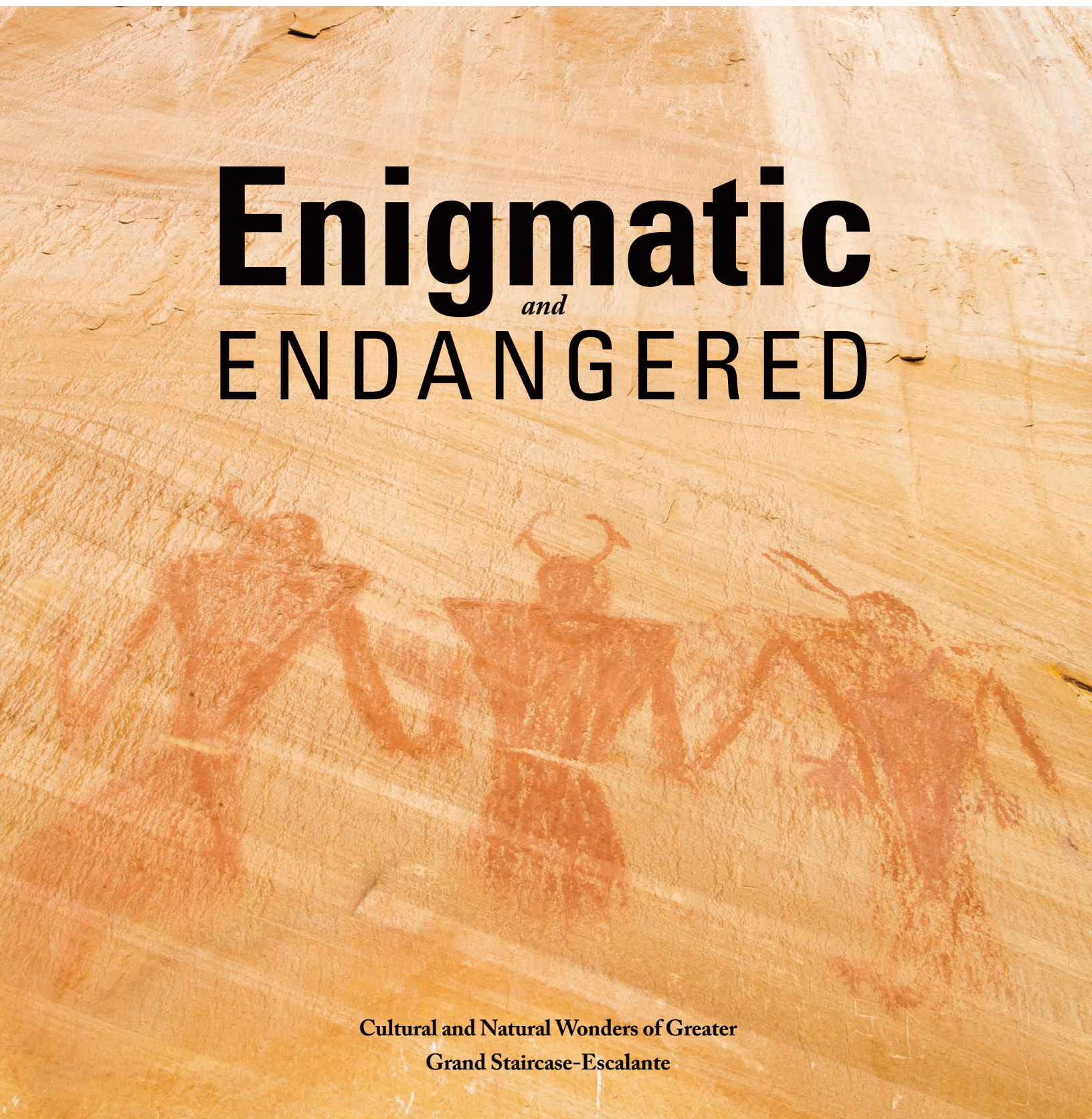
ARCHAEOLOGY SOUTHWEST magazine

WINTER & SPRING 2019

A QUARTERLY PUBLICATION OF ARCHAEOLOGY SOUTHWEST

VOLUME 33 | NUMBERS 1 & 2



Enigmatic *and* ENDANGERED

Cultural and Natural Wonders of Greater Grand Staircase-Escalante

inside this issue

Cover image: *Fremont pictographs in Lower Calf Creek Canyon, Grand Staircase-Escalante National Monument. Three figures with linked hands appear in other Fremont rock art. Note that the figure on the right has been painted over another figure. These are between four and five feet tall, and are visible from a fair distance. Another view of this evocative trio is on page 42.* IMAGE © JONATHAN BAILEY

ISSUE EDITOR:

R. E. Burrillo

ONLINE EXCLUSIVES:

For additional references and links, visit
www.archaeologysouthwest.org/asw33-1-2

SUBSCRIBE:

Use the enclosed envelope or inquire by:

phone: 520-882-6946, ext. 26
online: archaeologysouthwest.org/subscription
email: kfitzpatrick@archaeologysouthwest.org

Established by William H. Doelle in memory of his mother, the ***June Harper Doelle Endowment fund*** *supports the publication of* Archaeology Southwest Magazine *and other public outreach programs.*

Contact Linda Pierce *at (520)882-6946, ext. 23, or lpierce@archaeologysouthwest.org to learn how to support our mission through an endowment.*

Additional funding for this issue came from the Conservation Lands Foundation.

Archaeology Southwest

Archaeology Southwest Magazine (ISSN 1523-0546) is a quarterly publication of Archaeology Southwest. Kate Sarther (kate@archaeologysouthwest.org), Content Editor. Kathleen Bader, Design Production.

Archaeology Southwest is a private 501 (c) (3) non-profit organization supported through memberships and donations, as well as grants from individuals, foundations, and corporations. For three decades, Archaeology Southwest has practiced a holistic, conservation-based approach to exploring the places of the past. We call this Preservation Archaeology. By exploring what makes a place special, sharing this knowledge in innovative ways, and enacting flexible site protection strategies, we foster meaningful connections to the past and respectfully safeguard its irreplaceable resources.

Enigmatic and Endangered: Cultural and Natural Wonders of Greater Grand Staircase-Escalante

NICOLE CROFT
GRAND STAIRCASE ESCALANTE PARTNERS

Remote, wild, sprawling, Grand Staircase-Escalante National Monument defies imagination. Its spectacular landscape bears witness to the oldest time of our planet, to the oldest human habitation on the Colorado Plateau, and to what often feel like the oldest debates about America's public lands.

Grand Staircase-Escalante was first conceived as a landscape to set aside for perpetuity as early as 1935. Although World War II sidelined that proposal, the region's majestic canyons, cultural significance to indigenous peoples and Mormons, and emerging recognition as North America's most exciting paleontological bone bed all encouraged President Bill Clinton to designate it as a national monument on September 18, 1996.

This new monument was to be a science monument, an experiment in diverse land use that protected traditional uses—including grazing, gathering of ceremonial plants, and scholarship—in an effort to understand this magnifi-

View west of Boulder, Utah. Boulder is near the eastern unit of Grand Staircase-Escalante National Monument (see map on page 6). This unit comprises the Escalante River and its tributary canyons. IMAGE © STEPHEN STROM

A Closer Look

Grand Staircase Escalante Partners is a nonprofit 501(c)(3) organization committed to preserving and protecting the vast landscape of Grand Staircase-Escalante National Monument for the use and enjoyment of present and future generations. As the official "friends" organization for Grand Staircase-Escalante National Monument, Grand Staircase Escalante Partners promotes science, education, and conservation on the monument; builds its membership to represent a constituency that supports the monument; increases public awareness and understanding about the monument; provides resources to support the monument's scientific, interpretive, and educational programs; and recruits volunteers. Learn more at **gsenm.org**.

cently diverse corner of the Colorado Plateau. The science has not disappointed.

More than 21 new species of dinosaurs have been discovered here, providing insight into life on the 100-million-year-old continent of Laramidia through to the dinosaurs' last days 66 million years ago. Today, as in comparatively recent centuries, ribbons of lush green wend through enormous sandstone canyons, providing healthy riparian habitat for an abundance of plants, animals, and insects. In fact, 85 percent of the biodiversity of the state of Utah may be found here. More than 650 species of bees live in Grand Staircase-Escalante, some incredibly specialized for this habitat—and therefore incredibly vulnerable.

This has also been a working landscape for centuries, evidenced in swaths of wild potato growing in pockets even today, tiny corn cobs scattered in ancient alcoves and dwellings, and generations-old ranches. And this aspect—that of a landscape in which lives are sustained—is where conflict around the Grand Staircase-Escalante is grounded. Who does the land belong to? What is the land's best use, and who should be making those decisions?

President Trump's 2017 proclamation reducing the boundaries of Grand Staircase-Escalante National Monument by nearly half has amplified these questions. That decision is currently being challenged in the courts by Grand Staircase Escalante Partners and a cadre of scientific and conservation organizations. We stand with the majority of legal scholars who believe that proclamation exceeded the bounds of executive power.

This landscape has challenged, nurtured, and inspired people for millennia. Grand Staircase Escalante Partners works to engage the public on the monument, defend its boundaries, and ensure that this place receives the strongest possible conservation so that our generation is not the last to be captivated by its grandeur.

I invite you to learn about this wondrous cultural and natural landscape through the words and images offered in these pages by our many partners and friends. I encourage you to bring that knowledge with you when you come to the monument and visit with respect, ready to learn more. I urge you to join us in strongly advocating for the future of Grand Staircase-Escalante National Monument.

Panoramic view of The Cockscomb, an impressive monocline (geologic fold). IMAGE © TIM PETERSON

An Outdoor Archaeological Laboratory

JERRY D. SPANGLER
COLORADO PLATEAU ARCHAEOLOGICAL ALLIANCE

On September 18, 1996, President William Jefferson Clinton stood on the South Rim of the Grand Canyon and, with a stirring speech and the stroke of a pen, issued a proclamation creating the 1.7-million-acre Grand Staircase-Escalante National Monument (GSENM). The new monument encompassed the lion's share of federal land in Utah's Kane and Garfield Counties, and it was later expanded to 1.9 million acres through a subsequent land trade with the state of Utah (below right).

This was the largest national monument created specifically as an outdoor scientific laboratory. And the rich archaeological resources of the region were specifically highlighted as a justification for the monument. As Presidential Proclamation 6920 states:

> *The cultural resources discovered so far in the monument are outstanding in their variety of cultural affiliation, type, and distribution. Hundreds of recorded sites include rock art panels, occupation sites, campsites, and granaries. Many more undocumented sites that exist within the monument are of significant scientific and historic value worthy of preservation for future study.*

Truth be told, in 1996 archaeologists knew there was a lot of undocumented archaeology in the new monument, but they had little grasp of what it all meant or how the ancient resources of the region related to better-known manifestations to the east and west. In fact, the data gaps were massive.

Now, almost 25 years later, it is appropriate to look back on what has happened since the outdoor archaeological laboratory was opened and ask the question—has the monument been fulfilling the intent of the original proclamation? The answer, at least from my perspective having worked in GSENM since 1998, is an unqualified "beyond a shadow of a doubt."

Research initiated after GSENM's designation has resulted in systematic inventories of more than 36,000 acres and 33 miles of river corridors, documentation of at least 1,587 archaeological sites, partial excavation of more than two dozen sites, and a cumulative radiocarbon database that now includes more than 400 dates. Although the quantitative nature of these investigations is impressive, more important are the contributions these efforts have made toward an understanding of past lifeways. To consider just a few:

» Archaeologists have long viewed Coombs Village (now protected as Anasazi State Park) as an anomalous intrusion of Kayenta folk from what is now northern Arizona (page 37) in late Pueblo II times. But through the research of Brigham Young University (BYU), we now know that Ancestral Pueblo presence was far greater than ever thought, ranging from the Lampstand in the northeast corner of the monument to the Wide Hollow area outside the town of Escalante. We now see the "intrusion" not as a displacement of Fremont farmers, but rather as a brief

A Closer Look

State Trust lands were granted by Congress to western states as they entered the Union. When the public domain was mapped into six-by-six-mile Township quadrats consisting of 36 square-mile sections, the respective state was given sole ownership over several of those sections (in Utah, these are 2, 16, 32, and 36). The state may then use these to generate revenue through energy and mineral leases, rent, and royalties; real estate development and sales; and surface estate sales, leases, and easements.

The Utah State Institutional Trust Lands Administration (SITLA) allocates the proceeds to their beneficiaries, mostly the public school system. These SITLA allotments may also be used for land exchanges in which state-owned land is handed over to the federal government in exchange for a federal allotment of approximately equal value—or vice versa. When the 1996 designation of GSENM enveloped more than 200,000 acres of State Trust lands across two counties, SITLA and the Utah delegation worked with the federal government to facilitate an exchange of 139,000 acres of federal land and $50 million paid to the state of Utah by taxpayers nationwide in compensation for lost mineral royalties. The 2017 reduction of the monument did not include a refund.

— R. E. Burrillo
SWCA Environmental Consultants

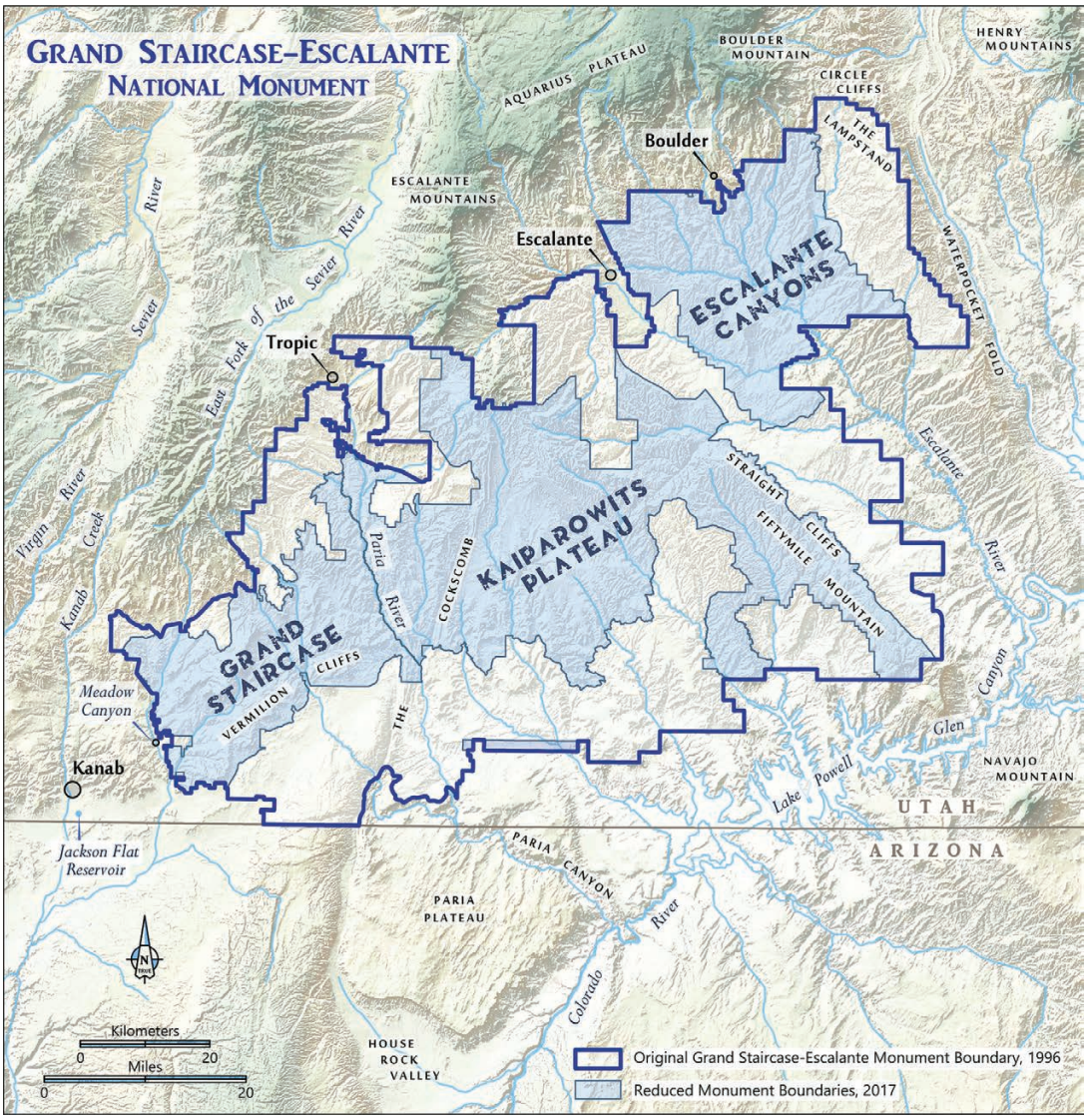
coexistence of Fremont and Ancestral Pueblo groups (pages 40–41, 41–43).

» A Fremont presence has long been recognized in the eastern portion of GSENM, but we knew almost nothing of that culture history there in 1996. We had no idea when farming started in the region or how these farmers related to others to the south and west. Through the combined efforts of BYU, Don Keller, and Doug McFadden, we now know the region was home to Archaic hunters and foragers for thousands of years, some of whom embraced agriculture by at least AD 200, farming the river corridors in the summer and relocating to pinyon-juniper forests for the winter. This bi-seasonal farming lifeway persisted until 1300, and perhaps a generation or two later, if the radiocarbon dates are taken at face value.

» Fremont farming is well documented along permanent creeks throughout Utah. But in GSENM, we now have evidence of high-elevation Fremont farming (above 7,200 feet) in areas that were not suitable for irrigation. Through the combined efforts of McFadden and the Colorado Plateau Archaeological Alliance, we have established that farming of the inhospitable Kaiparowits Plateau originated centuries before the Kayenta dry-land farmers ever set foot there—and judging by the massive size of the granaries, it was hugely successful (although downright risky).

» Prior to 1996, Archaic presence in GSENM was largely unknown outside the Colorado River corridor. Today, there are dozens of Archaic radiocarbon dates from open and sheltered sites across the entire region in a multitude of environmental settings, thanks to the work of Joel Janetski and colleagues at BYU and Phil Geib and the Navajo Nation Archaeology Department. And we now have indisputable evidence of Archaic house structures due to the work of McFadden and Heidi Roberts (pages 30–32).

» River corridors are recognized as critical ecosystems for humans, but the archaeology of the two largest systems found in the monument, the Escalante River and the Paria River, were largely unknown in 1996. Today, those river systems have been thoroughly investigated, demonstrating robust Fremont habitation in the Escalante River corridor, as well as Ancestral Pueblo use of the Paria River corridor. In fact, the northernmost Pueblo I hamlet thus far documented north of the Colorado River was found in the upper reaches of the Paria River.



Major landforms mentioned in the text. The three geologically distinct areas of the monument are managed as units: the Grand Staircase, the Kaiparowits Plateau, and the Escalante Canyons. MAP: CATHERINE GILMAN

» Explaining how maize farming was successful in environments where it is risky (or impossible) today has perplexed generations of researchers. In GSENM, we now recognize that farmers employed a variety of strategies. They farmed along the creeks and streams where water could be easily diverted to fields, of course, but they also farmed dry canyon bottoms, exploiting runoff from conventional thunderstorms. Each was probably an adjunct to the other, a contingency against the failure of any single strategy.

