



Message from the Council Chair

Here it is 2015 already. Despite a little snow, perhaps some of you have ventured out to monitor your sites. And lectures resume the first Wednesdays of the coming three months starting 2/4. See below for our lineup and watch for reminders online.

Your council members met January 24 to plan events for the coming year as well as to elect officers. Those serving second-year terms are Irene Wanner, chair; Beth Parisi, vice chair; and Stella Davidsen, member-at-large. Those beginning what will probably be two-year terms – officers are voted in a year at a time with a two-year maximum but the possibility of returning in later years – are Nancy Hudson, budget coordinator; Steve Lund, secretary; and members-at-large Judith Isaacs and Courtney Perkins. We all want to thank Ann White for maintaining the financials these past two years and Kelly Aldridge, who served as our secretary. Both were accurate, industrious, and much appreciated. Anyone interested in serving in coming years is welcome to contact me at iwanner@uw.edu.

The next Council meeting will be held at 9 am on Saturday, April 25, in the conference room, SFNF, Santa Fe. Stewards are welcome to attend.

On a sad note, we were sorry to learn about the death of Jamie Gardner, a member of the Jemez Area team, on January 17. He and his wife, Chris, were diligent monitors of several sites. In addition, he was unfailingly generous with his time and expertise in geology, giving talks at more than one annual meeting. We'll miss him.

Another outcome of the council meeting was to set Saturday, September 19, as the date for our annual chili cookoff, formerly known as the annual meeting. Of course, there will be updates on the program from ATLs and about the forest from Mike Bremer in the morning, afternoon speakers, and a silent auction all day. And, as always, we'll have a delicious potluck lunch with the usual culinary delights. At the moment, the committee is researching possible venues. Ghost Ranch near Abiquiu? Fuller Lodge in Los Alamos? Museum Hill in Santa Fe? We're taking an online vote of all stewards this week. Stay tuned for results and be sure to mark the date as taken on your calendars. Anyone who'd like to join the committee can contact Will Dearholt at wrd@lanl.gov.

When you do head into the field, be sure to contact your ATL on departure and return. Take all the usual safety precautions, file your site visit report online, and enjoy the forest and

its riches.

—Irene Wanner



From left, Steve Lund, Stella Davidson, Irene Wanner, Courtney Perkins, Judith Isaacs, and Nancy Hudson.

Photo by Paul Leo.

INSIDE THIS ISSUE:

ARC Burn—Ongoing Research in the Jemez	2
One More Award	4
Fall 2014 Field Activities	4
Final Lecture for 2014	5
Cotton Farming in New Mexico before Columbus	6
Ongoing Research in the Gallina	7
Heritage Resource Investigations Course	8
Interesting Reading	9
Jamie Gardner	10

Contributors to this Issue

- Bill Cella
- Connie Constan
- Chris Gardner
- Elaine Gorham
- Paul Leo
- Paula Lozar
- David Strip
- Phil Young

The editors thank you!

ARCBURN – Ongoing Research in the Jemez

ArcBurn is a research project studying fire effects on cultural resources. It is funded by the Joint Fire Science Program under the title *Linking field-based and experimental methods to quantify, predict, and manage fire effects on cultural resources*. It involves an interdisciplinary-team comprising archaeologists, soil scientists, ecologists, fire managers, and social scientists (see the project website, <http://www.forestguild.org/Arcburn>). The principal investigator is Rachel Loehman, a fire ecologist. Our objectives are to provide guidelines for best management practices for cultural resources in fire-prone landscapes.

Fuel treatments have been shown to reduce fire severity, but the effectiveness of risk mitigation operations is constrained by lack of information in three areas: the range of fire effects on cultural resources, quantification of the magnitude and duration of heating that result in permanent damage, and linkage between fire effects and operational fire models. To assess these areas, the research includes laboratory experiments to replicate variable burn environments and the direct effects of fire exposure on archaeological materials, field-based examination of post-fire effects from the recent Las Conchas Fire (2011), and instrumentation of archaeological sites and materials during prescribed fires (San Juan Rx 2012) and managed fires (Pino Fire 2014).

The laboratory experiments are examining masonry (volcanic tuff rock), lithics (obsidian), and ceramics (painted and utility wares). The fire environments we are looking at are radiant heating, smoldering, and direct flame contact. Experiments are being conducted at the Forest Service Fire Lab in Missoula, Montana.

