patrol to assess safety conditions on the East Entrance Road when he apparently went over a 70-foot embankment about five miles west of the East Entrance.

The incident occurred between 7:30 and 8:00 a.m. on Monday, January 17, during a period of low visibility, high winds, and blowing snow. When Ranger Mahn failed to check in by radio, another East Entrance Ranger began a preliminary search. At 8:45 a.m., he located the area where Mahn's snowmobile left the road, and requested assistance. He located Mahn at about 9:20 a.m., and began CPR and emergency medical first aid, which was continued by various personnel throughout the evacuation process. Mahn was transported to West Park Hospital in Cody, Wyoming, where he was pronounced dead at 1:09 p.m.

Bob Mahn had been with the NPS since 1973, and also worked at National Capital Parks, Canyonlands, and Golden Spike Natonal Historic Site. He was, in the words of Yellowstone Superintendent Bob Barbee, "a legend in and around Yellowstone." He came to Yellowstone in 1976, and had been at the East Entrance since 1982. He is survived by his wife Grace Nutting.

New Yellowstone Curator Selected

Susan Kraft has been selected Park Curator, replacing Cyd Martin, who recently moved to Alaska. Susan is a participant in the National Park Service's Resource Management Intake Trainee Program, and has been assigned to the North Atlantic Regional Office since June 1991.

Prior to entering the intake trainee program, Susan Kraft worked at Saint-Gaudens National Historic Site (N.H.), Independence National Historical Park (Pa.), Valley Forge National Historic Park (Pa.), and Salem Maritime National Historic Site (Mass.). Since entering the trainee program, she has served as project coordinator of the North Atlantic Region's Collection Accountability Program, and has spent the past year in charge of museum collections at Acadia National Park (Maine).

Though Yellowstone will be Susan's permanent duty station, she will continue her involvement in the intake trainee program until June 1994. Over the coming months she will therefore occasionally be on assignment to other parks as part of her training in museum operations and management.

The Yellowstone museum collection contains more than 26,000 artifacts and objects representing the park's cultural and natural history, as well as more than 60,000 historic photographic images. The collection and curator's office are located in the Horace Albright Visitor Center at Mammoth Hot Springs, and are part of the Branch of Cultural Resources in the Yellowstone Center for Resources. We plan to profile the collection in a future issue of *Yellowstone Science*.

National Biological Survey Official

On November 11, 1993, President Clinton signed the Department of Interior Appropriation Bill, creating the National Biological Survey. F. Eugene Hester, formerly of the National Park Service (NPS), is serving as Acting Director of the new agency. As reported in previous issues of *Yellowstone Science*, a number of NPS research staff in Yellowstone have been transferred to the new agency, and will now be directly supervised through the National Ecology Research Center in Fort Collins, Colorado. Their research assignments in Yellowstone remain the same for the moment.

Claims of Research Suppression Debated

Two former NPS research scientists in Yellowstone, both employees of the newly created National Biological Survey (NBS), have recently made the news by saying their research findings were suppressed by their supervisors because those findings disagreed with "official" views of the subjects they studied. Articles on this controversy have recently appeared in several newspapers, including *The Los Angeles Times* (November 22, 1993) and *High Country News* (November 29 and December 27, 1993) as well as local papers in the greater Yellowstone area.

Richard Keigley, a research scientist who began work in Yellowstone Park in 1991, has been studying the way in which northern range cottonwoods have been affected by ungulate browsing. Keigley believes that his research has been thwarted, that his research assignment was changed, that his research funding has been withheld, and that his attempt to publish his findings has been resisted, because his findings lead to the rejection of the long-standing "natural regulation" hypothesis that has largely guided management policy on the northern range for the past 25 years.

David Mattson had been a member of the Interagency Grizzly Bear Study Team (IGBST) for about 10 years. Mattson believes that his study of the greater Yellowstone grizzly bear popu-

lation has been terminated, that his computer files were deleted and his notes confiscated, and that he has been subjected to harassment and transfer, because his interpretations of IGBST data disagreed with his supervisor's publications and statements claiming that the population was experiencing an increase.