» The cumulative radiocarbon database has also allowed us to explore population dynamics through time, mapping increased dependency on cultivated resources and the consequent demographic shifts in response to diminished or overexploited resources. We can also plot changes in architecture over time and compare and contrast those changes on a macroregional scale; identify socioeconomic relationships with distant regions; and better explore issues such as cultural boundaries, migration, and exchange.

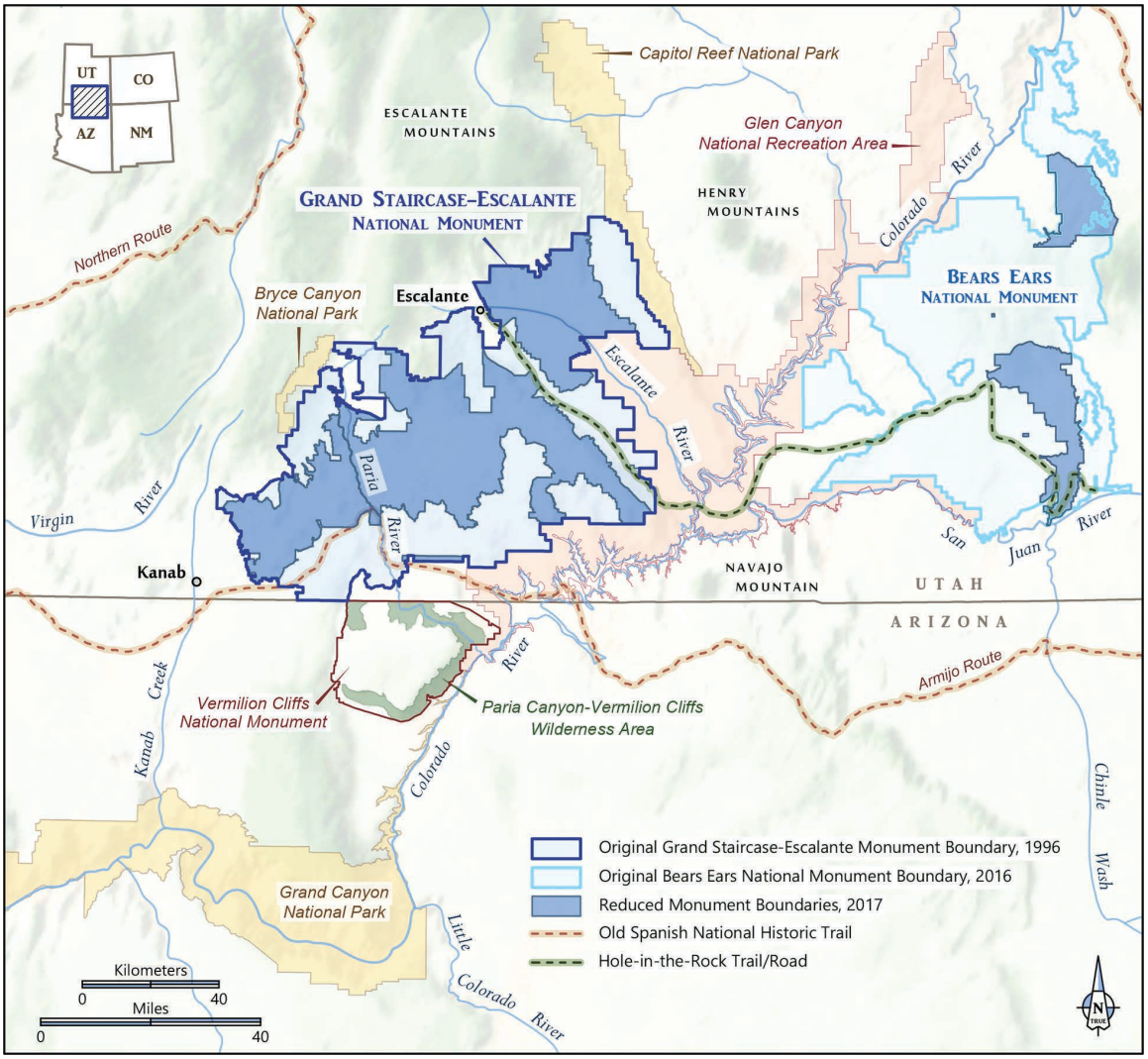
These are but a tiny sample of the research that has resulted from GSENM's designation.

In fact, these investigations have contributed new insights into every phase of ancient human use of the region, from Paleoarchaic times through late precontact times. Research has addressed a variety of salient archaeological questions, from Fremont–Ancestral Pueblo boundaries to seasonal versus full-time sedentism.

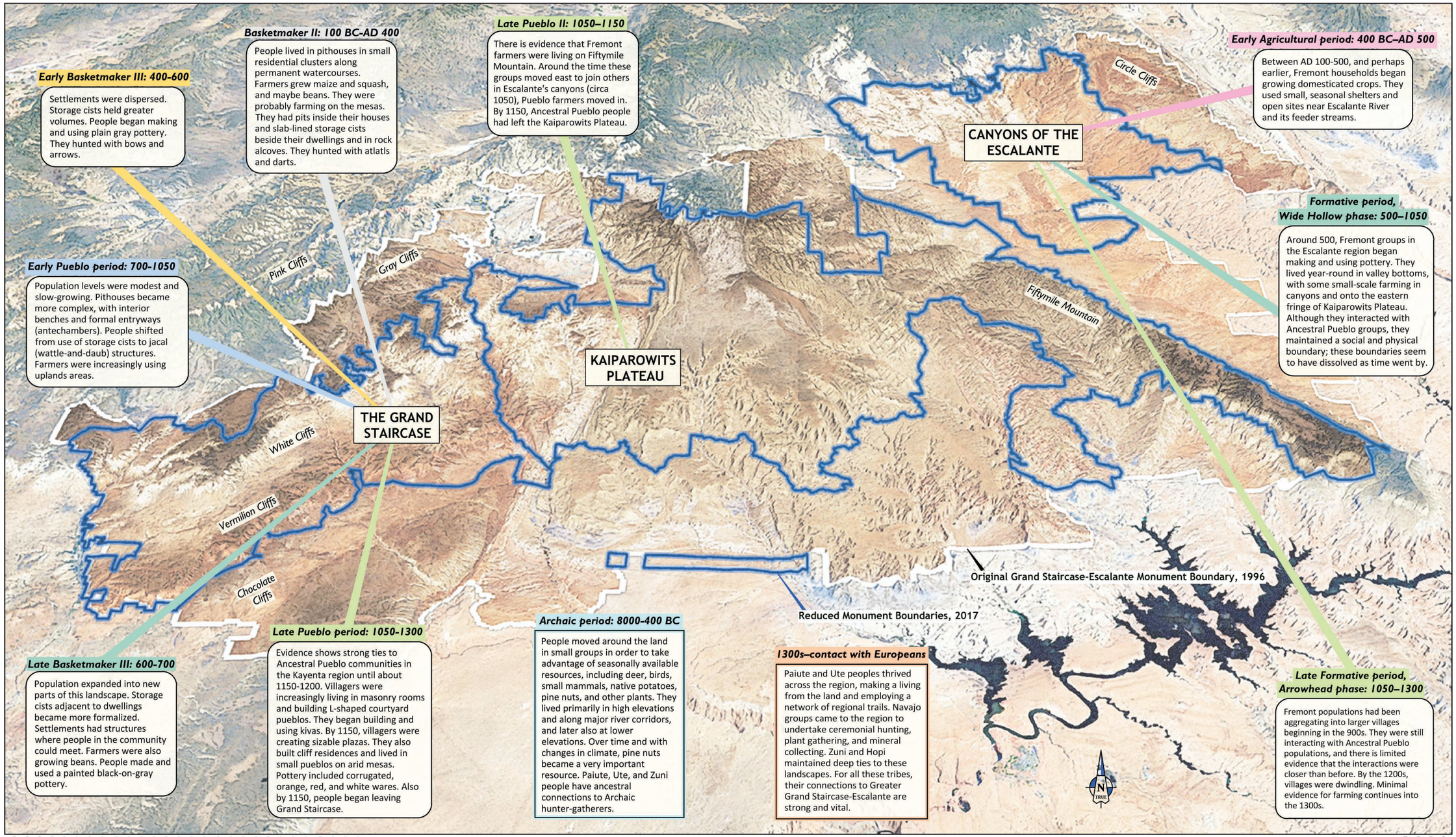
Most important, we now have a valid baseline from which we may explore a multitude of questions related to human behavior in the distant past.

By and large, most of this research was conducted through cooperative agreements with public and private institutions, including BYU, Northern Arizona University, the Natural History Museum of Utah, the Navajo Nation Archaeology Department, and the Colorado Plateau Archaeological Alliance (pages 45–47).

Collectively, these projects have generated a wealth of baseline data that have redefined the deep history of the Escalante River Basin, the Kaiparowits Plateau, and the Grand Staircase. It is exciting to think about what the next two decades of research could reveal. It is also disheartening to imagine that this outdoor laboratory could be shuttered and forgotten, sacrificed on the altar of political expediency.



Grand Staircase-Escalante National Monument and nearby public lands. From 1996 to 2017, the monument protected nearly 1.9 million acres. Presidential Proclamation 9682 reduced the size of the monument by nearly half, stripping protections from biological, paleontological, and cultural resources. MAP: CATHERINE GILMAN



Archaeology of Greater Grand Staircase-Escalante

Time line for the Archaic period through contact with Europeans. Before about 400 BC and after about 1300, people made a living tending and collecting resources across the region. Farmers of at least two different traditions made a living in the Escalante Canyons and on the Grand Staircase, with some use of the eastern portion of the Kaiparowits Plateau. TIME LINE: CATHERINE GILMAN, BASED ON ORTHOIMAGERY BY GOOGLE EARTH. ELEVATION IS EXAGGERATED BY A FACTOR OF THREE. TEXT ADAPTED FROM ARTICLES IN THIS ISSUE BY MCFADDEN, ROBERTS, SUCEC, TALBOT, AND BURRILLO

Seeking the Future in the Deep Past

CHRISTA SADLER
THIS EARTH

Grand Staircase-Escalante National Monument was the first national monument of its kind in the country, established in large part as a laboratory for education and scientific research and inquiry. The region's fossil record was one of the primary motivations for protecting these lands.

Even before paleontological research really took off here, scientists knew that the area's sedimentary layers contained extraordinarily important fossils. Since the late 1990s, researchers have found dozens of species of plants and animals—including some very nifty dinosaurs—many of which are completely new to science. And we have been learning from these fossils in ways that may help us understand what lies ahead for our species and our planet.

Top: *Tyrannosaur metatarsal (foot bone).* IMAGE: CHRISTA SADLER ***Bottom:*** *Artist's reconstruction of life in the Late Cretaceous ecosystem of southern Utah's Kaiparowits Formation.* © ANDREY ATUCHIN

The Late Cretaceous: Beginnings of Our World

The monument encompasses rocks and corresponding fossils from most of the time period geologists call the Mesozoic Era (more colloquially known as the Age of Dinosaurs). But by far the most eye-popping and jaw-dropping fossils come from the later part of the Mesozoic—between about 100 and 75 million years ago—a period known as the Late Cretaceous. In these fossils, we see the beginnings of our modern world.

During the Late Cretaceous, Earth was a completely different place. Global temperatures were much warmer overall. Carbon dioxide levels in the atmosphere appear to have been higher than current levels—but perhaps not by much. There were no permanent ice caps at the poles, which even hosted conifers from time to time. A seaway stretched across the central third of our continent, dividing it into a long, skinny, western landmass known as Laramidia and a bulkier, eastern landmass called Appalachia.

The Kaiparowits Formation: An Entire Ancient Ecosystem

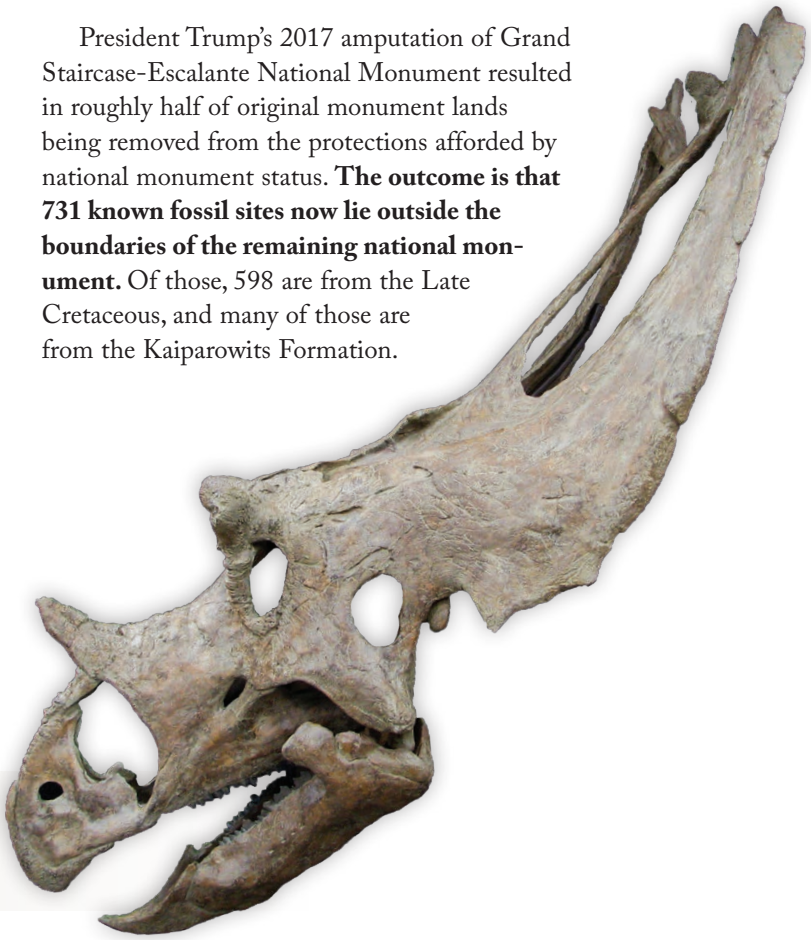
Although all the Late Cretaceous rocks in the monument have yielded important fossils, the Kaiparowits Formation in particular has proven to be a veritable time machine for paleontologists. Roughly 75 million years ago, the region now occupied by Grand Staircase-Escalante National Monument lay about 46 degrees north of the equator (its current latitude is around 37 degrees). It was home to a massive river system on the scale of the Ganges, with channels braiding back and forth across the landscape and depositing huge amounts of sediment that formed the 2,800-foot-thick Kaiparowits Formation.

So many different kinds of plants and animals are preserved in the muds and sands of this layer that paleontologists are essentially able to reconstruct an entire ancient ecosystem. This is extremely unusual, given that many parts of an ecosystem generally do not fossilize, and we are left to guess at what is

Western North America during the deposition of the Kaiparowits Formation. The Western Interior Seaway divided Laramidia in the west from Appalachia to the east. MAP © 2014 COLORADO PLATEAU GEOSYSTEMS INC.

missing. But in the Kaiparowits Formation, we find ant nests and beetle scrapings on fossil bone. We find clams, snails, fish, and salamanders. There are sharks, alligators, turtles, lizards, ancient mammals, birds, and a surprising variety of dinosaurs. The plants tell us that southern Utah had a climate not unlike that of southern Louisiana today, with higher precipitation and much warmer temperatures year-round.

This formation contains so much fossil information that its global importance is now recognized. It has helped us color in the spaces in the picture of our continent near the end of the Age of Dinosaurs, and during the time when our very distant mammalian ancestors began to appear. But just as important as the view of the past afforded by these fossils is the view of the future we may now probe.



Above: *Brushing a fossil.* ***Right:*** Utahceratops, *one of several new horned dinosaurs found within the monument.* IMAGES: CHRISTA SADLER

Lessons from the Kaiparowits

Our planet is currently still in an ice age, but in a relatively short time we could be living in the equivalent of the Late Cretaceous world in terms of temperature and carbon dioxide levels. If so, our world will be a very different place. One way to understand how the biosphere reacts to such major climate shifts is to go back in time to study examples from the ancient past when the climate was warmer. Here are two examples:

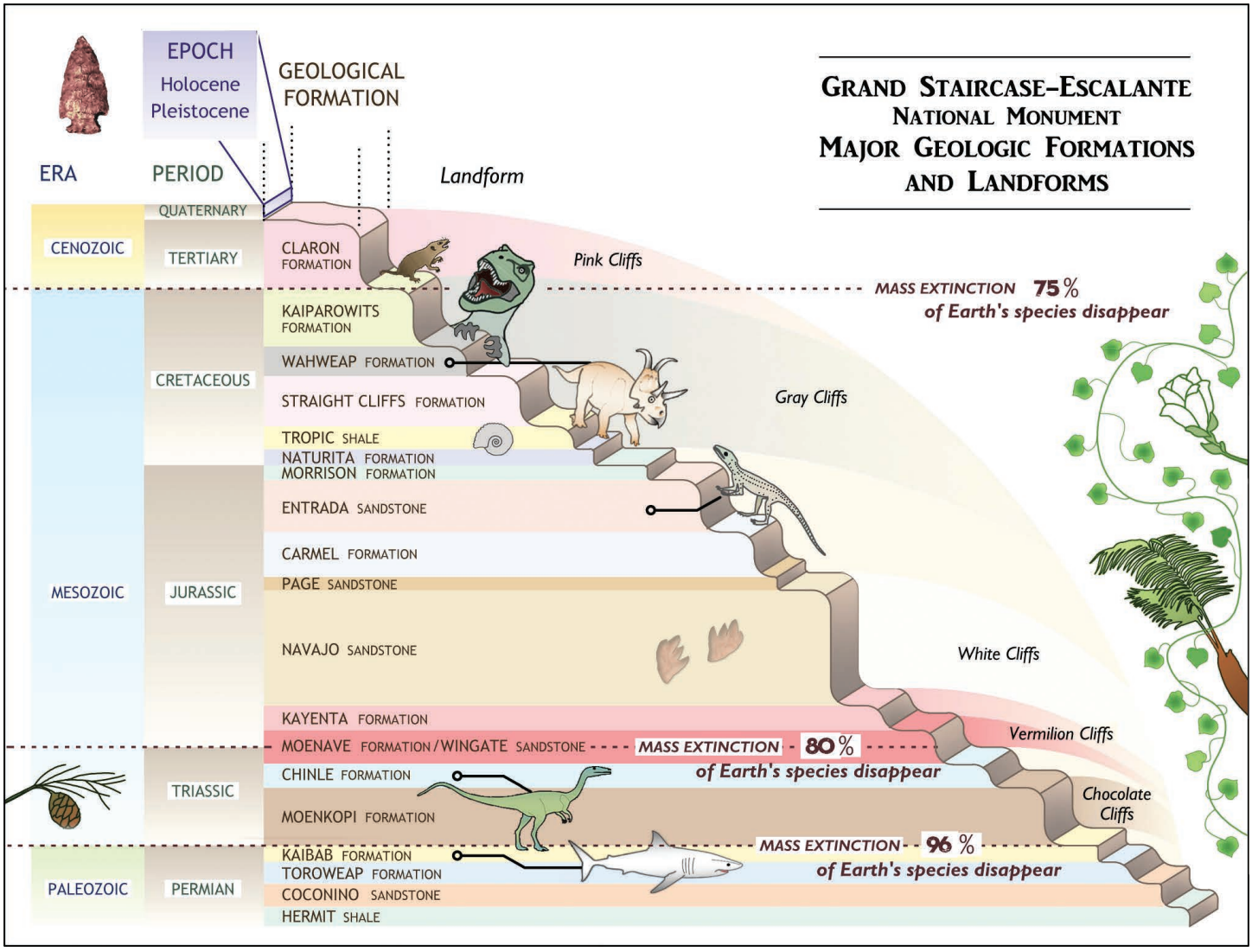
- Research elsewhere in the western United States indicates that Late Cretaceous fossil biodiversity decreases to the north (likely due to daylight hours and seasonal resource availability) and the south (due to higher temperature). This suggests that in a hothouse world, the highest biodiversity may lie in the middle latitudes. What implications does this have for current biodiversity and habitability as global temperatures increase?
- Research from the Kaiparowits Formation also suggests that in a hothouse world, species may not evolve or adapt as rapidly, which has implications for conservation, agriculture, and food production. How would we deal with slower rates of evolution and adaptation in the face of a very rapidly changing world?