Work compiling and analyzing the post-fire effects from the Las Conchas Fire is in its initial stages. These data will be integrated into a fire model that incorporates several factors, such as slope and vegetation. If possible, we will include additional post-fire information from other older fires in the Jemez Mountains.

For the San Juan Prescribed Burn in 2012, we instrumented at three fieldhouses, one large pueblo, and one plot specifically in a thick pine tree seedling area. The instrumentation con-

sisted of temperature loggers with eight thermocouples per logger. Temperatures ranged from almost no rise to 1,470 degrees Fahrenheit (800 degrees Celsius). Many of the higher temperatures were shorter duration spikes, but some were incremental rise and fall of temperature over hours. Duration seems to have been from one hour to more than 16 hours, but shorter durations of a couple of hours seem to be more common.



At left, fire behavior instrument

Photo by Connie Constan

Post-fire monitoring was conducted at 28 archaeological sites. The sites were light to moderately burned, and most can be described as

scorched. There were limited effects to archaeological materials. Several of the sites exhibited old fire effects from previous prescribed burn entries. Post-fire analysis showed varying levels of fuel treatment effectiveness.

During the Pino Fire in 2014, we placed instruments at seven plot locations (1m x 1m) within three archaeological sites. The plots were placed in locations to include masonry stone, while the ceramics (40 sherds) and obsidian (72 flakes) were brought into the site and placed in the plots. To provide variation, certain plots incorporated fuels to simulate untreated sites—piled slash and a masticated fuels layer.



At right, retrieval of artifacts

Photo by Connie Constan

ARC Burn - Ongoing Research in the Jemez (cont)

Our instrument arrays included surface and near-surface temperature loggers and above-ground fire behavior packages. Thermocouples (sensors that measure temperature) were placed on artifacts that were on the ground surface, below surface fuels such as slash, or within mastication, and recorded temperatures over a 24-hour period during and after the fire. The thermocouples showed ranges in temperature from around 210 degrees Fahrenheit (100 degrees Celsius) to about 1,740 degrees Fahrenheit (950 degrees Celsius) at the artifact locations, with variable heating durations from 3 to 24+ hours.



At right, temperature logger

Photo by
Connie Constan

Fire behavior packages were arrayed on tripods within the sites to document variables such as peak air temperatures, which ranged from 175 degrees Fahrenheit (80 degrees Celsius) to 3,450 degrees Fahrenheit (1,900 degrees Celsius) (average 1,600 degrees Fahrenheit/870 degrees Celsius), flame length, rate of spread, and amount of convective and radiant heat produced by the fire.

Post-fire monitoring was conducted at 22 archaeological sites. All the assessed sites were either unburned or lightly to moderately burned at the site level. Based on the monitoring work on the San Juan and Pino Fires, suggested im-

provements are: larger ignition buffers around archaeological sites to allow fire to spread through sites without adding extra ignition via torch; tailored ignition patterns that reduce fuel hazards around sites, but mitigate the potential for high severity fire areas that occur with terrain or fuels jackpots; off-site removal of slash and heavy fuels; and minimal treatment of live fuels.

In conclusion, the ArcBurn project strives to describe wildfire effects using data gathered from post-fire visits to sites affected by the Las Conchas Fire and other fire events in the Jemez Mountains. We are working to quantify fire environment variables related to damage to archaeological material through laboratory experiments at the Fire Lab in Montana. The goal is to define the relationships between fire behavior and impacts. There will be a synthesis of information that has initially led to the development of an online portal housing useful but not well distributed reports and papers about fire effects on cultural resources. See the website www.frames.gov/partner-sites/arcburn/.

The final product will be linking science and management by developing a shared language and protocols for the fire and cultural resource managers. It will include a GIS vulnerability model integrating treatment, fuels, and landscape variables (including erosion data) to anticipate cultural resource effects. We will create tools to integrate cultural resources fire effects into operational fire effects models and a technical guide that will distribute our recommendations for protecting cultural resources from fire effects. Results of this project will be critical as we move forward in the next five years applying treatments—including fire—to thousands of acres with thousands of our archaeological sites.

- Connie Constan
Assistant Archaeologist, Jemez Ranger District

One More Site Steward Award

The third recipient of our annual award was not disclosed at the annual meeting. A certificate and keishi was given to Lois Haggard at the October lecture by Irene Wanner.