Keigley's former NPS leaders in Yellowstone, Superintendent Robert Barbee and Yellowstone Center for Resources Director John Varley, as well as his former NPS supervisor and now his immediate NBS supervisor, Don Despain, disagree with his accusations. They maintain that prior to Keigley's relatively recent arrival in Yellowstone, a variety of agency and independent advisors established that the park's most pressing riparian research need was a study of willow, and that Keigley was assigned such a study from the beginning, but that he has ignored that research assignment to pursue his own interests. They further maintain that his findings about cottonwoods are in good part old news to park researchers, who have long known about elk impacts on cottonwoods. Dan Huff, NPS Rocky Mountain Regional Chief Scientist, who recommended that Keigley revise his paper before submitting it for publication, believes that Keigley's one year of data collected from a limited study area was not enough to justify such a sweeping "rejection" of the natural regulation hypothesis.

Mattson's immediate supervisor was Richard Knight, who has been IGBST team leader for about 20 years. Knight maintains that in studying grizzly bear population dynamics, Mattson was operating outside his field of expertise (habitat analysis) and was analyzing population data gathered by Knight and others without having asked for permission to do so. Thus, according to Knight, he was merely protecting his own data when he stopped Mattson's use of it.

Unlike the Keigley case, the Mattson case has reached a sort of resolution. Barbee and Varley intervened in the dispute and arranged a mutually agreeable transfer of Mattson to the University of Idaho National Biological Survey/Cooperative Park Studies Unit. There he will pursue a Ph.D. and complete the grizzly bear habitat work he started as an IGBST employee.

As of early January, there was no progress toward settlement of any of the scientific disputes involved, and no likelihood of that in sight. Nor were any legal or formal administrative actions known to be underway regarding the various positions taken. All parties continue to maintain they are right, and none seem at all persuaded by the arguments of their opponents.

Yellowstone Fire Bibliography Available

NPS

The International Association of Wildland Fire (IAWF) has published a 70-page bibliography containing approximately 1,000 titles relating to the fires of 1988. This bibliography, whose first edition was premiered at the fire conference in the park last September, is a collaborative effort of IAWF and NPS specialists, and at press time is being prepared for a second enlarged edition. The IAWF, which maintains an extensive research library on fire, can make available almost all of the materials contained in the bibliography.

The bibliography is available in paperback for $20.19 U.S. ($20.44 other countries), and may be ordered directly from the IAWF at P.O. Box 328, Fairfield, Washington 99012-0328. For more information on the bibliography and the IAWF's other fire-related publications, including a current list of books they sell, contact them at the above address or call 1-800-697-3443 (FAX509-283-2264, e-mail jgreenlee @igc.apc.org).

Cinnabar Symposium to Focus on Wilderness

The seventh annual Cinnabar Symposium will be held March 25-26 at the Museum of the Rockies in Bozeman, Montana. The symposium, entitled "Sustaining the Wild in Wilderness," will bring together some of the country's leading environmental philosophers, scientists, and policymakers to discuss the concept of wilderness.

Program organizers say that the symposium "will take a fresh look at the fundamental principles underlying wilderness preservation: what constitutes wilderness, why is it worth saving, and how can the values with wilderness be sustained?"

Speakers include Daniel Botkin, Director of the Program on Global Change at George Mason University and author of *Discordant Harmonies: A New Ecology for the Twenty-first Century*; J. Baird Callicott, Professor of Philosophy at the University of Wisconsin; T.H. Watkins, editor of *Wilderness* magazine; and Karen Sheldon, General Counsel for the Wilderness Society. Roger Kennedy, NPS Director, will give the keynote address on Friday evening, March 25.

Admission is $10. For further information, contact the Montana State University Yellowstone Center for Mountain Environments, (406) 994-5178, or the Education Department at the Museum of the Rockies, (406) 994-5282.

The annual Cinnabar Symposium, a public forum devoted to interdisciplinary discussion of wildland and wildlife issues, is sponsored by Montana State University and the Museum of the Rockies, with funds from the Montana Committee for the Humanities, the PEW Charitable Trust, and the Cinnabar Foundation.