President Trump's 2017 amputation of Grand Staircase-Escalante National Monument resulted in roughly half of original monument lands being removed from the protections afforded by national monument status. **The outcome is that 731 known fossil sites now lie outside the boundaries of the remaining national monument.** Of those, 598 are from the Late Cretaceous, and many of those are from the Kaiparowits Formation.

These are just the known sites. When you realize that less than 10 percent of the monument has been surveyed, it is relatively easy to appreciate how many more sites are out there that are now unprotected. How much more information about our past—and our future—might currently be imperiled?

Most ecologists and geologists accept that we are in the middle of the sixth great mass extinction our planet has experienced—one that humans appear to be causing largely by ourselves. We cannot remain apart from the creatures and ecosystems we affect, and we may not need to create another greenhouse world of the Late Cretaceous for major problems to arise. How long we remain the planet's dominant terrestrial vertebrates may be determined by how we react to the challenges facing Earth today.

The answers may, in part, reside 75 million years ago in the Late Cretaceous of southern Utah.



The rock layers and major landforms in the Grand Staircase-Escalante National Monument region. The Grand Staircase itself comprises the Chocolate Cliffs, Vermilion Cliffs, White Cliffs, Gray Cliffs, and Pink Cliffs. Each of these layers represents a unique time and set of ecosystems (and their corresponding lifeforms) in Earth's history. Fossils from this region include sharks (Kaibab Formation), one of the world's earliest dinosaurs, Coelophysis *(Chinle Formation), larger plant-eating dinosaurs that left the tracks known as* Otozoum *(Navajo Sandstone), the little crocodile* Entradasuchus *(Entrada Formation), the horned dinosaur* Diabloceratops *(Wahweap Formation), the tyrannosaur* Teratophoneus *(Kaiparowits Formation), and marsupials and rodents (Claron Formation).* GRAPHIC: CATHERINE GILMAN AND CHRISTA SADLER

"A stunning stretch of wild"

Like those around me, like those before me, I coax a living from this landscape of red rock and blue sky. I am not a hunter-gatherer, farmer, or rancher. Rather, I outfit neighbors and visitors with gear suited to outdoor adventures—and books and coffee suited to indoor ones. My business is to celebrate the wild of the West.

As my storefront opened nearly 25 years ago, the nearby lumber mill closed, laying off 200 neighbors. Our community turned a desperate eye to the coal seam running through the Kaiparowits Plateau. Meanwhile, my shop barely survived its second winter. I was afraid for my two little children. Our family savings were nearly gone.

The autumn winds of 1996 brought a national monument instead of a coalmine. Some neighbors were so angry that others were afraid to express support for the new protections. I was optimistic: surely this new monument would boost my business and our local economy, as well as protect our quality of life.

While some remain embittered over the monument designation, my shop and our town have indeed thrived in its halo. Hotels, restaurants, and other businesses have opened or expanded. Kanab built a new school, library, swimming pool, and parks.

And for now, a stunning stretch of wild persists.

—Susan Hand, Willow Canyon Outdoor Company, Inc., Kanab, Utah

Another view of The Cockscomb (see page 4). IMAGE: MORGAN SJOGREN

Condors in the Canyons

ANDREW GULLIFORD
FORT LEWIS COLLEGE

Across the vast expanses of Grand Staircase-Escalante National Monument, California condors again take flight. Reintroduced on the Vermilion Cliffs, condors now soar up and over the Grand Canyon and southern Utah as they have since the Pleistocene, as they did above the ancestors of the tribes who still maintain connections to these lands. Visitors to Utah national parks and national monuments may now see these majestic birds gracefully riding thermal updrafts, their keen eyes scanning canyon walls. In their movements, in the arcs of their flight, the distances they travel epitomize wilderness and wild country.

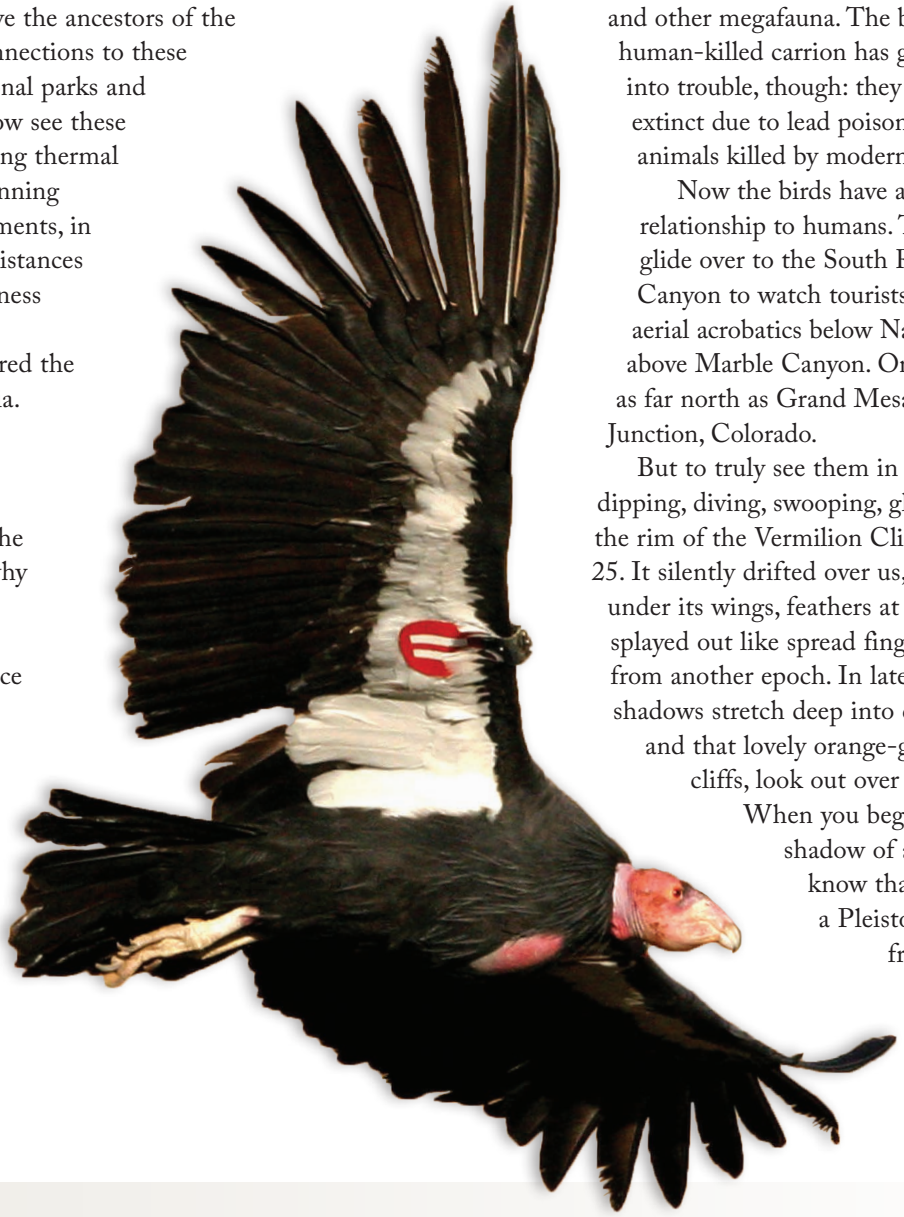
In 1987, biologists captured the last wild condor in California. The California Condor Recovery Team and captive breeding program saved the species. The remoteness of the Vermilion Cliffs is exactly why federal agencies chose the cliffs in the mid-1990s as a perfect location to reintroduce the birds. On the southwest corner of the rim, holding and feeding pens allow young condors to acclimate. Trained specialists with the U.S. Fish and Wildlife Service use hand puppets to feed roadkill to juvenile birds.

Grand Canyon guide Wayne Ranney believes that the birds coevolved with hunters of the Paleoindian era. He envisions condors cruising in for the banquet after a successful human hunting of mammoth and other megafauna. The birds' affinity for human-killed carrion has gotten them into trouble, though: they almost became extinct due to lead poisoning from eating animals killed by modern-day hunters.

Now the birds have a different relationship to humans. They routinely glide over to the South Rim of the Grand Canyon to watch tourists. They practice aerial acrobatics below Navajo Bridge above Marble Canyon. One even flew as far north as Grand Mesa near Grand Junction, Colorado.

But to truly see them in their element—dipping, diving, swooping, gliding—walk the rim of the Vermilion Cliffs. I saw bird 25. It silently drifted over us, white patches under its wings, feathers at the wing tips splayed out like spread fingers—a vision from another epoch. In late autumn light, as shadows stretch deep into canyon bottoms and that lovely orange-gold light climbs cliffs, look out over the vastness.

When you begin to see the shadow of a low-flying jet, know that it is probably a Pleistocene bird, back from the brink of extinction.



California condors weigh up to 20 pounds and have a nearly 10-foot wingspan. Today, there are almost 300 condors in the wild. IMAGE COURTESY OF PACIFIC SOUTHWEST REGION USFWS, VIA FLICKR

Where Paleontology and Anthropology Meet

R. E. BURRILLO
SWCA ENVIRONMENTAL CONSULTANTS

Among the more common phrases uttered by frustrated archaeologists is "we don't dig dinosaurs." And that is true—for the most part. But dinosaurs and other fossilized creatures do occasionally play a role in archaeology, and in the parent discipline of anthropology as a whole.

Indigenous peoples have always articulated closely with the landscape, and fossils have not escaped their notice. Indeed, the first evidence we have of ancient people curating and appreciating fossils comes from a cave near Yonne, France, where a trilobite pendant was discovered in the 1880s. Trilobites flourished hundreds of millions of years ago. The pendant-maker had lived tens of thousands of years ago, in the era known today as the Late Paleolithic.

Trilobites had already been discovered by fossil hunters in western Utah in the 1860s, but in 1931 scholar and journalist Frank Beckwith discovered that Utes had known about them all along, depicting them in rock art and making necklaces out of them. The Ute name translated to "little water bug in stone" and—most likely because of their armored appearance—trilobite fossils protected people against disease and bullets.

On the other side of Utah, Utes also quarried Eocene mammal fossils in the Uinta Basin for tools, decorations, and medicine. In 1872, a team of Yale paleontologists led by Othniel Marsh and Edward Cope accompanied some Ute guides to their bone beds. This is how *Uintatherium anceps*, the North American rhino, was identified. (Ironically, the two men would spend the rest of their careers arguing over which one of them deserved credit for "discovering" it.)

In the Grand Canyon, Late Archaic hunter-gatherers were known to make perilous climbs into dry caves to leave split-twig figurines in association with fossils of Harrington's mountain goat, a species that went extinct at the end of the last Ice Age. In 2014, as part of the Cedar Mesa Perishables Project, Dr. Laurie Webster and Chuck LaRue recognized a Harrington's horn among debris from an archaeological site excavated in the 1890s. The site dates to the Early Basketmaker period immediately following the Late Archaic (see time line on pages 8–9). Moreover, rock art depictions of the associated figurines occur in the river corridors linking Bears Ears with the Grand Canyon. People clearly attached some meaning to evidence of an animal extinct well before their own time.

Elsewhere, in the Bears Ears area, a door lintel on a later Pueblo cliff structure was found to contain the fossilized track of the dinosaur species *Grallator* isp. Nearly every other stone used in its construction was local sandstone blocks and slabs;

Ancestral Pueblo pictographs incorporate depictions of a nearby set of tracks from a three-toed dinosaur (theropod). IMAGE: R. E. BURRILLO

people carried this stone from elsewhere for this purpose and positioned it with the track facing downward. Geologist and paleontologist Kevin Madalena, a member of the Pueblo of Jemez, helped interpret this find.

And in Greater Grand Staircase-Escalante, there is an assemblage of dinosaur tracks that paleontologists ascribe to *Dilophosaurus*, a genus of medium-sized theropods. The main set of tracks lead straight to the edge of a very steep cliff at the edge of a mesa top. Writer Scott Thybony appreciated that ancient inhabitants of the area would have studied the footprints with intense interest, to the point of estimating the animal's size and weight with considerable accuracy. "I once watched a Navajo tracker do this at another dinosaur track site," he recounts in a blog post for KNAU Public Radio, "to the surprise of the paleontologists with us."

» *For more information on the writings Burrillo quotes from, visit* ***archaeologysouthwest.org/asw33-1-2.***

This intense and meaningful attention to the ancient tracks is demonstrated on the rock face just beneath them, where an extensive pictograph panel includes unmistakable impressions and morphed, stylized interpretations of the tracks. Although their specific meaning is unclear, clouded by time, what is clear is that ancient inhabitants of the mesa recognized and interpreted this even-more-ancient trackway as a significant component of the landscape and its history.

In 1935, in a brief paper in the *Journal of Paleontology* titled "American Indian Discoveries of Vertebrate Fossils," paleontologist Edward M. Kindle rightfully suggested that Native Americans should be credited with at least a handful of scientifically significant fossil discoveries. His suggestion was strenuously rejected by paleontologist George Gaylord Simpson of the American Museum of Natural History because these were "casual finds without scientific sequel."

Fortunately, times are changing. In *Fossil Legends of the First Americans*, Adrienne Mayor writes, "Combining oral traditions and paleontology, and drawing on history, archaeology, anthropology, and mythology, the investigation of fossil legends offers a new way of thinking about pre-Darwinian encounters with prehistoric remains."

Such an enterprise would also engender an opportunity to engage with the culture and history of indigenous peoples in a constructive, collaborative way. And I can think of no better place than Grand Staircase-Escalante, a national monument wholly conceived for its vast scientific and cultural importance.

Above left: *An overview of the tracks depicted in the rock art.* ***Left:*** *Close-up of stylized dinosaur tracks.* IMAGES: R. E. BURRILLO

Indigenous Landscapes of the Grand Staircase-Escalante National Monument

ROSEMARY SUCEC
NATIONAL PARK SERVICE

Federal agencies are the new kids on the block. The national parks that surround Grand Staircase-Escalante National Monument (GSENM) have been jurisdictional residents for only 50 to 70 years, and GSENM is itself just entering its third decade. American Indian Tribes, however, have intimate historical and contemporary relationships with the landscape north of the Colorado River that reflect at least 12,000 years of Western time, as well as ancient time beyond memory and record.

While Western scientific newcomers study the tangibles of "nature" inclusive of animals, plants, ecosystems, and archaeological sites, the Hopi, Navajo, Paiute, Ute, and Zuni communities associated with GSENM and the larger regional landscape north of the Colorado River do not separate themselves from it, nor do they compartmentalize what it constitutes. That interconnected reality is profoundly reflected in indigenous memories, histories, beliefs, and cosmologies. On behalf of Capitol Reef National Park and the National Park Service, I undertook an ethnographic study of tribal connections to these landscapes (see page 19). The project helped the National Park Service fulfill its responsibilities to appropriately manage ancestral resources and landscapes.

Fremont pictographs in a deep alcove. IMAGE © JONATHAN BAILEY

Zuni

The Zuni recount that they came to the GSENM regional landscape during what archaeologists refer to as the Paleoindian and Archaic periods, as hunters and gathers, not farmers. Religious leaders of the Pueblo of Zuni relayed an epic saga of emergence and millennia-long migrations. One of the Zuni medicine societies, Le:we:kewe, led a passage north on the origin trail into what is now Utah after emergence from the Colorado River in a place that is now known as Grand Canyon National Park. Ancestors blazed trails and created temporary residences that became today's archaeological sites.

Members of this medicine society and its co-residence group used and honored the environment to aid their survival. *"Each stream or spring, each ancient…site, each stopping place on our origin trail became a sacred shrine, still remembered in prayers, and at which offerings are still left when Zuni return to them."* They scribed images on rocks as maps and for ceremonial purposes.

For Zuni knowledge experts, seeing a geological formation of crystal deposits and other ceremonially important places in person on a field visit immediately confirmed certain cosmological narratives stored in memories, transmitted orally through hundreds of generations; they had arrived at places they had never seen before, but knew to exist. *"These things existed back then. Religious and cultural activities show the generations what we've been told through oral tradition of how migrations happened. It goes back to our ancestors. It all comes back to life."* Such places are referenced and revered in daily ceremonial practices.

Hopi

The Hopi share a common history with the Pueblo of Zuni. They, too, emerged at the same location and began thousands of years of migrations. Their residential history in this area is different, however, and encompasses approximately 1,400 years (79 BC–AD 1403), during the time archaeologists refer to as the Formative period. It starts with their clan ancestors who were farmers, thousands of years later than when Zuni ancestors lived in the region.

Like the Zuni, contemporary Hopi came on our field visits with pre-existing, intergenerational knowledge. Upon encountering petroglyphs and pictographs, they immediately began reading them and recognized ancient symbols that conveyed yet another saga—the images of their deity, Maa'saw, who allowed them to emerge in this World if they would accept the pact of acting as stewards of it. When their ancient ancestors agreed, Maa'saw directed them to farm, to conduct rounds of migrations, to leave evidence of their stay ("footprints") throughout the land, and to conduct a quest to find their spiritual center.

Hopi knowledge experts saw icons of almost 20 clans that affirmed their covenant with Maa'saw, their chosen vocation, their spiritual destiny, and their clans' histories. Other symbols told about local agriculture, provided maps of the region, and formed portions of altars for various ceremonies. *"Visiting these sites confirms a lot of our knowledge of how many clans have migrated through this area…what they have been telling us a long, long time ago…and confirms our obligation to the Creator of this World."* Far from forgotten or abandoned, these places continue to be remembered and revered

A Closer Look

From 2000 to 2005, I conducted a study that explored the associations of American Indian Tribes with Capitol Reef National Park (CARE) in order to fulfill the park's management responsibilities. *Fulfilling Destinies, Sustaining Lives: The Landscape of Waterpocket Fold: An Ethnographic Overview and Assessment of American Indian Histories and Resource Uses Within Capitol Reef National Park, Utah, and on Lands Surrounding It* was published by the National Park Service in 2006.