Her certificate reads:

For her dedication in developing the interim training program for site stewards on the Santa Fe National Forest. She single-handedly edited and condensed the individual presentations to a useful format that could fit in the time allotted. The lead trainer (and Forest Archaeologist) is very grateful for the work she did.

Lois received a Wolf (Yuna:wikko'o) keishi.

Wolf medicine has to do with deciphering information and finding new pathways for the benefit of the clan. Being part of a clan and exhibiting loyalty to it is some of the wisdom Wolf brings. And yet, even though Wolf is very loyal, it retains its individuality within the clan.



Photos by Paul Leo

Congratulations, Lois!

Fall 2014 Field Activities



Caja del Rio crew (Stella Davidson, Steve Lund, Gary Newgent and Steve Koenig) put up a site steward sign for Los Aguajes Pueblo.

Photo by Paula Lozar



Mike Bremer and Lee Borduin put a new tarp on the roof of the excavated pithouse in the Gallina area, a now-annual chore before a new roof is constructed.

Photo by Bill Cella

Final Lecture for 2014

On November 5, about 40 site stewards gathered to hear Dr. David Stuart's talk titled "Food, Labor, and Calories: The Development of Four Corners Farming Society." We were just finishing our brown bag dinners of sandwiches, salads, and the wonderful cookies Gail Bryant always bakes as an extra treat, so it was particularly interesting to compare our comfy situation with early Four Corners peoples whose struggle to survive drought, failing crops, societal upheaval, and inadequate nutrition contributed to the collapse of the Chacoan world.

Dr. Stuart explained that the presentation had grown from a University of New Mexico two-semester undergraduate course. He began with a thumbnail sketch for A.D. 250. A typical pit house family might have numbered about 11 people. They were small – men, 5 feet, 3 inches, and women a couple of inches shorter – slender, and metabolically efficient, with a diet of corn, beans, and squash as well as occasional animal protein. Typically, they lived near water so they could farm.

Flash forward to A.D. 400. A growing population now needs more and bigger plots of land under cultivation, which require more labor – therefore, more calories for a larger group doing harder work – as well as more water. But often there isn't more water. So people begin dry farming farther and farther from what little water exists, praying for winter snow and summer monsoons. And they start building places to store any possible surplus against the growing threat of insufficient yields in the future.

By A.D. 650-700, the situation is approaching its limits. There are many more people but far

less food. Under nutritional stress, body size decreases. By A.D. 800, average height has dropped 1 ½ inches. Nitrogen, a natural soil fertilizer, is becoming depleted. Animal protein intake drops; large game eventually seems to have disappeared. The population had grown fourteen-fold since A.D. 250, but now infant mortality is up and life expectancy down.

The gradual Chacoan response to the scattering of people in search of arable land was to build a system of great houses – containing ever larger storage areas – and roads. For a time, the great houses, which seem to have been involved with resource distribution, secure the food supply. And roads reduce the energy needed to transport goods, saving calories needed to sustain workers. But as this system becomes larger and more spread out, it grows "at a price," Dr. Stuart explained. The wealthy, upper class, and priests, who hoard the best for themselves, actually remain healthy and even become taller, forming an elite out of touch with commoners. Building more great houses and devising elaborate religious rites do little to address the inevitable crisis. So, with big drops in precipitation and facing starvation, people begin to move away, for example, to the Animas River and Aztec.

Dr. Stuart ended his fascinating portrait of this unsustainable civilization with a cautionary remark from something he'd once read. The more complex a society is, he said, the shorter the time it will survive. Many of us thought about the strains we put on our world's resources today and how we might learn from problems faced by the ancient people of the Four Corners region.

— Irene Wanner

March Lecture

The Wednesday evening lecture on March 4 will feature Chip Wills, Professor of anthropology and a regents lecturer at the University of New Mexico. Dr. Wills' talk is titled "Did Reforestation Cause the Chaco Collapse?"

(Frances Underhill has volunteered to take notes and write a story for the Spring 2015 Site Lines. Thank you, Frances.)

Cotton Farming in New Mexico before Columbus

Glenna Dean, an archaeobotanist, is the former New Mexico State Archaeologist, and retired three years ago as Executive Director of the Northern Rio Grande National Heritage Area. She is also a spinner and weaver with a special interest in natural dyes. Her professional and personal interests led her to study cotton growing in northern New Mexico, especially the use of “farming with rocks,” i.e., grid gardens with gravel mulch. This lecture was given on February 4, 2015.