Rare Animal Report System Overhauled and Computerized


RARE ANIMAL OBSERVATION FORM
YELLOWSTONE NATIONAL PARK

Please fill out all appropriate information and turn into Bear Management Office or phone 307-344-2162

Species _____ Time _____ a.m. p.m. (circle one)
Observation Date ____/____/____ Number of Animals _____ Sex: M__ F__ Unknown__

Observer Name _____ Phone ( ) _____ Visitor___ Employee__
Address _____ Date _____ Zip _____
Have you seen this species before? Yes___ No___ When? _____
Indicate explanation with this species

Describe the Animal (Characteristics unique to this species) _____

Color _____ Sex _____
Weight _____ Shoulder height _____ Horns/Antlers (circle one) Describe _____
Length _____ Tail position: Up___ Down___ Straight out___ Curled___
Tags or radio collar (color, placement) _____

Describe Behavior of the Animal _____

How long did you observe the animal? _____ Distance from animal _____
Optical aid used: None___ Binoculars___ Spotting scope___ Other _____ Power of optics _____
Photos taken? _____ May we make or have copies? Yes___ No___

Exact Location _____

Drainage _____ UTM _____E _____N Elevation _____

Describe Surrounding Area (i.e. meadow, marsh, forest) _____

Describe vegetation near animal _____
Describe animal size in relation to vegetation or other animals _____
Describe weather conditions (foggy, sunny, etc.) _____

Track measurements Length _____ Width _____ # of toes ____ Claw marks? ____ Sexist _____
In Mud? ____ Dust? ____ Snow? ____
Scat Diameter _____ Length _____
Vocalizations Yes___ No___ Describe in (sentences) How long _____ How many animals _____
Comments _____

Report taken by _____ Title _____
Date _____ Time _____ Location _____

sentences below.

Use this form to record observations of reptiles, amphibians, uncommon animals (other than bears and birds ask for a bear or bird sighting form), and unusual behavior and atypical locations of common animals. Below is a list of animals that are especially important to report. When in doubt, fill one out.

Amphibians	Fisher	Mountain Goat	Reptiles
Beaver	Fox	Mountain Lion	White-tail deer
Bighorn Sheep	Lynx	Otter	Wolf
Bobcat	Mink	Raccoon	Wolverine

SEND ALL OBSERVATION REPORTS TO BEAR MANAGEMENT OFFICE

Claw length
Length
Width

Stride

The method of measuring stride shown on a bobcat track.

Notified Bear Mgmt. (Date/Time) _____ Rec'd by _____
Bear Management notified the following (who/date/time):
SDO _____ DO _____ RM _____

Prior to the 1930s, observations of rare animals within Yellowstone National Park were recorded primarily in personal and employee journals, Army scout diaries, Army station records, and monthly and annual reports from the park Superintendent. During the 1930s, the NPS began a more systematic wildlife reporting system, with wildlife observations being recorded on Wildlife Observation Cards. The system was further refined in 1986, with the implementation of the Rare Animal Sighting Form System.

Although these observations contained very useful and important information, the large noncomputerized database made data analysis, sorting, retrieval, and summaries a very tedious and time-consuming process. In an effort to make data analysis faster and more efficient, the Yellowstone Center for Resources (YCR) updated and computerized the Rare Animal Sighting Report System in 1993.

The new computer database breaks down each sighting into 56 separate pieces of information (or fields) that can be quickly sorted and retrieved. The new computer database can be used in conjunction with the parks Geographic Information System (GIS). In addition, the database is completely compatible with the U.S. Fish and Wildlife Service's Wolf Reporting System and the National Heritage Project's Conservation Data System.

The new program will make the sighting reports much more useable for research biologists, management biologists, and resource management coordinators, as well as for visiting and contracting researchers. For example, the U.S. Fish and Wildlife Service can use the Rare Animal Sighting Report System as a tool to help determine if and when wolf packs become established in the Yellowstone ecosystem.

In another example, researchers may soon start a red fox research project within the park. As part of their preliminary work, they will be reviewing the existing data on red fox sightings within the park to determine study area boundaries. The red fox data can be quickly retrieved from the Rare Animal Sighting database and locations mapped through the park's geographic informaton system.

Data from 1986 to the present have been entered into the computer database. This database consists of more than 1,000 records, ranging from species as small as amphibians and flying squirrels to as large as gray wolves and mountain goats. Wildlife observation records prior to 1986 will still be available for use manually, through the Wildlife Observation Card System.

The YCR encourages all park visitors, employees, and researchers to report sightings of uncommon animals as well as unusual animal behavior or atypical locations of common animals. Rare animal sightings can be reported at all ranger stations and visitor centers in the park, or to the Bear Management Office. To obtain sighting forms or further information please contact the Bear Management Office, P.O. Box 168, Yellowstone National Park, Wyoming, 82190, (307) 344-2162.