My research encompassed the Colorado Plateau surrounding CARE north of the Colorado River and was inclusive of other public lands, such as Glen Canyon National Recreation Area, Grand Staircase-Escalante National Monument, the Henry Mountains, Bears Ears, and surrounding national forest lands.

Sources of evidence included archaeological site data; historical and archival documents from, for example, the archives of the state of Utah and of the Church of Jesus Christ of Latter-day Saints (LDS); older documents containing indigenous oral traditions relayed through generations; interviews with descendants of the first Euro-American settlers to the area (LDS members); and on-site consultation with American Indian Tribes to learn their traditional knowledge and the contemporary significance associated with the landscapes of interest.

Participating tribes included the Hopi Tribe, Kaibab Band of Paiute Indians, Navajo Nation, Pueblo of Zuni, Paiute Indian Tribe of Utah (Kanosh and Koosharem Bands), the San Juan Southern Paiute, Southern Ute Tribe, Ute Indian Tribe of the Uintah and Ouray Reservation, Ute Mountain Ute Tribe, and White Mesa Ute.

Not all potentially associated tribes were able to participate or to be identified, as time has revealed, but I did not intend for the study to be complete or final. The revelation of knowledge and understanding remains a dynamic process.

— Rosemary Sucec

in clan histories and songs, and reenacted in ceremonies. (For more from a Hopi perspective, see Lyle Balenquah's essay on pages 34–36).

Paiute and Ute

Interviews with members of many Paiute and Ute tribes and bands, together with other sources of evidence, reveal a different history on the land. Unlike the traditional histories of Pueblo people, there are no migration stories among Numic-speaking peoples. Their ancestors were brought to life by Coyote, who opened his sack and released them in various locations across ecologically diverse habitats of this traditional homeland. They were living in the region when the Hopi farming clans migrated into the area, and were probably even in place during at least the Archaic period (pages 26–27). In fact, Hopi experts confirmed that when their clans migrated there, the ancestors to the Numic speakers were present.

Paiute and Ute peoples were living on these landscapes when Latter-day Saints settlers arrived, and they interacted with the settlers. Historical and traditional accounts show that these Paiute and Ute communities and individuals did more than search for food—the richness, variety, and complexity of their lives, and their inseparable relationship with the land, are apparent. The wonderfully descriptive names of Paiute and Ute groups derived from their environmental homes—Sanwawitimpaya (Sagebrush Canyon Mouth People), Paw goosawd'uhmpuhtseng (Water Clover People), Kwaguiwavi (Seed Valley People), and Avua (Pocket Between Hills People), among others.

These groups made sensitive adjustments to the bounty of diverse resources that sustained them where they resided and on their seasonal travels. They also routinely interacted and engaged with other kindred groups across a network of regional trails, to celebrate social events and undertake ceremonies (including the Circle and Bear dances), as well as to gather and grieve the passing of other community members (the "Cry" ceremony). Florence Kanosh, an elder among the Ungkaw'pawguh'u vutseng, or "Red Fish People," relayed that *"Before…we lived everywhere, moved here and moved there. Before [Euro-American] settlement, all of it was our home, our permanent residence. The entire landscape was our home."*

(For more from a Paiute perspective, read Charley Bulletts's essay on pages 28–29).

Navajo

Traditional knowledge relayed by Navajo elders through oral histories and texts authored by Navajo people document more than 300 years of history with the Utah study area as far back as potentially the 1400s or even 1300s. For traditional Navajo whose homeland—Kéyah—is south and east of the Colorado River, the land across the river, including what is now GSENM, became a customary place to undertake ceremonial hunting, plant gathering, and mineral collecting. One Hataałii (a specific kind of spiritual leader) who led such expeditions said, *"As far as I can remember, when I first realized, stories were*

Possible Navajo petroglyph mimicking Fremont style. The hourglass-shaped figure is about a foot and a half tall. Adjacent Fremont petroglyphs have a darker patina. IMAGE © JONATHAN BAILEY

told before and beyond, about Navajos from here and other parts who would get together and hunt in those areas. It is a ritual to hunt and bring back venison once a year…We were able to go when there were no settlers…After settlement, we had to work with them."

In contrast with the American custom of hunting for subsistence or recreation, the Navajo traditional hunt is a religious ceremony originally given by Holy Beings who created animals before humans came into existence and told them, *"…in days to come you will be the food of the Earth-peoples…By you, living will be possible."* Deities supplied knowledge of numerous ceremonies to hunters that included songs, prayers, and rigorous rituals.

Navajo traditional elders also relayed through interviews that the whole landscape is imbued with life forces that protect, yield food, heal, and provide for the well-being not only of the travelers, but also their communities back home south and east of the Colorado River. Certain etiquette is required in crossing, traveling, and returning, which has resulted in the creation of certain types of archaeological sites.

In the late 1800s, the landscape north of the Colorado and San Juan Rivers also became a place of refuge, as an outcome of early intrusion by Spaniards and Mexicans, and in an attempt to elude forcible resettlement by the U.S. military. Navajos continue to journey across the Colorado River and continue to retain respect for the land away from Kéyah. According to another Hataałii, *"…this land is filled with the presence of Holy Beings. Through prayers, offerings, songs, and other ceremonies, protection, safety, abundance, healing and well-being can be sought there."*

Enduring Connections

Beyond documenting sustained and spiritual indigenous connectivity with this landscape, the study also led to new insights. As diverse groups inhabited the area across millennia, they had numerous interactions, hostile as well as amicable, which presented opportunities as well as hardships. This fluid, enduring network of social relationships—which facilitated spiritually mandated journeys, subsistence, trade, warfare, marriage alliances, ceremonies, and celebrations—was mirrored in the vast network of trails across the entire region and beyond, even as far away as Latin America.

The system of indigenous trails that became the Old Spanish National Historic Trail continued to serve as a compass orienting the first Euro-American governmental surveyors and ultimately transformed into a contemporary system of roads and highways. Trails are a tangible symbol of the complexity of relationships between and among indigenous peoples and across landscape through time.

The understanding that American Indian tribes still retain their vital relationships with this living landscape cannot be overstated; these relationships have not faded into the "historic" past. Rather, those ancient and enduring relationships made it possible for the "present" of contemporary tribal societies to come to fruition. Such places are referenced and revered in reciprocity and with respect. Multiple tribal cultural processes of memory and history renew people's links with places that may have been forgotten, irregularly visited, or occupied by other groups.

Federal jurisdictions are the most recent occupant in a long and distinguished lineage of homesteaders; these landscapes were never vacant wilderness. Managing these precious lands for the well-being of all, not least of which is the land itself, requires us to recognize that fact and engage collaboratively with descendant American Indian communities.

Fremont polychromatic pictographs. IMAGE © JONATHAN BAILEY

"A landscape miracle"

I hardly notice the first sandy splash when my foot hits the Escalante River. After a month of hiking in Grand Staircase-Escalante National Monument, the fine silt is making its home on my skin, or maybe I am finding my place among it. My hiking partner and I jog through the ankle-deep water to race the sunset, as we have chosen to start our hike just an hour shy of dusk to mitigate the searing heat the area doles out from mid-summer to mid-fall.

We detour down a side-drainage, expecting to find nothing, but optimistically certain we will bump into something, as often happens in canyon country. Our destination is Phipps Arch, named for cattle rancher Washington Phipps, who was shot by his business partner John Boynton in 1878. I follow my companion's footsteps, dead-ending at a box in the canyon. As he begins to scramble up and over a slick pour-over, I reflect on the tension between business partners for which this area is so morbidly named. I reluctantly follow and begin the ascent up and out of the canyon, which involves a traverse around the pour-over, followed by a scramble on sandstone so chossy it literally crumbles at the touch of my hand.

We reach the bench, now high above the canyon floor. Despite my trepidation, exiting a canyon in this way always reminds me that even in a seemingly visually impossible position, there is almost always a way out. The light of golden hour begins to wash the red sandstone vibrant orange, magnifying a series of caves tucked within the remaining layer of rock wall still standing above us. We might have missed it, if my eyes and heart had not already become specially attuned to this part of the world, where the people who dwelled here first remain a part of the landscape.

And there it is, something colorful. A series of pictographs flaunting delicate fine lines spread like ephemeral wings that belong to a butterfly made of feathers. Having spent most of the past two years exploring the rock-art-emblazoned Colorado Plateau on foot, I readily perceive that this series of images placed across the walls in all three caves is quite different than anything I have seen.

I stand and stare, fascinated by the unique patterns, well-preserved colors, and unknown artists who created these images. I imagine someone painting the walls as the other desert dwellers look on, enjoying an evening of live entertainment. Of course I know how unlikely that vision is, but it serves as an intellectual appetizer to hold me over until I return to civilization to devour historical and archaeological information about what I am seeing.

Red Breaks, near Phipps Wash. IMAGE: MORGAN SJOGREN

Later in the week, I meet up with my friends Ralph (R. E. Burrillo, the guest editor of this edition) and Kate and Bill from Archaeology Southwest. We trade stories about our hikes, concerns about the future of the monument and, best of all, the highlights of the rock art we have seen. Ralph narrows down the location of the cave fairies I fell in love with and explains that they are some of the oldest in the Grand Staircase-Escalante region, dating back 6,000 years. Certainly, I felt in my gut that these were special, but knowing that simple fact elevated the art from a human creation to a landscape miracle—to have something set in stone that lasts through the ages feels incredibly humbling, given the crumbling rocks that fell from the face of the canyon as I clambered up to the cave.

This Archaic pictograph tradition almost always uses multiple colors and seems to be limited to the Escalante area. Read more on page 27. IMAGE © JONATHAN BAILEY

The current culture of hikers and recreationalists often separates what we love to do from the past. We are driven to accomplish something—go farther, faster, crazier—and along the way see something jaw-dropping to snap a photo of. As a guidebook author, this is why I elaborate on the history and experience of each place, rather than offer up GPS coordinates for a surgical strike mission. All too often we miss the finer details, forgetting that our weekend outdoor adventure was once a day in the life for those who walked and lived in these canyons before us.

With a dose of knowledge about the past in our minds, our hikes through the same landscapes humans have been granted passage through long before our time bring about greater appreciation and take on a grander meaning. And from that, we forge a connection with place that helps us comprehend, at least in a subtle way, what we stand to lose if we fail to protect it.

—*Morgan Sjogren, Author,* The Best Grand Staircase-Escalante National Monument Hikes

Archaeological Potential of the Grand Staircase-Escalante National Monument

PETER M. YAWORSKY, KENNETH B. VERNON, AND BRIAN F. CODDING
UNIVERSITY OF UTAH ARCHAEOLOGICAL CENTER

On December 4, 2017, Presidential Proclamation 9682 reduced the size of the Grand Staircase-Escalante National Monument (GSENM), thereby removing protections for at least 2,000 known archaeological sites and an unknown number of yet undiscovered cultural properties.

Because only 10 percent of the GSENM's 1.9 million acres has been inventoried by archaeologists, fully evaluating the potential consequences of these boundary reductions in the remaining 90 percent, or 1.7 million acres, requires the use of predictive modeling. The University of Utah Archaeological Center undertook this project in collaboration with the Colorado Plateau Archaeological Alliance and shared its results in a report to the Bureau of Land Management.

Modeling Approach

Our model uses Maximum Entropy, an advanced machine learning method, to assess the distribution of known archaeological sites relative to a range of environmental variables. The result is a series of time-period-specific maps showing the potential for undiscovered archaeological sites across the GSENM.

Predictive models have many applications in research and resource management. In research, models like ours may be used to understand land-use patterns and environmental characteristics that drove past people's decisions about where to best make a living. For resource management, predictive models are tools that help inform current decisions about where unknown archaeological resources might be located. This allows managers to evaluate questions like: What is the likelihood that a project will encounter archaeological sites? How would changing administrative boundaries impact site protections?

Snapshots through Time

Our model reveals changes in ancient land-use across the GSENM through time, including the 6,000-year record of Archaic hunter-gatherers, the nearly 2,000-year Formative period dominated by maize farmers, and the subsequent return to hunting and gathering in response to decades-long droughts and population decline.

During the Archaic period, people lived throughout the monument, but preferentially lived in a limited number of larger canyon drainages, particularly beneath the Vermilion Cliffs and across Fourmile Bench. We believe this is related to hunter-gatherer lifeways and preferred food sources (pages 26–27).

During the Formative period, larger population densities counterintuitively clustered in only a few centralized locations, such as Fiftymile Mountain (pages 40–41) and the area above the Vermilion Cliffs. Additionally, we see many low-probability areas across the GSENM, suggesting that these areas were used, but not as intensively as during the Archaic. This distribution of archaeological potential during the Formative period is almost certainly a function of maize agriculture, as it allows for higher population densities while at the same time being constrained to areas where people can farm reliably.

Around AD 1300, there were catastrophic droughts that resulted in population declines, with individuals returning to foraging. Our model shows that people were availing themselves of many more areas during this late period—while some people continued to practice agriculture, others relied primarily on foraging, and still others did both. Mixed ways of making a living are apparent in the overlap between the areas used during the Late period and in the preceding Archaic and Formative periods.

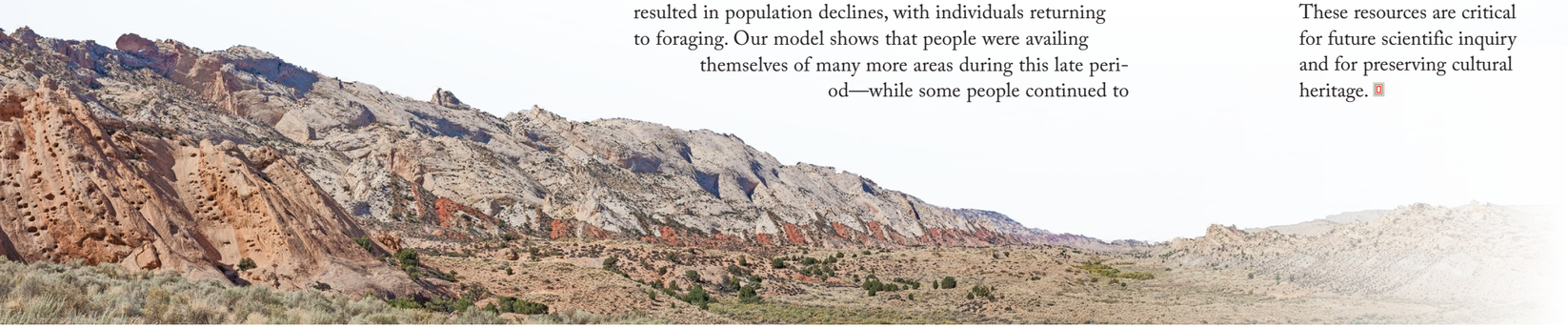
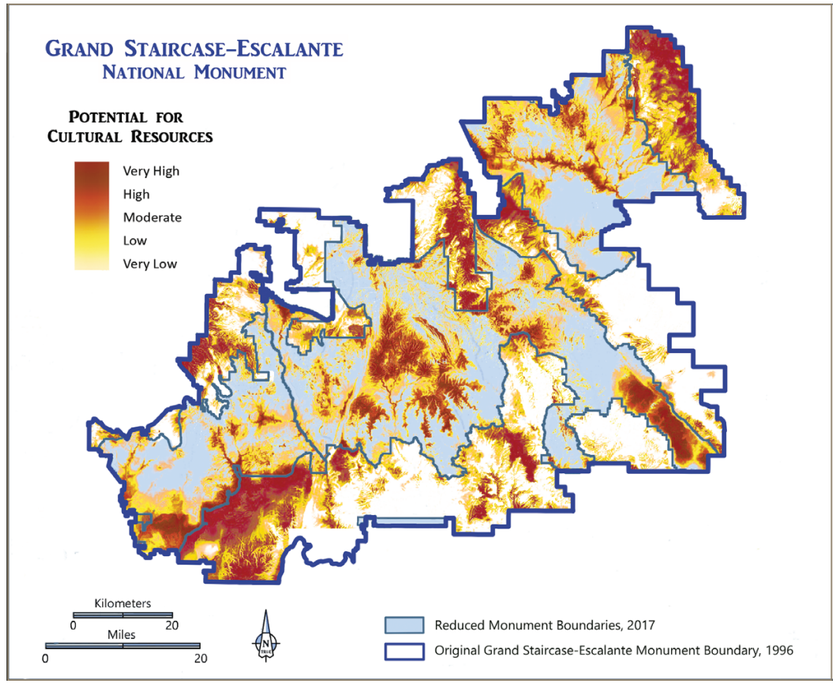


IMAGE © STEPHEN STROM

At Risk

The evaluation of potential threats to unknown archaeological resources is impossible without an evidence-based predictive model showing their potential. That is what our research provides for the GSENM. Our results show that there is a high probability of archaeological resources in areas of the GSENM yet to be surveyed.

From a land manager's perspective, areas with very high potential for cultural resources are very sensitive to impacts and deserve high priority for protection. As our map highlights, the reduced boundary excludes large areas of these highly sensitive lands, thus depriving countless thousands of currently uninventoried archaeological sites of the protections afforded by a monument designation. These resources are critical for future scientific inquiry and for preserving cultural heritage.



Above: MAP: PETER M. YAWORSKY, KENNETH BLAKE VERNON, AND BRIAN F. CODDING, ADAPTED BY CATHERINE GILMAN ***Below:*** *Appalling evidence of cultural heritage crime.* IMAGE: WILLIAM H. DOELLE

The Archaic Period in Greater Grand Staircase-Escalante

R. E. BURRILLO
SWCA ENVIRONMENTAL CONSULTANTS

Although the Archaic period is the longest-lasting cultural time period in the Southwest, it has not received as much attention as other eras, and it remains poorly understood. Generally speaking, it was an era in which people broadened their subsistence strategies—their means of identifying, acquiring, and processing sustenance. They began hunting a wider range of animals and gathering a wider range of plants than their Paleoindian forebears had.

Details vary from region to region, but the overarching story is one in which people incorporated food items not previously prized—such as seeds and grasses, wild potatoes and other tubers, and cactus fruits—and developed new technologies suited to this lifestyle, including basketry, grinding stones, and sandals. These people were closely tied to the land for survival, and their strategies almost certainly responded to shifting environmental factors.