Common myths about cotton in the New World are as follows.

Myth 1: Europeans brought cotton to New Mexico. On the contrary, when Spanish explorers arrived in the Southwest in the 16th century, they found that cotton was widely grown. They were bemused by the fact that New World cotton grew in colors, including red, blue, and yellow; the domesticated cotton they knew in Europe was white. But the quality of the cotton, and the sophisticated techniques used to weave and knit with it, soon led them to appreciate it. For many years, cotton mantas (wearing blankets) were part of the tribute that the Pueblos were required to send to Mexico City.

Myth 2: All cotton is white. No: South American cotton grows in colors, and Mexican cotton is usually brown. (Native cottons and domesticated white cotton are different species and don't hybridize.)

Myth 3: Cotton is an annual. In fact, New World cottons are perennial. They don't produce a boll in the first year, but after that, they will produce annually, unless killed by frost.

Myth 4: Cotton breeding is a modern science. Not so: As early as the 7th century AD, on the

Arizona-Mexico border, perennial cotton was bred to become an annual, a process that probably took generations of people to accomplish by selecting for faster growth.

Myth 5: Cotton requires a long growing season. In Arizona, cotton has a 120-day growing season, but in the ancestral Tewa area, this was reduced to 90 days.

Myth 6: Cotton requires prime farm land. No: In northern NM, especially the Rio Chama area, cotton was typically grown in gravel-mulched plots outlined with larger cobbles. The gravel fill captured snowmelt and water, and provided heat retention, leading to earlier sprouting. Cobbles held the gravel in place and helped to slow down the flow of water. Pollen analysis proves the presence of cotton in the gravel fill of these grid fields, along with food crops such as corn, beans, and squash.

Farming with rocks apparently started about 1250, when drought in the Four Corners area caused the population to migrate southward. All the good farmland was already taken, so the residents developed techniques to farm on marginal land, such as the sloping benches above the Rio Chama. The technique fell into disuse about 1500, when dropping temperatures led to a shorter growing season and the population consolidated into large pueblos along the Rio Grande. But, to this day, the disused grid fields retain water and promote plant growth.

Gravel grid farming is almost invisible on the landscape unless you know what to look for, but it was extensively and successfully practiced in the northern Rio Grande area for centuries.

—Paula Lozar

April 2 Lecture

The Wednesday evening lecture on April 1 will feature retired National Park Service archaeologist Joan Mathien. The title of her talk is “The Role of Gems and Minerals in the Pueblo World.”

Anyone want to take notes and write an article for the Spring issue of *Site Lines*? Step right up!

Ongoing Research in the Gallina Area

If you monitor archaeological sites in the Gallina, you will quickly notice that many of the sites are on ridge tops while relatively few are on valley bottoms. A popular conjecture for this mix is that ridge-top locations are more defensible. Another line of thinking is that ridge tops allow signaling between sites, though the proximity of sites argues against this explanation. It is well known that nighttime temperatures are colder in valley bottoms, but are the temperature differences between valley bottoms and ridge tops large enough to be a factor in locating residences for the Gallina people?

In 2013, we Gallina stewards began a study to address this question. New technology in the form of small, low-cost, environmentally rugged recording temperature monitors has allowed us to measure the temperature at various locations throughout the area formerly inhabited by the Gallina people. Temperature measurements are recorded four times a day: midnight, 6 a.m., noon, and 6 p.m. The sensors are retrieved, read, and replaced every six months.

We have put sensors at 10 site locations, including Nogales Cliff Dwelling, the ridge above the Nogales Cliff Dwelling, and other sites on ridge tops, table mesas, and near valley bottoms. The sensors are attached to trees at about shoulder height in locations to avoid direct

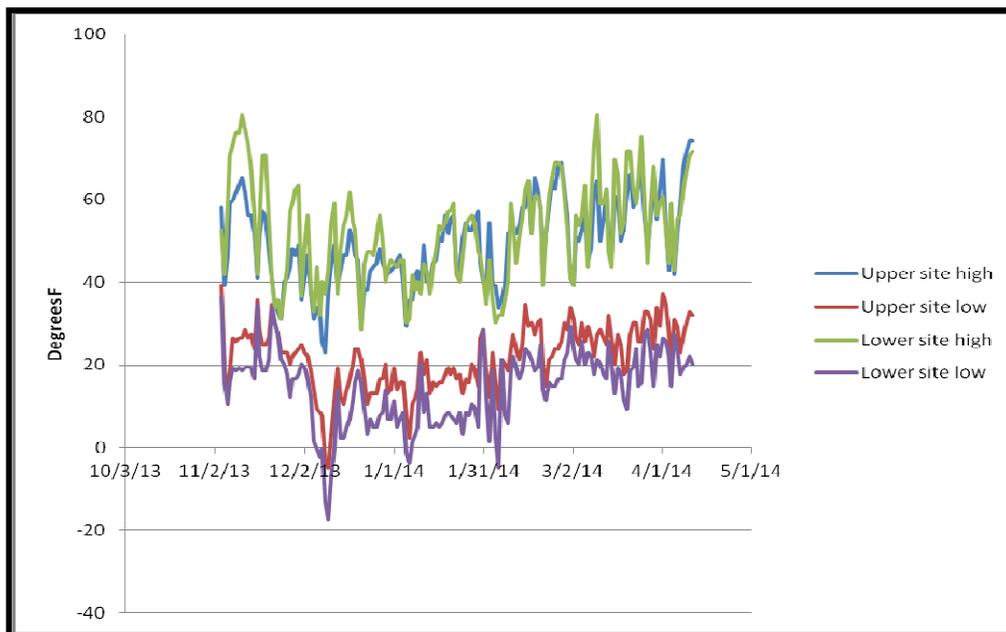
sunlight. We have found that nighttime winter temperatures can differ substantially between the valley bottom and the ridge tops, in some places by as much as 20 degrees Fahrenheit. The graph below shows the temperatures for two sites in Cañada Ojitos. These sites are only a few hundred yards apart, separated vertically by 300 to 400 feet.

As can be seen from this graph, nights are substantially colder in the valley bottom, with similar daytime highs for much of the winter. While these data are not sufficient to answer the question whether temperatures drove the Gallina people to build on the ridges, they suggest sufficient support to warrant comparing how well this theory explains the location relative to competing conjectures such as defensive positioning.

Temperature measurements are ongoing in all original locations, in order to obtain data consistency. Currently, we have had sensors in the field for 18 months, with plans to continue obtaining data indefinitely. Our goal is to have adequate site characterizations and temperature data to present at the upcoming Pecos Conference.

We would like to thank the Site Steward Foundation, which provided the funding to purchase the temperature sensors.

-Elaine Gorham and David Strip



Heritage Resource Investigations Course, Silver City December 2014

Every couple of years, our heritage protection partners at the State Historic Preservation Division (HPD), New Mexico Department of Game & Fish, and New Mexico State Parks ask for a 2-3 day course in the investigation of archaeological damage cases, or ARPA, for the Archaeological Resources Protection Act of 1979.

Led by Phil Young, a SFNF site steward and SiteWatch volunteer, the course was most recently taught December 2-4, 2014 in Silver City. Participants included professional archaeologists and law enforcement officers (LEOs). Previous courses were primarily attended by contract archaeologists and state/local LEOs. However, the Silver City session had a strong showing from our federal agencies, especially the Forest Service and Bureau of Land Management. In particular, Annmarie Kmetz, an archaeologist from the Pecos/Las Vegas Districts of the Santa Fe National Forest, attended.

Subjects and topics included the looting, collecting and trafficking network; what is "hot" and why; federal and state statutes protecting archaeological resources and human remains; artifacts and tools of the trade: tools used by violators; cultural resources crime scene management and investigation; dealing with, and handling of, human remains; and archaeological damage assessment methods. A half-day field scenario highlighted the 20-hour course.

This year's class was cosponsored by HPD, the Gila National Forest, and our very own Site Steward Foundation (SSF); and for the very first time, the course was able to accept payment via credit cards due to SSF's capability to process those payments. This service resulted in \$468.00 being donated to the SSF for ongoing steward support and programs.

-Phil Young



Krysia Baron (Cibola National Forest LEO-ret) and Norm Nelson are on left in above photo.



Flagging was used by the teams to demarcate their forensic crime scene area boundary (photo above) and pin flags (photo below) were used by teams for physical evidence loci.

Photos by Phil Young



Interesting Reading

Plunder of the Ancients - A True Story of Betrayal, Redemption, and an Undercover Quest to Recover Sacred Native American Artifacts

By Lucinda Delaney Schroeder
Lyons Press. \$22.95. 248 pages.