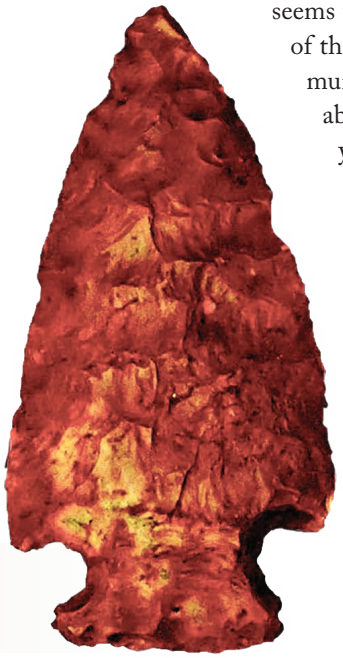
A palimpsest of pictographs, most of which date to the Archaic period. Among the Archaic elements are some in a distinctive tradition that is tentatively being called Escalante Polychrome. IMAGE © JONATHAN BAILEY

The close of the last Ice Age almost 12,000 years ago correlates with a gradual shift toward warmer climates and a general drying trend. Changing climates made for changing adaptations across ecological zones, including the slow-but-steady march of plant communities to exploit newly opened environmental niches while escaping those that had become unlivable. For example, the gradual migration of pinyon pines throughout the intermountain west—reconstructed primarily from pollen and macrofossil samples drilled out of ancient packrat middens—traces an almost identical pattern to the footprint of human colonization of the same environments over the same time periods. Evidence shows that this was true in the Grand Staircase-Escalante region, as well (pages 30–32).

The earliest definitive evidence of Archaic foragers in the region comes from North Creek Shelter, a site located near the modern town of Escalante, where researchers demonstrated repeated use by deer-hunting groups from about 8000 to 7000 BC. These people also took a broad range of birds and small mammals; the latter in particular thrived in the area's wetter conditions at that time, which were probably in turn accentuated by a massive, melting glacier atop the Aquarius Plateau above the site. (The residents of North Creek Shelter were also fond of wild potatoes; see pages 53–54.)

After about 7000 BC, as the climate grew markedly drier and populations of game animals dwindled, people added more and more plant foods to their diets. By at least 5500 BC, pinyon-juniper forests had replaced the large conifers of earlier times throughout the region at elevations up to 7,200 feet. By that time, foragers had become dependent upon these forests for pine nuts and other forest resources, so they followed the food and ranged in those higher elevations.

The succeeding Middle Holocene environment (5500–2500 BC) was erratic and drought-plagued. Some researchers have suggested that foragers abandoned the region during this time, but there are indications that people retreated to the area's high-elevation refuges or major river corridors, or both. In the Grand Staircase-Escalante region, this time period is signaled by an increase in the number of projectile points with distinctive side-notching.



Side-notched projectile point. IMAGE: R. E. BURRILLO

The droughts seem to have ended with a period of greater moisture overall, most likely owing to stronger monsoon seasons to the south and greater snowpack at higher elevations. This also coincides with the migration of pinyon pines into lower elevations after about 3000 BC and a dramatic increase in sites with Late Archaic projectile points in those zones. Throughout the northern Colorado Plateau and in the Great Basin to the west, it is clear that people were locating their settlements in places that were optimal for obtaining water, game, and pine nuts.

Migrations into the area from the southern Great Basin, northwestern Great Plains, and even southern Arizona are indicated by the presence of projectile points associated with those respective areas. Movement into the area seems to have occurred after the hot, dry climates of the middle Holocene had abated. Biotic communities responded by expanding into recently abandoned environmental niches, including pinyon forests, which had reached their modern extents by at least 2500 BC.

Pine nuts continued to be an important food source through the rest of the late Archaic and succeeding early farming periods, tethering groups to prime harvesting locations. Ultimately, increasing dependence on agriculture led people to form settlements in places more conducive to growing crops: early Ancestral Pueblo farmers favored the Grand Staircase, whereas proto-Fremont farmers took to the Escalante River basin.

A Closer Look

The presence of two or three distinct Archaic rock art styles in the Grand Staircase-Escalante region suggests that groups were expressing different cultural identities through iconography. The Barrier Canyon style is interpreted as antecedent to the rock art traditions of Fremont groups, and Glen Canyon Linear is tied to later traditions of Ancestral Pueblo groups. Most enigmatic of all is Escalante Polychrome (pages 23 and 26), one of several very colorful rock art traditions dating to the Archaic period in the Greater Southwest. Although Archaic material culture may seem uniform, these traces show that there must have been fascinating variability in the actual, living cultures of the people who produced them.

Autumn, Lower Calf Creek Falls. IMAGE © JONATHAN BAILEY

"Rivers and seep springs flowed for all"

Grand Staircase-Escalante National Monument and its landscapes hold cultural, ceremonial, and ancestral ties to Kai'va-vits-ee, the Kaibab Band of Paiutes. Since the beginning of time, prayers, song offerings, and gatherings have played major roles in the life of the Kaibab Paiute.

The lands of the Grand Staircase-Escalante region had no boundaries and were open to all. Rivers and seep springs flowed for all to partake of. Plants were plentiful, and gathering depended on how much rain came to the lands. The Paiute people have collected and continue to collect minerals on this landscape, as well.

The lands of the Grand Staircase-Escalante region had no boundaries and were open to all.

These lands connect us to surrounding areas like Canyonlands, Death Valley, Fish Lake (Fishlake National Forest), Monument Valley, the San Francisco Peaks and—let's not forget—the Colorado River. The Colorado River cut through many of these places and formed almost every canyon in the West. These connections, along with all earth's elements, bring together Paiute lifeways.

Today, there are laws and rules that must be followed and the national monument is open to everyone. Its great importance to Paiute people remains. We are stewards of this land.

—Charley Bulletts,
Director, Southern Paiute Consortium

Answering Big Questions about Greater Grand Staircase-Escalante's Early Farmers

HEIDI ROBERTS
HRA INC., CONSERVATION ARCHAEOLOGY

Named for the major river system that bisects it, the Virgin Branch of the ancient Pueblo world is renowned for its dry caves rich with sites. Kanab, Utah—one of the gateway towns to Grand Staircase-Escalante National Monument—lies at the northwestern edge of the Virgin region (see map on page 6). Archaeological investigations by my company and by some of our colleagues revealed that the Jackson Flat Reservoir area of Kanab was inhabited intermittently for 6,000 years, and intensively between 300 BC and AD 1000. People built hundreds of excavated houses, trash deposits, and storage structures during the transition to farming over those 1,300 years, which spanned Basketmaker and early Pueblo times (see time line on pages 8–9).

Aerial view of the Jackson Flat Reservoir looking north to Kanab. Archaeological excavations conducted prior to construction on this 300-acre reservoir answered important questions about the region's ancient history. Between 2009 and 2011, HRA Inc., Conservation Archaeology, Bighorn Archaeological Consultants, and Brigham Young University's Office of Public Archaeology excavated threated portions of 10 ancestral Pueblo villages and Archaic forager camps in the construction footprint of the Jackson Flat Reservoir. Unexcavated portions of the largest two sites were later donated to the Archaeological Conservancy by the Kane County Water Conservancy District, which had sponsored the project and owned most of the property. IMAGE COURTESY OF HRA INC.

Two theories of Basketmaker origins have gained popularity in recent decades. In the 1990s, R. G. Matson proposed that early farmers migrated into the northern Southwest from the San Pedro culture area in Arizona. These migrants became the Western Basketmakers. Other archaeologists have hypothesized that maize (corn) agriculture was adopted by the region's Archaic foragers. In this scenario, mobile foragers gradually incorporated farming into their lifeway. Our work in the Jackson Flat region yielded evidence to evaluate these possibilities.

Jackson Flat's largest village, Eagle's Watch, yielded two dates on corn that are the oldest reported north of the Colorado River: 1300 BC and 800 BC. These dates came from an earth-lodge-style pithouse and deep bell-shaped storage pits that yielded soil samples with charred maize. People's use of formal architecture contrasts starkly to the centuries-older temporary camps of the area's Archaic foragers, who built shallow roasting pits and hearths to cook jackrabbits they caught in nets. The small number of artifacts at these camps included waste flakes from making cutting tools and simple grinding stones to extract marrow from the rabbit bones. In contrast, the first farmers of Eagle's Watch used a large number and variety of stone and bone tools. They also wore exotic ornaments made of turquoise, shell, and a green, jade-like stone (see image at right).

I have linked Jackson Flat's first farmers to Matson's San Pedro groups because of their spear point styles, Cortaro and San Pedro/Elko Side-notched, as well as their use of earth lodges containing bell-shaped pits (page 31, top right) and their focus on grinding pigment. Analyst

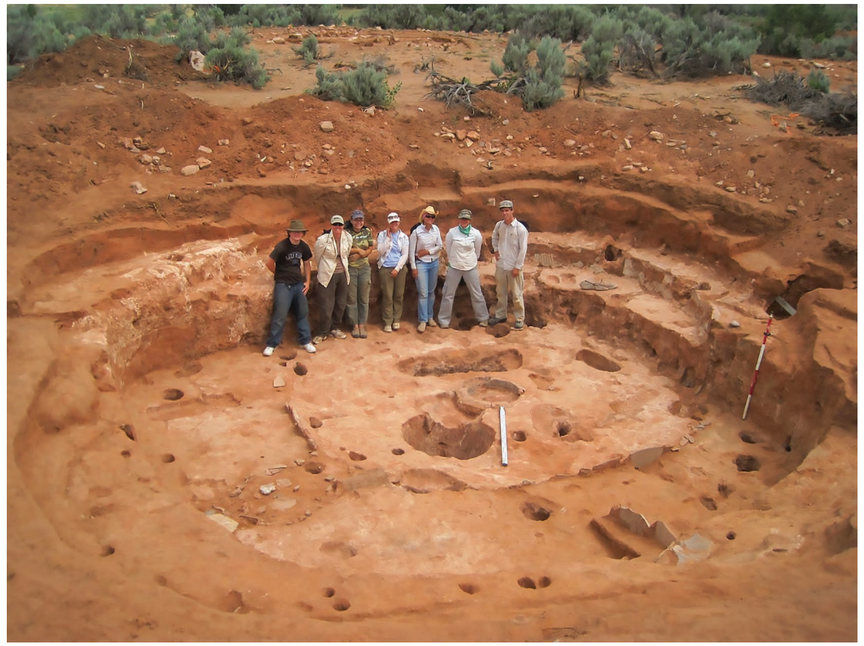
Arthur Vokes noted that the green barrel-beads have only otherwise been reported from sites in Gila Bend, Arizona.

Between 300 BC and AD 550, Jackson Flat's Basketmakers farmed the wet meadows along Kanab Creek. They erected light fieldhouses and built more substantial pit structures for winter use. These winter structures gradually became more complex, and by AD 300 to 400, builders were appending entries, which archaeologists call antechambers, to the southeastern edges of their houses (lower right). People also added slab-lined benches with storage bins. Upon studying the stone tools we recovered, expert Joel Janetski discovered that Basketmaker II stemmed spear points are unique to the Virgin region during this period.

Between AD 200 and 550, small hamlets with one to three houses and large, slab-lined storage pits (middle right) dotted the landscape. Toward the end of the Basketmaker II period, people built an oversized pithouse almost 30 feet in diameter near the center of Eagle's Watch on the highest part of the ridge. These extra-large structures are reported throughout the Southwest. Archaeologists believe they served ceremonial or communal functions.

The oversized pithouse at Eagle's Watch conformed to the Southwestern pattern and contained floor vaults, also known as foot drums, as well as a massive central hearth (page 32). It is the only reported oversized structure in the Virgin region, and it is also one of the earliest in the Southwest (AD 450–550). I have suggested that people built it to resolve regional conflicts or forge alliances. Soon after it was constructed, families left the small hamlets and relocated to Eagle's Watch. Then, around AD 600, some of the houses at Eagle's Watch catastrophically burned while people were still using them, and larger pithouses, in a new style, were built on top of the burnt ones.

Top right: *A bell-shaped storage pit with HRA archaeologist Suzanne Eskenazi.* ***Middle right:*** *A Basketmaker III slab-lined storage cist at Eagle's Watch with HRA archaeologist Rob Davide.* ***Right:*** *A Basketmaker III pithouse foundation with an attached antechamber with HRA archaeologist Mike Osife.* IMAGES COURTESY OF HRA INC. ***Above:*** *Green chrysoprase bead used by Eagle's Watch first farmers.* IMAGE: ARTHUR W. VOKES



Pictographs showing aspects of Fremont (triangular-bodied figure to the right of the circled figures) and Ancestral Pueblo traditions (flute-player figure to the left of the circled figures). A buffaloberry bush (Shepherdia rotundifolia) *is in the foreground.* IMAGE © JONATHAN BAILEY

For several reasons, I hypothesized that the original Basketmaker farmers of Eagle's Watch fell victim to an intrusion by Basketmaker farmers from the Kayenta region of today's northern Arizona. First, the houses were made in a new style not found in the Virgin Branch area. Second, new pottery types and projectile point styles were introduced with these houses. Third, child-rearing and burial practices changed in dramatic ways. I have linked these groups to the Kayenta region because people's use of obsidian sources shifted to the Flagstaff area and pottery known as Tallahogan Red Ware was made in that region. Ceramic analysts Karen Harry and Sachiko Saki studied the pottery clays and concluded that the clay potters used to make the red vessels recovered at Eagle's Watch matched clays from the Kayenta region.

By AD 1000 people had left these villages, and only one masonry room block remained in the area. This pueblo is on private land, and only its trash deposits extended into the reservoir footprint we were permitted to investigate. Radiocarbon dates and pottery designs tell us that the four- to five-room pueblo was inhabited between 1050 and 1300. Pottery types suggest that ties to the Kayenta region remained strong. After the pueblo's abandonment, the area remained uninhabited until 1650.

Jackson Flat's final residents camped in the sage flats to hunt rabbits and collect wild plants. They made corrugated brown pottery, Desert Side-notched arrow points, and stone pipes. Their lifeway resembled Kanab's historical Southern Paiute people, whom John Wesley Powell encountered when he explored the Colorado River in the late 1800s. Today, the Kaibab Band of Paiutes live just west of Kanab, and their claim of ancestral ties to Jackson Flat's Pueblo people is supported by continuities in pottery corrugation techniques.

Top left: *Multiple views of a pipe collected from a 300-year-old campsite.* ***Left:*** *Eagle's Watch oversized pithouse with the excavation crew.* IMAGES COURTESY OF HRA INC.

Ancestral Hopi Presence in the Grand Staircase-Escalante National Monument

LYLE BALENQUAH
HOPI

Hopi people maintain a cultural connection with the region now designated as part of Grand Staircase-Escalante National Monument (GSENM). We believe that groups of our ancestors once dwelled within the canyons and on the mesas and plateaus, ultimately leaving telltale signs—metaphorical "footprints"—that verify their existence upon the land.

Within GSENM, these include numerous villages, shrines, pottery sherds, stone tools, textiles, and rock art left behind by Hopi ancestors, and also include their deceased, who remain as spiritual guardians of this holy ground. We recall these ancient histories within epic clan migrations that speak of our ancestors traveling across large geographic regions of the Southwest.

Hopi people do not define our ancestors who inhabited the GSENM area using modern archaeological concepts such as "Fremont," "Virgin Anasazi," or "Kayenta Anasazi" (page 37). We do acknowledge that these definitions provide useful tools in illustrating differences and similarities among past cultures, and the "stuff" they created or used. Archaeologists have long recognized movements of ancient peoples within GSENM, with various theories offered as to why and how these movements occurred.

Hopi relies on analogies found within our clan structure to show these same ideas, albeit through more of a "braided stream" metaphor that is fluid and dynamic. Hopi ancestors moved around, and they were also sedentary, sometimes residing in shared landscapes, other times dividing clans only to rejoin one another in different regions, perhaps generations down the line. This was part of a purposeful plan, playing out over a wide geographic area, encompassing thousands of years, according to a set of preordained instructions.

Traditional Hopi knowledge states that many ancestral clans lived in and moved through the area of GSENM. Among these are the Badger, Fire, Flute, Snake, Sand, Greasewood, Reed, Horn, Bearstrap, Spider, and Katsina. Each of these clans has their own oral histories about their physical and spiritual connections to this landscape, as well as to surrounding regions, including Nine Mile Canyon and Range Creek to the north, Toko'navi (Navajo Mountain) to the south, and Cedar Mesa and Hon'muzru (Bears Ears) to the east.

Twentyfive Mile Wash, a tributary of the Escalante River. IMAGE: R. E. BURRILLO

After centuries of migrating and living in various regions for periods of time, Hopi ancestors made their way to the Hopi Mesas in northeastern Arizona, resulting in a "coming together of the clans" and bringing the idea of "Hopi" into fruition.

Within these migrations, Hopi ancestors learned the skills necessary to survive in a harsh desert landscape and developed the complex ceremonies and religious beliefs we still practice to this day. Knowledge was accumulated: medicine, technology, architecture, language, arts, celestial understandings to track the seasons, and ultimately, the development of agriculture.

We believe this farming tradition heralds a cultural development that would put us on the path to becoming "Hopi." The idea of "Hopi" is more than just a designation of a people, but a way of life, reflected in the acceptance that corn and other crops would be the foundation of our being. These traditions remind us of the humble beginnings that our ancestors first sowed, meticulously developing a cultural lifeway through hardship, cooperation, humility, and purposeful prayer.

We view our ancestral and present-day lifeways as forever connected.

Yet we are also reminded that, at times in our history, we have strayed from these teachings, causing imbalance among ourselves and with the natural environment. Harsh lessons showed we are not the masters of this world, that there are greater forces that must be respected and cared for. These are the cultural understandings we remember and carry with us as Hopi people when we interact with our ancestral landscapes. Packed into our consciousness, they serve as guides as we encounter the footprints of our ancestors. These teachings also provide a unique cultural lens in which to view this ancient past.

We have always stated Hopi is a living culture. This means that the knowledge about our ancestral history is not just the "past" but lives in the present among the Hopi who retain and continue to use such cultural teachings in our daily and ceremonial lives. We view our ancestral and present-day lifeways as forever connected. Within Hopi culture is the belief that the meaning of the past is what it contributes to life in the present. This belief underscores the "cultural continuity" between modern-day Hopi and our ancestors.

How this connection manifests, often daily, is in the cultural knowledge and traditional know-how a Hopi person maintains. This knowledge is evident in many forms within traditional Hopi culture—the crops we grow and eat, the tools we use, the art we create, the ceremonies we enact, and the language we speak. All of this is an accumulation of ancestral Hopi experiences, learned over countless generations.

Maintaining these cultural connections is not only carried out through recounting oral histories, prayers, or songs, but often also through actual visitation or pilgrimages to ancestral villages and shrines such as those found in GSENM. Archaeological evidence shows that this practice of return migration has occurred in the historical past within the GSENM and surrounding areas. This is illustrated through the satisfying discovery of Jeddito Yellow Ware ceramics on the Kaiparowits Plateau. This pottery has been made on the Hopi Mesas from about 1300 to the present, meaning that it postdates when Hopi ancestors had already vacated much of the GSENM.

The fact that this pottery appears nearly 200 miles north of its manufacture indicates either long-distance trade or return pilgrimages by Hopi descendants, or both—perhaps an individual or a small group of Hopi people returning to pay respects to remembered landscapes, villages, or shrines spoken of in clan histories. I believe in the latter!

Thus, in contemporary Hopi culture, it is important that the specific cultural footprints and the associated landscapes be protected and preserved. These cultural landscapes are imbued with spiritual energy that is vital to the connections we strive to maintain. As modern Hopi people, we continue to visit the landscapes that our ancestors once dwelled in. We come as any other visitor, excited to experience this unique region and explore its rivers, canyons, and mesas. Yet, as this brief writing illustrates, Hopi people come with a deep appreciation of history and belonging. We have our own sense of inquiry, and we welcome any opportunities to learn more about this area through appropriate and respectful study conducted in cooperation with scientists and researchers.

Hopi participation in formal research has indeed yielded important insights about ancestral lifeways within GSENM. Fieldwork conducted by knowledgeable Hopi individuals and researchers has helped to inform and guide archaeological studies, offering cultural context to answer significant questions: How were certain artifacts made or used? What are the symbolic meanings of images found in rock art, ceramics, or textiles? How were people able to grow corn and other crops in a seemingly arid landscape? Where did they go, and why?

These and many other questions find useful analogy and sometimes concrete proof within the perspectives offered by Hopi knowledge. These are proud moments, validating what we feel in our hearts and minds as Hopi people—that our history in this landscape is long and complex.

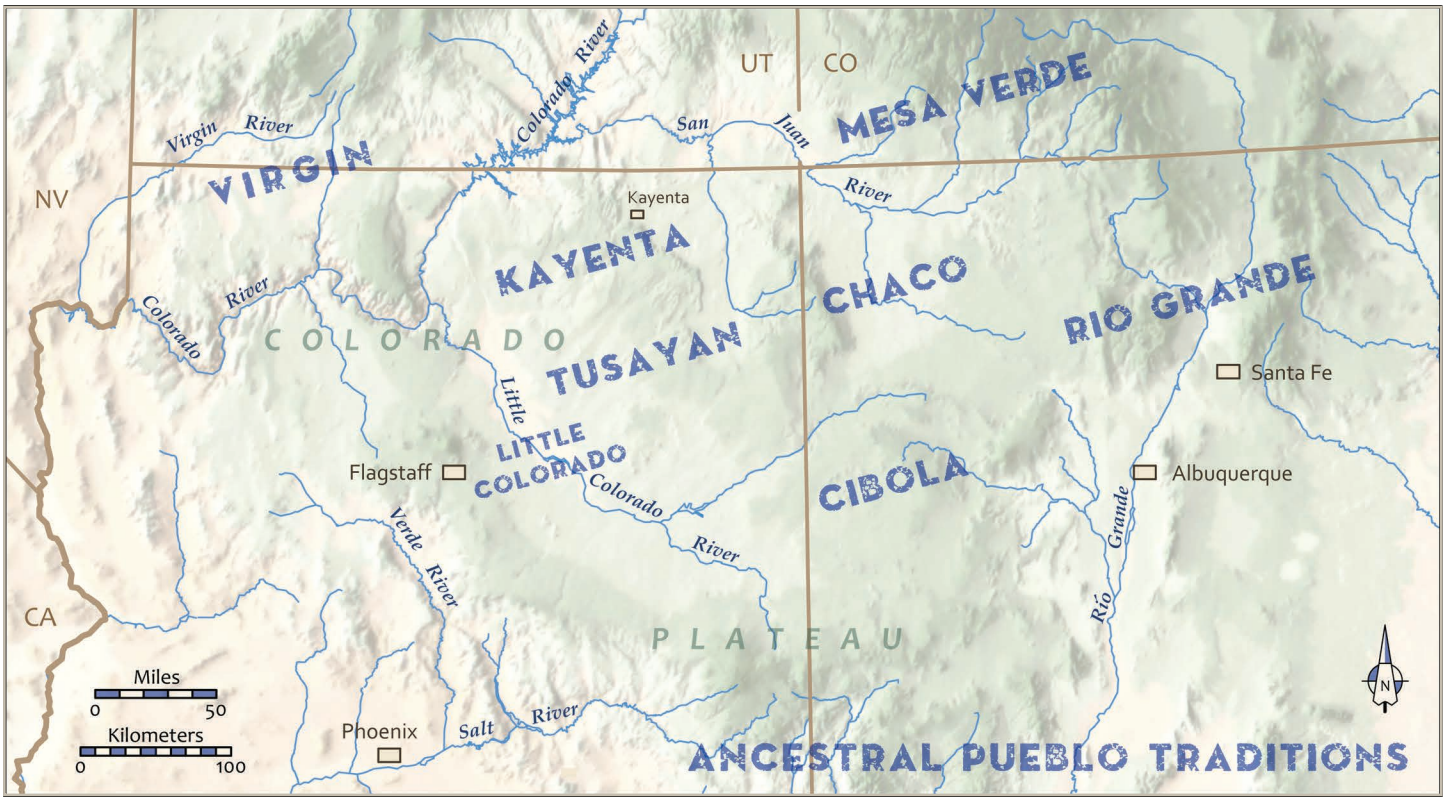
Pueblo Farmers on the Grand Staircase

DOUGLAS MCFADDEN
BUREAU OF LAND MANAGEMENT (RETIRED)

The great promise of the Grand Staircase-Escalante National Monument (GSENM) for Virgin archaeology is one of scale. It offers the opportunity to reconstruct the full lifeway of Virgin Ancestral Pueblo people by considering their settlement history in its entirety—that is, by identifying the full range of sites from hunting camps to pueblos, over the varied landscapes they inhabited, and throughout the time they lived there.

Even so, no single monument is large enough to encompass such a big picture—the matrix of surrounding public lands is still essential for that. Given its mandate as the "science" monument, GSENM has, and should continue, to play an important role in integrating research on public lands beyond its administrative boundaries. Although recent events show that boundaries may be quite arbitrary, the locations of cultural resources are not (pages 24–25).

As GSENM's inaugural archaeologist, I am pleased to report that great progress has been made over the past 23 years toward understanding the lives of those who called this landscape



"Documented differences among Ancestral Pueblo groups relate to ways of building and making things, settlement patterns, spatial separateness on the landscape, historical trajectories, or various combinations of these," (Jeffrey S. Dean, Archaeology Southwest Magazine *Vol. 27, No. 3, page 6). The names archaeologists have given to those patterns in Ancestral Pueblo traditions are usually tied to geography. For example, authors in this issue use "Virgin Branch," named for the Virgin River, and "Kayenta," named for a historic trading post in northern Arizona. Roberts (pages 30–32), McFadden (pages 37–40), and Burrillo and McFadden (pages 40–41) discuss contacts between Virgin and Kayenta groups. As Balenquah (pages 34–36) points out, though, we should keep in mind that these terms refer to archaeological patterns rather than the living cultures of Pueblo ancestors. It is interesting to think about how these groups might have thought about themselves, and whether they saw themselves as different peoples.* GRAPHIC: CATHERINE GILMAN

home in the distant past. Researchers have undertaken investigations into the relationships the region's residents had with other Virgin peoples, with Fremont populations, and with Pueblo groups of the Kayenta region. Here, I focus on the Pueblo farmers of the Grand Staircase. Long perceived as backwoods cousins of better-known groups to the east, these farmers are interesting precisely because of their location on the margins of the Ancestral Pueblo world (page 37).

Background

Archaeologists have worked out a relatively detailed chronological sequence of artifacts and architecture for the Grand Staircase that spans over 1,200 years and is based on the Pecos Classification. This overview compresses much of that record into two major periods, the Early Pueblo and Late Pueblo periods. The former describes the slow

Rock art also displays a distinctively local flavor as early as Basketmaker II. Cave Valley style human-like figures are common over most of the region. The examples pictured here are from a site in the Kanab region. TOP IMAGE: R. E. BURRILLO; BOTTOM IMAGE © JONATHAN BAILEY

development of a region-wide Virgin tradition emerging from Basketmaker roots. The latter is a period of abrupt material culture change long thought to be a result of external influences. Both periods are well represented on the Grand Staircase.

The timing and nature of the origins of agriculture in the Virgin region are not yet resolved. The argument may be made, however, that the region was inhabited by Archaic foragers when maize was introduced. Their choice was clear—eat it or plant it? By the early centuries AD, it is clear that local populations were heavily dependent on maize and all that farming entails.

Early Pueblo Period, AD 700–1050

From this point, the stage was set for the "Early Pueblo period," a useful concept that spans from the end of Basketmaker III through the Pueblo I and Early Pueblo II periods. During this lengthy span, groups on the Grand Staircase participated in the slow growth and development of a region-wide Virgin "tradition"—what archaeologists see as similar ways of doing and making things. If the essence of agriculture is to accumulate surplus, it follows that to be successful, farmers needed a means and method of storing their bounty. Gradual stylistic changes of Virgin storage architecture have been an important focus of research for some time.

In 1920, archaeologist Jesse Nusbaum excavated dozens of slab-lined storage cists at Cave du Pont near Kanab. These dated to the Basketmaker II period (AD 1–400). The excavation produced no evidence of where the people who had made and used these storage features actually lived. Only recently have archaeologists found open-air pithouses in the Kanab area (pages 30–32).

By early Basketmaker III (AD 400–700), open-air sites with clusters of cists associated with pithouses with benches and shallow antechambers are known across the Grand Staircase. Little more than the introduction of the bow and arrow and plain gray pottery differentiates this period from the preceding one. Although village-sized sites have been documented, we also know of small, household-sized sites. This suggests that cist-pithouse clusters of "villages" may have accumulated over time, and were not contemporaneous.

By AD 700, cists were aligned and eventually connected with slab pavements—essentially an early form of room blocks. The complex history of their development and off-and-on use, however, suggests that people moved among multiple farmsteads. This behavior makes Virgin settlement an intriguing subject, and sets it apart from other regions. Over time, storage cists became shallower and more room-like with *jacal* (wattle and daub) superstructures. Room blocks were still not planned as such, but created as new rooms were added.

Throughout the Early Pueblo period, storage features had one thing in common: carefully sealed, slab-lined subfloors with clay surfaces that protected foodstuffs from moisture, pests, and rodents. Interestingly, we find very few pottery sherds on sites of this time period. This leads us to infer that people continued to rely on cists rather than pottery for storing food. The larger implication is that storage in cists was more efficient for periodically mobile farmers.

Shallow pithouses with benches served as the primary habitation throughout this era. Formal floor features including sand-filled bins and vaults—sometimes sealed over with floor clay—are common across the region. Often, these were accompanied by lightly constructed *jacal* rooms people probably used during warm weather.

Pottery was simple and utilitarian. We use sequential changes in how potters formed the rims on plain gray pottery to help us date associated materials and architecture. A progression of black-on-gray designs beginning with Mesquite (Lino style) merged into a local type called Washington Black-on-gray during Pueblo I times, culminating with St. George Black-on-white. The latter is roughly analogous to Black Mesa Black-on-white pottery made in the Kayenta region. The fact that potters on the Grand Staircase were not making red wares or corrugated pottery during this Early Pueblo period is, however, a powerful comment on the region's isolation from Kayenta groups, who were producing corrugated pottery by about AD 1000.

These 350 years of Virgin material culture and settlement show isolation, but also stability and internal equilibrium. Population levels were modest and slow-growing, social relationships remained simple, and farmers were ultimately successful—a notable achievement during an era known for periodic climate disruptions.

Late Pueblo Period, AD 1050–1250

Sometime between AD 1050 and 1100, the situation changed dramatically on the eastern Grand Staircase. What has been called the "Pueblo II expansion," the "Kayenta intrusion," and the Virgin-Kayenta "interface" is signaled by the sudden appearance of a wide range of material culture, including deep masonry pit structures, formal linear room blocks, and "L"-shaped courtyard pueblos. Recent tree-ring dates from Cave 6, a site near Kanab investigated by Neil Judd in 1919, indicate this transformation was fully integrated into the local culture by 1100.

Coincident with the new architecture is the appearance of different kinds of ceramics. These include corrugated pottery, Kayenta-inspired Sosi and Dogoszhi Black-on-white designs, and Tsegi Orange Ware. Although researchers have long inferred that these abrupt changes were a result of direct Kayenta influence, we now know that most of this new pottery was manufactured on Grand Staircase rather than in the Kayenta region. This raises the question: Where did these people, or at least these new traditions, come from?

A good case may be made that these traditions originated on the eastern Arizona Strip, where Virgin and Kayenta groups had been interacting for some time. Courtyard pueblos, often with pit-structure depressions, are well represented there. Local versions of the Kayenta-inspired pottery, including red ware, are most prevalent among the kinds of pottery found there.

Residents of the eastern Grand Staircase began building pueblos differently, and this architectural innovation has distinct social implications. Instead of adding on room by room, builders constructed pueblos as a unit using the "ladder" technique. This involved laying out the parallel walls of the room block and then partitioning it into separate rooms. "L"-shaped courtyard pueblos were formed by setting a leg of residential rooms at a right angle to a storage room block. Several are known on the Grand Staircase. One of the best examples is the pueblo (Structure A) at Coombs Village (Anasazi State Park).

By early Pueblo III times (circa 1150), villagers were building sizeable plazas. Although these changes might seem to be a result of external contact, locally produced pottery once again indicates this was not the case. In fact, enclosed plaza layouts are known, employing one construction technique or another, throughout the Virgin region. Like other late Puebloan attributes, architectural traits were quickly absorbed into the fabric of Virgin culture on the Grand Staircase, though their acceptance was quite variable elsewhere in the region.

There is little evidence of continuing contact with the Kayenta region other than the introduction of Flagstaff Black-on-white design style on pottery by 1150. Evidence for depopulation of the Grand Staircase is based on a few radiocarbon dates extending into the mid-1200s. This seems to be the case farther west, as well. The virtual absence of negative-design Pueblo III pottery suggests that there was little contact with Kayenta groups during the final century of Virgin Pueblo habitation on the Grand Staircase.

The precise span of time between depopulation by Virgin Pueblo groups and the arrival of ancestral Southern Paiute is not known—perhaps a few hundred years. The Grand Staircase continued to be a viable landscape for making a life.

Who Lived on Fiftymile Mountain?

R. E. BURRILLO, SWCA ENVIRONMENTAL CONSULTANTS
DOUGLAS MCFADDEN, BUREAU OF LAND MANAGEMENT (RETIRED)

The highest eminence of the Kaiparowits Plateau, Fiftymile Mountain is actually a mesa that extends for about 50 miles from tip to tail. Geologist Clarence Dutton, who named the Grand Staircase, noted that Fiftymile Mountain was "an excellent example" of the ancient and uplifted remnants of Utah's geology. John Wesley Powell described it as a "long and narrow" plateau with "storm-caved cliffs." It goes by "Wild Horse Mesa" in some of Zane Grey's most popular novels.

The appropriately named Straight Cliffs of its sheer eastern margin delineate the boundary between the Kaiparowits Plateau and the Escalante River basin (see map on page 6). Access to the mesa top is tricky, making it one of the least developed landforms in the intermountain west. And its human history is trickier still.

Ever since archaeological investigations of Fiftymile commenced with the Rainbow Bridge–Monument Valley Expedition of the 1930s, its archaeology has been intensely debated. James Gunnerson, one of the earliest investigators of Fremont material culture in the region, recognized Fremont components amid later Ancestral Pueblo materials. He posited that the latter represented immigrants from the Virgin culture area who had displaced the Fremont. Somewhat later, Florence Lister proposed that these people were Kayenta immigrants from Tsegi Canyon to the south. Subsequent studies of the pottery and architecture cast doubt on this hypothesis.

Recent investigations in House Rock Valley to the west and Escalante Valley to the north may offer clues to help resolve the mystery. Ancestral Pueblo residents of House Rock Valley were building room blocks with a distinctive "L" shape during a major expansion into the area from about AD 1050 to 1150. Although this style of room block is unknown atop Fiftymile Mountain itself, the Coombs Village (Anasazi State Park) in Boulder includes a structure with the same shape and dimensions, dating to about 1129 to 1169—or just about the time House Rock Valley was also most intensely inhabited.

Thus, it is possible that Fiftymile came to be inhabited by Pueblo farmers from the Kayenta region or the Virgin region, although available evidence fails to definitively support one or the other. In either case, these people seem to be strongly related to people living in House Rock Valley. Now the question

Ancestral Pueblo cliff dwelling associated with Fiftymile Mountain. Before Ancestral Pueblo farmers arrived in the region, people of the Fremont tradition lived on the mesa and in its canyons. This place is now outside of the downsized national monument boundaries. IMAGE: R. E. BURRILLO

is: Who was living in House Rock Valley?

Meanwhile, at a site called Arrowhead Hill in the Escalante Valley, Joel Janetski and colleagues found evidence that tantalizingly suggests Fremont and Ancestral Pueblo living contemporaneously while maintaining ethnic distinction. Multiple lines of evidence—including architectural styles, pottery, and radiocarbon dates from maize cobs—currently indicate that the two groups were living side-by-side, at least for the period from about 1050 to 1150. At present, Arrowhead Hill is also the earliest known site with Ancestral Pueblo presence in the Escalante drainage, dating to a time period when the Fremont were probably still the dominant inhabitants. If these two groups were not co-residents there, then the Ancestral Pueblo must have swooped in and replaced the outgoing Fremont faster than archaeologists' dating tools can track!

For reasons that remain unknown, both groups were gone from the area by the mid-1200s. Although different groups use the area sporadically to this day, nobody ever lived atop the mountain again.

Escalante-Area Fremont

RICHARD K. TALBOT
BRIGHAM YOUNG UNIVERSITY

The Fremont archaeological tradition lasted from as early as the first century AD until the 1300s. At maximum extent, it spread over some 58,000 square miles, covering most of Utah north of the Colorado River and into northwestern Colorado and eastern Nevada.

On the southeastern edge of this large expanse, the Fremont cultural area overlaps into what are now the Kaiparowits and Escalante Canyons units of the Grand Staircase-Escalante National Monument (GSENM). Here, the huge Boulder Mountain and proximal Aquarius Plateau and Kaiparowits

Plateau (see map on page 6) are the source of many small creeks and intermittent drainages that feed into the Escalante River, which then flows primarily through a tortured landscape of broken sandstone on its way to the Colorado River.

The upper reaches of the Escalante are unlike other portions of GSENM, however. The Escalante Valley is a small, verdant boundary between mountain and desert. River valleys such as these were a primary attraction to Fremont horticulturalists, and in that regard the Escalante area is typical. Materially, economically, and socially, the first farmers here fit well within the larger Fremont world, and we have evidence that they maintained long-distance connections with farmers to the north and west.

The relationship between Escalante Fremont groups and nearby Ancestral Pueblo people also helps define who they were initially and who they became. In fact, there are few other areas where archaeology offers such good potential for addressing questions of Fremont relationships with neighboring peoples.

Another view of the Fremont pictographs featured on the cover of this issue, giving a sense of their context and proportion. IMAGE: R. E. BURRILLO

Escalante Fremont through Time

The temporal framework for the Escalante Fremont follows the same general periods used for the Glen Canyon region to the south—the Early Agricultural period, circa 400 BC to AD 500, and the Formative period, circa 500 to 1300. Details of change through time within Fremont lifeways here distinguish these people from the generally similar Ancestral Pueblo populations to the south.

The Escalante phase demarcates the earliest known production of domesticated crops among these Fremont groups. At the beginning of the Wide Hollow phase, people began making and using pottery. During the Arrowhead phase, Fremont and Ancestral Pueblo groups seem to have been living among each other in the upper Escalante River drainage area. Cultural change through time was more fluid and progressive than these archaeological phases can describe, of course, and in many respects changes were directly tied to relationships with neighboring Pueblo groups.