In 1974, when Lucinda Schroeder was hired as a special agent for the U.S. Fish and Wildlife Service, she was one of the first women to work as a federal investigator of crimes against wildlife. She wasn't permitted to write about covert operations until her retirement in 2004. Then, her 2010 book, *A Hunt for Justice: The True Story of a Wildlife Undercover Agent*, described a sting in which she helped successfully infiltrate an international ring of guides who poached bears, wolves, and other trophy animals in Alaska.

Later, she and her husband moved to Albuquerque. When her cover was blown in an investigation involving importers of parrots and other illegally-traded animals, she found herself joining forces with FBI and National Park Service agents, setting up another sting, this time to recover 24 Navajo *yei* masks as well as numerous items that had eagle parts and feathers, which are also illegal for all but very few people to own or sell. In fact, in the mid-1990s, sales of Navajo, Hopi and Pueblo sacred objects in Santa Fe's galleries were becoming widespread and so lucrative, artifacts were vanishing from tribal kivas and social houses, either stolen and/or bought for ridiculously low prices.

Schroeder sets herself up as Dana Delaney, secretly the head of Operation Monster Slayer, publicly a dealer of mostly legal Native American goods. Dressed in a flounced skirt with a derringer in her bra,

packing bigger heat in the small of her back, and a tiny video recorder in her leather bag, she narrows down her targets to Tony Lorenzo (names are changed), who buys on reservations and sells primarily in Santa Fe, and Spirit Bear gallery owner, Dirk DeVries. Her plan, she writes, is to find out what these two want and then give it to them. That is, she'll slip in some shady deals to ascertain their ethics while at the same time trying to purchase things they shouldn't possess or offer.

Inevitably, Schroeder's book will be compared to Tony Hillerman's mystery series. The writing itself is more reportorial, relies less complex characters, and the narration is first-person point of view told by an Anglo woman. But this true-crime story has the appeal of something that really happened.

And it doesn't disappoint. There are satisfyingly good and bad guys in addition to personal risks Schroeder takes that keep the pot boiler boiling. She suffers several setbacks along the way including serious health problems but, inspired by Monster Slayer, one of the Navajo war god twins, whom she describes as responsible for warding off evil, she remains determined to bust Lorenzo and DeVries.

For the outcome, you'll have to read the book. And it is an enlightening, timely tale because such greed and commerce in the sacred cultural heritage of Southwest peoples continues to thrive.

Schroeder shows that her work was also a spiritual experience. "The Indians taught me that it was good to call attention to beauty," she explains, "to express humility and gratitude, and to work for the greater good. Setting your mind on good things brought blessings and left no room for evil."

—Irene Wanner

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We're on the Web
www://snfsitestewards.org

Jamie Gardner

Once again, it is with great sadness that I write another obituary for a site steward. We all hoped that Jamie would beat the diagnosis of esophageal cancer, especially after seeing him at the September 2014 annual meeting, as well as when he led a geology tour of the Jemez Mountains in mid-October. At 61, he was too young to leave us.

Jamie and his wife, Chris, joined the site stewards in the spring of 2008, were members of the Jemez Area team and, in addition to other sites, monitored Seshukwa, an impressive pueblo with standing walls and outstanding rock art on one side of the mesa. A Forest Road ran close to the site, making it accessible until all roads in the immediate area deteriorated. Jamie was always willing and enthusiastic about providing us with a talk about the local geology and did so at several of our annual meetings. Telling people about rocks was as interesting to Jamie as knowing about rocks.

Jamie was born and raised in Spokane, Washington; business took his family to Japan and thence to California. He graduated from the University of California at Santa Cruz with a Bachelor of Science in earth science. By 1985, he received his Ph.D. in geology from the University of California at Davis. He worked for Los Alamos National Laboratory for 29 years, retired in 2008, and moved to Jemez Springs. What better place for a geologist to live than San Diego Canyon, with its high ridges rising on both sides of the valley—the story of the past clearly written in the nicely stratified steep mesa cliffs.

Jamie and Chris married in 1981; they have two grown children, daughter, Leah, and son, Alexander. The family hosted a wake on Saturday, February 21, in Jemez Springs.

Suggested memorial funds are the Friends of Jemez Springs Public Library, PO Box 16, Jemez Springs, NM 87025 and the Site Steward Foundation.

We will miss him.

-Nancy Cella



Jamie Neal Gardner
May 29, 1953—
January 17, 2015

Photo by Chris Gardner