Escalante phase, AD 100–500

Comparatively little is known about Escalante phase Fremont. Small, seasonally used shelter or open sites near the Escalante River or its feeder streams suggest at least moderate-intensity farming efforts by individual households. This is consistent with what we know about comparable early Fremont sites on the northern Colorado Plateau and in the eastern Great Basin.

Although in situ development was long favored as the explanation for Fremont beginnings, more recent evidence, including DNA studies, suggests that Basketmaker groups migrated north of the Colorado River on a small scale, and that these groups originated the Fremont farming tradition. Early maize occurs to the south several centuries before this time, and it is very possible that the beginning date for the Escalante phase will be pushed further back at some point.

Wide Hollow phase, AD 500–1050

The vast majority of excavated Escalante Fremont sites are from the Wide Hollow phase. The settlement and subsistence patterns seen in the archaeological record suggest year-round habitation in farmsteads, hamlets, and small villages in the valley bottoms; small-scale seasonal farming in canyons and up onto the eastern fringe of the Kaiparowits Plateau near available water, but possibly including some dry farming; and seasonal exploitation of abundant plant and animal resources in lowland and upland areas.

During the Wide Hollow phase, patterns in how people were living and what they were making, especially pottery, confirm a Fremont ethnic identity distinct from lower Escalante

drainage Ancestral Pueblo populations. This suggests that any earlier Basketmaker influence—whether genetic or cultural, or both—had already been transformed into this distinct Fremont identity. In fact, there appears to have been a somewhat formal social and physical boundary between the two that was still very permeable.

Interaction between the groups continued and probably increased over time, with Pueblo influence prominently reflected in the appearance of certain architectural traits in Fremont architecture, including slab-lined walls and fire pits, antechambers, and wing walls, none of which are common at Fremont sites beyond this borderland. On the other hand, not all interactions with neighboring peoples were necessarily friendly, as attested by some high and very defensible residential site locations along the edges of the valley.

Much has been made about differences in Fremont and Pueblo adaptations during this and the subsequent phase. In GSENM, these adaptations are primarily a factor of physiography, with the generally valley-dwelling Fremont contrasting with the generally Kaiparowits Plateau-adapted Pueblo populations. Fremont use of the uplands appears sporadic and seasonal, and they do not seem to have delved much deeper into the Kaiparowits than the Straight Cliffs and Fiftymile Mountain regions.

During a transition period between the Wide Hollow and Arrowhead phases, perhaps beginning in the 800s to early 900s, and certainly after 1000, the physical boundary between Fremont and Pueblo groups changed and, in a real sense, dissolved. Evidence shows that Ancestral Pueblo groups were present in the Escalante Valley by the mid-1000s. This was a time of considerable social complexity, with fluctuating movements of Virgin and Kayenta Ancestral Pueblo groups (page 37) along the Fremont frontier, from the Kaiparowits Plateau/Fiftymile Mountain area upward to the Boulder and Circle Cliffs regions, and as far east as the Henry Mountains.

A Fremont granary in a high alcove. People stored maize (corn) in this structure, which is about waist-high on an adult. It would have had a cover stone when in use. IMAGE © JONATHAN BAILEY

Arrowhead phase, AD 1050–1350

The Arrowhead phase is contemporaneous with the Pueblo Fiftymile Mountain phase. The Fremont–Pueblo boundary dissolution is particularly evident at the Arrowhead Hill site in the Escalante Valley, where distinctive Fremont and Pueblo pithouses very possibly existed contemporaneously, in close proximity, with gray ware pottery made by one group found among the ceramics on the floors of the other. There are only a handful of excavated sites in the Escalante Valley dating to this phase, so a deeper understanding of these types of social relationships is more difficult to grasp. Still, distinct Fremont and Pueblo ethnicities continued at least through the 1100s in the Escalante Valley and elsewhere, including at sites in the Boulder Valley and farther east into the Circle Cliffs and Capitol Reef areas.

What happened in the 1200s is less clear. Throughout the Fremont region, populations had been aggregating into larger villages since the 900s, but these were dwindling by the late 1200s. The same appears to be the case in the Greater Grand Staircase-Escalante area, though at a smaller scale. Minimal evidence for farming is present into the 1300s, and gradual depopulation is apparent. Whether for social, environmental, or other reasons, Fremont groups are no longer archaeologically visible in or near GSENM by the mid-1300s.

"A long and dignified human history"

Springtime winds are howling across the high desert today, again, ushering in the last slash-and-dash storm before the welcoming warmth that early summer brings. Living on the edge of the Colorado Plateau at 6,600 feet above sea level offers some challenges for all us avid and hopeful gardeners. Our gardens today connect us to this place, to each other, to our ancestors, and to the first people who tilled this soil.

For decades, people have grown gardens in this once remote and isolated place to help sustain themselves. And for millennia, indigenous people lived off what was naturally provided here, from large mammals to insects to many kinds of seeds, nuts, roots, and berries. Eventually, they added gardens of maize and squash to their use of these staple regional foods.

Where I live in Tropic, the family garden and agriculture, in general, have remained a central cultural piece of our rural life. Tropic (see map on page 6) was named after its tropical-like weather compared to other settlements in the area, and was billed as a place where you could grow an apple tree or even tomatoes. With a population of around 500, Tropic is a small, historic ranching community that borders the Grand Staircase-Escalante National Monument, Dixie National Forest, and Bryce Canyon National Park, leaving less than 4 percent of the surrounding region in private ownership.

Because of its access to these public lands, our community has increasingly come to rely on tourism, now in the millions of guests annually. More and more, service industries have replaced agriculture as the significant economic driver. Agricultural activities such as alfalfa production and other farm operations still continue with tenacity and grim persistence, whereas cattle ranching that relies on shared public lands struggles to eke out slim margins.

Many of my neighbors in Tropic are of pioneer stock, their distant relatives called here by their church in the mid-1800s to settle and lay claim to this rugged landscape. The Grand Staircase-Escalante National Monument Proclamation of 1996 declares the land "has a long and dignified human history, where one can see how nature shapes human endeavors."

Over the past two decades, many of these endeavors have been recorded as part of the Southern Utah Oral History Project. As the historian for the project, I have interviewed, transcribed, and archived the stories of the people who have called this region home for generations. There are many stories about cattle ranching, sheep shearing, corral building, chaining, and reseeding on these public lands. Additionally, information is available about the seasonal movement of the first inhabitants here and the resources they used for food and for ceremonies. Other stories cataloged may still be seen etched or painted onto canyon walls throughout the area, considered by many to be holy ground.

I have a cool job, talking with people about their historical connections to this land. And sometimes we also talk about our gardens. Whether we are planting our gardens, moving cows, or simply praying for rain, it's a start, realizing we all have these shared moments of gratitude and awe for the land we call home.

—Marsha Holland, Southern Utah Oral History Project,
gsenm.org/southern-utah-oral-history/

The Paria River. IMAGE © TIM PETERSON

Made Possible by…
Grand Staircase-Escalante National Monument

MATTHEW ZWEIFEL
BUREAU OF LAND MANAGEMENT (RETIRED)

Working as an archaeologist at Grand Staircase-Escalante National Monument (GSENM) is one of the premier positions available to an archaeologist in the federal system. Compliance with federal laws such as the National Environmental Protection Act and National Historic Preservation Act is always the major portion, if not all, of the workload. Because GSENM was explicitly established with preservation, research, and education as principal goals, however, my colleague Doug McFadden and I were also able to undertake and facilitate research. In fact, those principal goals represented a major paradigm shift for the BLM, and for the past 23 years, GSENM has taken them to heart.

The monument's archaeology is indeed impressive and stunning, and it should be brought to the public's attention as often as possible. Within GSENM lies the complete record of human use of this landscape, from the close of the Pleistocene to modern times, including traces of the Paleolithic Clovis mammoth hunters, through the adaptations of Archaic peoples to a warming and drying Holocene, to the rise and fall of farming in the Formative era, the return to a hunting-and-gathering lifeway in the 1300s, and finally the second rise of a largely agricultural lifeway with the arrival of the settlers and pioneers in the late 1800s. It is all here, if you know where to look and what to look for.

Preservation, Education, and Research

The key to preservation is education, and the key to education is based in research. The public education and interpretation programs at GSENM have been a huge success. When I joined McFadden (pages 37–40) at GSENM in 1997, many locals viewed archaeological sites as artifact-collection recreational opportunities. Over the past two decades, however, through public presentations at grade schools, science forums, the BLM Visitor's Centers, and any other opportunity we could take, there has been a notable shift in local perception of archaeological sites. Sites are now considered something to be proud of, something to show off to visiting friends and relatives, not something to be treated recklessly—who would want to show off a site full of looter's pits, or rock art covered with graffiti?

Looking almost due west from the Smokey Mountain Overlook. The cliffs on the right are the Kaiparowits Plateau. IMAGE © TIM PETERSON

Many presentations vital to the GSENM interpretive and educational component of the Cultural Resources program have been delivered by various researchers. And having the duty and responsibility of bringing researchers to GSENM has been one of the most rewarding experiences of being the GSENM Archaeologist. Although much research has been accomplished in-house by staff archaeologists, the majority of research has been performed by outside entities, including universities and independent investigators.

Our Door Is Open

In the late 1990s and early 2000s, archaeologists and graduate students from Brigham Young University undertook a great deal of field research in the Escalante area. This included not only significant excavations, but also large-area surveys for cultural resources in an effort to understand larger land use patterns and how land use is reflected in something as small as an archaeological site.

At the same time, an independent team of well-respected Southwestern archaeologists was conducting survey within the canyon of the Escalante River, and a survey was taking place on the Kaiparowits Plateau, where archaeologists from the Navajo Nation Archaeology Department were walking some 17,000 acres to again obtain important background information on the location, distribution, and cultural affiliations of archaeological sites across this massive landform.

Investigations were also taking place on the Grand Staircase portion of the monument. These were led by in-house researchers and by California State University, Long Beach. Experts from Mesa Verde National Park conducted preservation and stabilization at key architectural sites.

After the early 2000s, budgetary constraints changed the scale of research, but did not dim the overall view of its importance. Prior research had mostly focused on understanding large-scale site distributions across GSENM, as well as examining Ancestral Pueblo settlement, pottery, and architecture. Relationships between the Virgin and Kayenta Ancestral Pueblo and Fremont cultures were another area of intense interest.

In an effort to broaden research topics, we hired graduate students from Northern Arizona University as seasonal archaeologists. With continued GSENM involvement and support, these students completed their master's degrees focusing on GSENM archaeology, including travel management and archaeological issues, pollen core and environmental analysis in association with archaeological sites (pages 48–49), and ethnobotany (pages 53–54) and the cultural importance of springs and riparian areas (pages 50–51).

Other seasonal GSENM archaeologists continued with in-house research and professional presentations regarding people's use of the landscape in the Archaic era, Ancestral Pueblo diets, and site distributions. Of course, Doug McFadden and I continued our own research, as well. (Doug retired in 2005; I retired in 2019.)

Agreements with nonprofit organizations such as the Colorado Plateau Archaeological Alliance have significantly aided work with volunteer crews of students and other inter-

Grosvenor Arch. IMAGE: MORGAN SJOGREN

ested individuals, and have helped introduce new cohorts of archaeology students to fieldwork at GSENM. Development of the GSENM Archaeological Predictive Model (pages 24–25) was greatly facilitated by one such student, who is now a doctoral candidate in archaeology at the University of Utah. Additional fieldwork and artifact curation projects have been aided by archaeologists and students from Southern Utah University.

An especially rewarding and productive relationship has been the one we established with the Kaibab Paiute Tribe. We have cooperated on a variety of endeavors, including assisting with the training of tribal site stewards, spring restoration on the monument, and tribal youth education programs.

Broken Bow Arch. IMAGE © JOHN FOWLER, VIA FLICKR

Sharing Results

Research is necessary to fully understand any given resource, but if the results of this work are not made available to other researchers and the public, it is of little practical value. Grand Staircase-Escalante National Monument has always made an effort to publish and present the results of archaeological studies in a variety of formats. Research papers are published in professional journals, and presentations are made at professional meetings. "Gray" literature reports—completed research papers that do not see official publication—are made widely available to other researchers and federal archaeologists. Well over a dozen theses have been completed regarding GSENM archaeology, and these are available at several universities and elsewhere. The monument also hosts a "brown bag" lunchtime presentation series for the general public, and it has organized and hosted two symposia at which scientists from a wide variety of backgrounds presented monument-specific research.

In terms of its own publications, GSENM also shares archaeological research in its Special Publication series and as part of the larger Utah BLM Cultural Resource series; as of this writing, GSENM has four additional reports nearing completion for future publication in these series. Several of the larger, more comprehensive publications will take their place alongside such classics as the Glen Canyon series, becoming foundational documents for the next several decades of Southwestern archaeological research.

Limitless Potential

The past 20 years have seen a renaissance in studies of the Virgin Branch of the Ancestral Pueblo archaeological culture, as well as many other aspects of Southwestern archaeology. Grand Staircase-Escalante National Monument is situated in a physical and cultural landscape that offers fantastic research potential. Although this was noted by archaeologists as early as the 1870s, it is only through recent and ongoing inquiry that we are recognizing the true depth and complexity of archaeology in and surrounding GSENM.

As research continues and certain questions are answered, there are always more questions, and more complex questions, that come to light. The monument can and should continue to play a central role in addressing these questions and in providing additional archaeological puzzles for the next generation of Southwestern archaeologists. I invite them to get their start at GSENM.

Fire Regimes and the Greater Grand Staircase-Escalante Landscape

ROBERT M. D'ANDREA, NORTHERN ARIZONA UNIVERSITY
SCOTT R. ANDERSON, NORTHERN ARIZONA UNIVERSITY
KENNETH L. COLE, NORTHERN ARIZONA UNIVERSITY
MATTHEW ZWEIFEL, BUREAU OF LAND MANAGEMENT (RETIRED)
R. E. BURRILLO, SWCA ENVIRONMENTAL CONSULTANTS

Human interactions with naturally and culturally induced wildfires are amply documented in the archaeological record. For thousands of years, indigenous Australians practiced a strategy called "fire-stick farming" that involved burning vast areas of vegetation in order to alter the local plant and animal populations in ways that increased the land's carrying capacity for hunting and gathering. Elsewhere in the ancient world, "slash-and-burn" or "fire-fallow" farming—burning large areas of downed, dried timber in order to rejuvenate the soil with a layer of fertile ash—was practiced throughout Asia, Europe, and Mesoamerica, and some Maya communities continue a version of it to this day (and see *Archaeology Southwest Magazine* Vol. 30, No. 4).

The sediment record of Greater Grand Staircase-Escalante holds evidence of fire-stick and slash-and-burn farming. We know this in part through recent analyses of sediment cores taken from atop Fiftymile Mountain and in the Meadow Canyon area (map on page 6). The results tell an intriguing story about ecology, fire, and culture.

Historical Ecology

Historical ecology—reconstructing past human-environment relationships over long periods of time—involves many disciplines, including archaeology, ethnobotany, palynology, and geology, among others. Historical ecologists derive data from natural archives, such as sediments (pollen, charcoal, plant macrofossils) and annual plant and animal growth (tree rings, coral layers). Other information comes from documentary archives, such as diaries, land surveys, repeat photographs, maps, plot measurements, and weather observations.

Combined with traditional cultural knowledge, these archives allow scientists to understand historical trends and variability within a broad range of ecosystems. Conservationists and land managers can then apply that information on the ground.

Fiftymile Mountain

A major fire event took place atop Fiftymile Mountain about 2,500 years ago (500 BC), coinciding with the end of the Late Archaic period in the region; it is not clear whether the fire was natural or human-induced. Input from scientific and traditional knowledge sources throughout the Southwest indicates the use of "maintenance burning" to promote wild resources and disturbance-preferring plants, such as *Amaranthus albus* (protein-rich pigweed, a local cousin of quinoa), much like the fire-stick farming of ancient Australians. This would have been especially useful during the Late Archaic period, just before the appearance of agriculture in the region, when diet breadths were at their widest and most diverse—in other words, when people were more dependent than ever on a very wide variety of wild food sources.

Following this, environmental effects related to agriculture are evident from about 1,600 to 700 years ago (AD 400–1300), including a decrease of junipers (used as firewood) and concomitant increase of pinyon (provider of pine nuts), as well as increasing numbers of disturbance-preferring plants in response to agricultural impacts. Local fire frequency increased, and was characterized by relative consistency with very few major events.

This pattern indicates that Ancestral Pueblo farmers were practicing maintenance burning at that time, an inference supported by ethnography and by traditional cultural knowledge contemporary Pueblo farmers have shared. More likely than not, local farmers adopted and adapted this practice from versions earlier hunter-gatherers had employed to enhance ecological carrying capacities, underscoring the depth of cultural connectivity on this landscape over time.

Following depopulation of Fiftymile Mountain and the surrounding area by about 700 years ago (AD 1300), woodland density and wildfire events increased dramatically, and sagebrush and scrub oak communities gradually took over. This vegetative response probably represents secondary forest succession into areas that had been cleared of primary forest to make way for agriculture, as we see at Mesa Verde.

Meadow Canyon

From about 2,500 to 1,600 years ago, fire was persistent on the landscape of Meadow Canyon, with significant fires

occurring about every 300 years. Similar natural fire-rejuvenation intervals have been observed on about a 400-year cycle at Mesa Verde. At about 1,600 years ago, local wildfire occurrences decreased, suggesting that Ancestral Pueblo farmers were undertaking maintenance burning in this area as well.

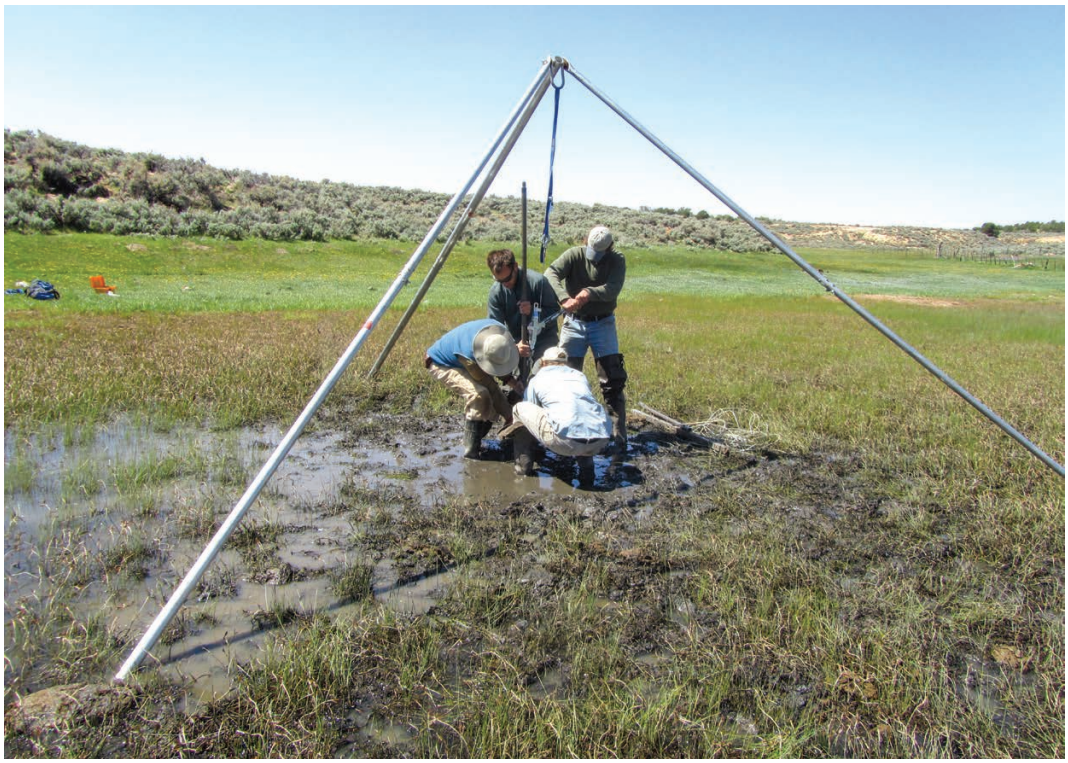
Given that people were almost certainly practicing agriculture here several centuries before AD 400, it is curious that evidence of fire-management does not appear earlier in the record. One likely explanation is a change in farming strategies, from farming near springs and seeps in canyon bottoms to more intensive dry-farming in upland areas. This kind of strategy is evident in the Bears Ears area, where farmers of the Basketmaker II era relied primarily on run-off farming in canyon bottoms, and later inhabitants dry-farmed the mesa tops (see *Archaeology Southwest Magazine* Vol. 28, Nos. 3 and 4, and Vol. 31, No. 4/Vol. 32, No. 1).

From about 700 years ago onward, Meadow Canyon was dominated by woodland with an understory of disturbance-preferring plants. This implies that the Southern Paiutes who inhabited the area after Ancestral Pueblo farmers left continued the practice of active fire management.

Modern Conditions

Following the migration of Ancestral Pueblo farmers out of the Grand Staircase-Escalante region by about 1300, local sediments mostly record the influences of a different prime mover: climate change. The transition from the Medieval Climate Anomaly (a warming period circa 950 to 1250), which in the Southwest was characterized by arid climates that fluctuated from anomalously wet to anomalously dry, to the Little Ice Age (1300 to 1850), which in the Southwest was characterized by increases in moisture availability but with large drought events. Major, regionally synchronous or co-occurring fire events erupted throughout what is now Utah between 1630 and 1900, during years with drier-than-average summers. New Mexico shows a similar pattern.

Finally, the uppermost portions of the sediment cores from atop Fiftymile Mountain document a relatively new set of impacts, including dramatic vegetative shifts and increased erosion. Historic livestock grazing and associated fire suppression have created a modern ecosystem unlike any in the region's past. The same may be seen in Meadow Canyon, where the record indicates a dramatic decrease of healthy fire regimes and increasing erosion since settlers introduced intensive grazing practices.



Top right: *Researchers Dr. Ken Cole, Dr. Scott Anderson, and Brittany Burgard investigating packrat middens in a Wygaret Terrace alcove.* ***Right:*** *Researchers Dr. Scott Anderson, Dave Vaillencourt, Charlie Truettner, and Rob D'Andrea recovering the Lake Pasture sediment core.* IMAGES COURTESY OF ROBERT D'ANDREA

Learning from a Land of Many Uses: Plants, Springs, and Archaeology at Grand Staircase-Escalante National Monument

DAVID M. SABATA
NORTHERN ARIZONA UNIVERSITY

Having spent my life in search of archaeology, and more than a decade working in cultural resource management, I grew to wonder what natural features attracted the human presence we see reflected in artifacts, features, and sites across the landscape? If our job, as archaeologists, is to help respect and protect places of significance, are we doing that by drawing circles around the archaeology alone?

Offering of Hopi Water Clan member to ancestral spring formerly on GSENM, used with permission of the petitioner "to let them know we're still here." The offering was later unlawfully removed. IMAGE: DAVID M. SABATA

While working on a large construction project with Paiute elder women in southwest Utah, I learned that plants and water-sources retain far more importance for traditional peoples than the remains of making flaked stone tools we archaeologists get excited about. Thus, I returned to school at Northern Arizona University to learn more about indigenous perspectives on the significance of natural features.

For my thesis, I hypothesized that springs have long been centers of human relationships with culturally significant biodiversity, and are thus more closely associated with archaeology than other places. As early Southwestern archaeologist Walter Hough observed, "Wherever there is a spring…there is the place to look for ruins." I received support from Grand Staircase-Escalante National Monument (GSENM) archaeologist Matthew Zweifel (pages 45–47), who hired me to conduct my thesis work studying relationships among springs, plants, and archaeology.

First, I reviewed Paiute, Pueblo, and Navajo ethnographies and compiled a list of important plants to search for. I then surveyed about half of the 150 named and mapped springs of GSENM for important plants. To calculate the cultural significance of springs based on plants found, I compiled use data for over 70 genera. The number of plants uses ranged from one for cocklebur (as a love-charm) to 113 (medicinal, edible, craft, ceremonial, and other) for juniper. I later compared springs data to a control group of upland areas recorded by botanists.

During springs surveys, I found more than 30 new archaeological sites. Using existing records and online mapping programs, I calculated the number of archaeology sites previously recorded within a one-mile radius of springs, added new sites, and did the same for the upland control group.

In terms of a spring's significance based on uses of plants observed, sites ranged from 137 to 982 uses, and averaged 540 uses and 8.2 archaeology sites within a one-mile radius. The upland group had a smaller range, averaging 396 uses and 5.3 archaeology sites within a one-mile radius. Thus, I found about 50 percent more plant biodiversity and archaeology at springs than other areas. Of special interest, however, are the outliers.

The highest-scoring spring sites are near large alcoves that contain significant archaeology, including rock-writing, deep soils, and middens in which important plants often grow, such as large Prickly Pear, Banana Yucca, and various berry-producing species. The highest scoring alcove/spring site had 250 percent more plants-diversity and 200 percent more archaeology than non-springs sites, though only 25 percent of the surrounding area had been surveyed. Elsewhere, I found springs that, though not high-scoring individually, when combined form a complex that supported the largest Ancestral Pueblo community found on GSENM and one of the largest documented Paiute settlements.

Although my focus was on important, often semi-cultivated plants near water sources, I also recorded plants at archaeological sites adjacent to springs. Important species are frequently found in middens, former fields, and other disturbed areas. In such places I found members of the especially important nightshade/potato family that have persisted for more than 10,000 years at sites in the region (and see pages 53–54). Near the highest-scoring spring site, below the alcove/midden, I observed groundcherry and, a short distance away, sacred datura. Similarly, wolfberry and tobacco were found at the largest Pueblo/Paiute archaeological complex.

My thesis revealed greater plants-diversity and archaeology near springs, and I am certain that both are correlated to the amount of water produced by springs. Still, flow data have not been measured for springs at GSENM. Thus, I was unable to conclude that more water means greater plants-diversity and archaeology, though this makes intuitive sense. I later had the opportunity to visit the largest spring I have yet seen, on private land formerly encompassed by GSENM, near which wolfberry, groundcherry, tobacco, and datura still grow, surrounded by dense archaeology.

I learned that traditional Paiute, Pueblo, and Navajo peoples continue to visit GSENM for plant-gathering and other ceremonial purposes. The greatest concentration of such activity is along the spring-fed Paria River in an area that is now outside of the downsized national monument boundaries—a place the Trump administration asserts is not unique. I do not know of any more intensively used place of traditional plants and ceremonial importance. This importance was attested by an offering made by a man whose ancestors have visited the location for a thousand years or more (see image on page 50).

As oil, gas, and coal interests have lobbied for use of GSENM, the aquifers that feed springs are targeted for extraction, putting important springs-dependent biodiversity at risk. Without better data, such impacts will be impossible to gauge. Weakened water protections, combined with regional warming and drying, put springs at greater risk than ever before. Our shared obligation to protect important places requires us to widen our gaze beyond archaeology to the natural features that brought people to such places.

Above: *Upper Calf Creek Falls.* IMAGE: MORGAN SJOGREN
Below: *Cottonwood leaves were found as temper in clay granary remnants within this archaeologically rich alcove. The green tops of cottonwood are visible (center) at the spring a short distance away. There are distinctive flora in the midden in the foreground.* IMAGE: DAVID M. SABATA

"A lovingly prepared meal and a magnificent wild landscape"

Nearly 20 years ago, I opened a restaurant in the remotest town in the lower 48, population 225, including infants. My business partner and I made this peculiar choice because, just a few years earlier, President Bill Clinton, along with then Secretary of the Interior Bruce Babbitt, had designated Grand Staircase-Escalante National Monument. Doing so had protected that landscape in perpetuity.

Having been cooks for Grand Canyon river trips, we understood well the powerful combination of a lovingly prepared meal and a magnificent wild landscape. We believed that if we made a restaurant near the monument, we could bring visitors happiness and the locals good-paying and meaningful jobs. We intended to help visitors fall deeply in love with this place, and food was our vehicle for that.

We live and work in a storied place, an area that people the world over come to just to experience. But under President Trump's December 2017 proclamation, the national monument is now about half the size it once was—and is, in fact, chopped into smaller, island-like separate pieces, destroying the intentional wildlife corridors and opening up vast roadless areas to extractive industries.

In the meantime, as lawsuits about the evisceration of Grand Staircase-Escalante and Bears Ears National Monuments wend their way through the court system, those of us in the local communities are already feeling the negative effects of this unpopular and unjustified action, in large and small ways. For me, it is an existential dread combined with anticipatory grief. My heart aches knowing that the place I love is under imminent threat of annihilation.

In my own business, I know the harm that development causes to landscapes as iconic and delicate as the Grand Staircase-Escalante. It is impossible to overstate how detrimental resource extraction is to the natural experience, which is what we rely on to ensure our customers keep coming back. Visitation to our beautiful monument has allowed our communities to avoid the roller-coaster effect of boom-and-bust extraction cycles. Outdoor recreation and tourism provide a much more stable revenue flow.

Part of living and running a business in this breathtaking place is acknowledging the stewardship we have of this land, which in truth belongs to all Americans. It is our duty as citizens to speak up for the landscapes we love beyond measure. From my perspective, I will fight hard for my beloved landscape—not so much for myself or my business, but because long after I and my restaurant are gone, this landscape needs to be intact for future generations who will need and love it as much as I do today.

I feel the eyes of the past and the eyes of the future watching. I absolutely intend to be a good ancestor to coming generations, and I ask you to join me in that quest. We *can* save Grand Staircase-Escalante from cynical and shortsighted plundering that benefits no one who actually lives or visits here, but we must get really loud and really involved to do so.

—Blake Spalding, Hell's Backbone Grill & Farm, Boulder, Utah

Hell's Backbone Farm (Blaker's Acres) in Boulder, Utah. IMAGE © ACE KVALE

Ancient Four Corners Potato

LISBETH A. LOUDERBACK
NATURAL HISTORY MUSEUM OF UTAH, UNIVERSITY OF UTAH

Archaeologist Joel Janetski peered over the edge of the deep excavation of North Creek Shelter at more than three meters, almost 10 feet, of exposed stratigraphy. His crew had revealed spectacular living surfaces with roasting pits and numerous ground stone tools. When he finally received the radiocarbon data, the deepest surface showing human activity was 11,500 years old, establishing North Creek Shelter as the most ancient archaeological site on the Colorado Plateau. Among the revelations were numerous features, such as hearths, faunal bones, and botanical remains, which told a complex story about how humans had adapted to the uncertainties of environmental change over millennia.

A few years later, I stared across the table at a large North Creek Shelter assemblage of manos and metates housed at the Brigham Young University Museum of Peoples and Cultures. These stones were present during the shift from early to middle Holocene, when temperatures and rainfall had varied greatly, as did the local vegetation. I wondered whether I would be able to find plant residues embedded within those stones that revealed patterns of human dietary change in response to those environmental variations.

As it turned out, the array of microscopic starch granules extracted from the cracks and crevices of those well-worn tools was astounding. One type of granule caught my attention because, unlike all others, it was very large, and its "nucleus"—the starting point for starch synthesis known as the hilum—was off-center, or "eccentric." There was also a narrow fissure that emanated from the hilum. These characteristics greatly reduced the number of possible plant species that could have produced this distinctive type of granule. Eventually, I was able to determine that at least nine granules possessed all these features and could, therefore, be identified with high confidence as belonging to the native potato, *Solanum jamesii*. From that point on, I was hooked. I had to find out more about this fascinating plant.

Solanum jamesii is a tuber-forming species native to the Four Corners region with a center of distribution and abundance in Arizona and New Mexico, especially along the Mogollon Rim. But populations of the potato are also found around Escalante, Utah, including in the Grand Staircase-Escalante National Monument. In fact, Escalante Valley was called Potato Valley in the 1800s, when it was inhabited by the Southern Paiute and the first Mormon settlers. Evidently abundant at the time, the potato was gathered and eaten by cavalrymen. Families also collected and cooked them during the Great Depression.

Overgrazing by livestock dramatically altered the natural vegetation in the ensuing decades, and this potato species is now considered critically imperiled in the region. We have currently identified at least eight remnant populations of the Four Corners potato near Escalante, including one growing about 500 feet from North Creek Shelter. Not only are these populations growing far north of the Mogollon Rim, but many are also so tightly associated with archaeological features that they predict the nearby occurrence of storage granaries, pottery sherds, stone tools, habitation structures, and petroglyphs.

These archaeological associations made us wonder how those populations became established. Is it possible that people transported and eventually domesticated *S. jamesii*, given its long history and strong association with human activity? Our current project, funded by the National Science Foundation, is designed to answer that question through a collaboration among a botanic garden, a natural history museum, the

The tiny Solanum jamesii *on the tine of a fork at an indigenous foods event hosted by Utah Diné Bikéyah.* IMAGE: GAVIN NOYES

tribes of the Four Corners region, and a government potato gene bank. If indigenous peoples had transported, cultivated, and selected tubers away from the center of distribution, we would expect to find genetic, ecological, and reproductive traits that reflect past manipulation. In that case, this would be the only known plant species to be domesticated in the western United States.

In addition to exploring the question of ancient domestication, we are also engaged with tribes in the Four Corners region who have a long cultural relationship with *S. jamesii* and detailed knowledge of its biology. Elders still eat these small tubers, gathered from carefully tended populations. Some grow the species in gardens and regard it as a sacred food, lifeway medicine, and gift of the holy people. Consequently, the Four Corners potato reconnects descendant groups to intact landscapes and traditional agricultural practices, helping revitalize indigenous food heritage. Understanding the ancient potato heritage in indigenous perspective includes the spiritual and traditional aspects of bringing old teachings back to life, with the intention of healing and nurturing, protecting whole, natural systems of the land, and strengthening native cultures and knowledge systems for future generations.

Top left: *Excavations at North Creek Shelter, a Paleoarchaic period site.* IMAGE COURTESY OF MUSEUM OF PEOPLES AND CULTURES, BRIGHAM YOUNG UNIVERSITY ***Left:*** *A population of the Four Corners potato with North Creek Shelter in the background.* IMAGE COURTESY OF LISBETH A. LOUDERBACK ***Above:*** *Louderback holds the tiny tubers of* Solanum jamesii, *the Four Corners potato.* IMAGE: DAVID TITENSOR, COURTESY OF THE UNIVERSITY OF UTAH

The San Juan Expedition

In 1878, at the direction of Church President John Taylor, two parties of Mormon settlers—a small advance group, followed by the main contingent—were dispatched to create a mission in what is now the town of Bluff on the north bank of the tempestuous San Juan River. The first part of their journey took them along an established route from Parowan to Escalante.

The rest of the route took them from Escalante along the bench beneath the Straight Cliffs, stopping *en route* to hold square dances in what was subsequently named Dance Hall Rock while awaiting word from scouts about the toil ahead. Upon reaching Glen Canyon, they were forced to spend several months widening a cleft in the red sandstone bedrock and then chiseling and blasting a gap all the way down to the Colorado River so that they could continue on their journey. They eventually made their way across the Bears Ears area, struggling through winter conditions in Grand Gulch along the way. The majority of settlers reached the townsite of Bluff by April 6, 1880, although it would take another 137 years before Bluff became an incorporated town.

Although officially called the San Juan Expedition, this impressive feat is commonly known as "Hole-in-the-Rock," and the road they took from Escalante to what is now Lake Powell bears that name to this day.

—R. E. Burrillo,
SWCA Environmental Consultants

Grand Staircase-Escalante National Monument is home to Dance Hall Rock, where pioneers of the San Juan Expedition enjoyed a respite, unaware of the harrowing journey ahead. IMAGE © JOHN FOWLER, VIA FLICKR

Archaeology Southwest
300 North Ash Alley Tucson, Arizona 85701

NONPROFIT
ORGANIZATION
U.S. POSTAGE PAID
TUCSON, AZ
Permit No. 878

back sight

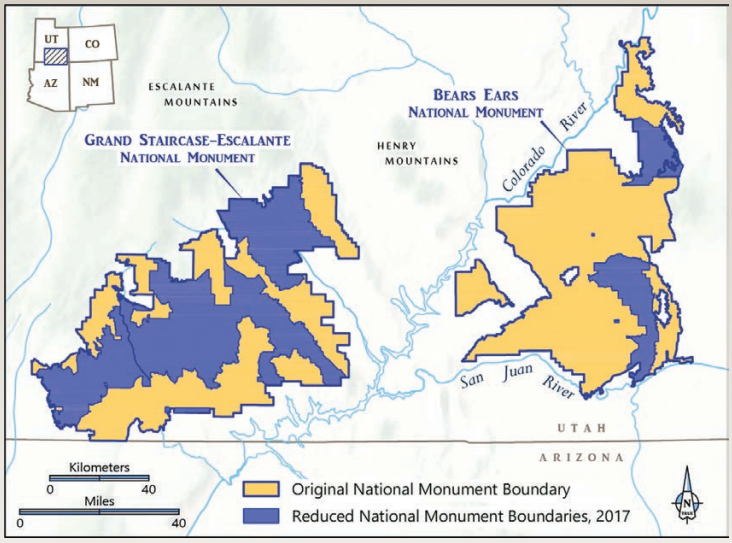
The Grand Staircase-Escalante National Monument's vast and austere landscape embraces a spectacular array of scientific and historic resources.
—President Bill Clinton, 1996

The [Bears Ears] landscape is a milieu of the accessible and observable together with the inaccessible and hidden.
— President Barack Obama, 2016

Two presidents, two national monuments. Both presidents recognized that these were special places, large places, places that had to be protected as intact landscapes. And so they did, establishing these national monuments by proclamations under the authority of the Antiquities Act of 1906.

Grand Staircase-Escalante was the first landscape-scale national monument to be managed by the Bureau of Land Management (BLM) rather than the traditional manager, the National Park Service. In 2009, Congress further expanded the BLM's role in protecting the nation's public lands when it established the National Landscape Conservation System.

Ten years later, our public lands are up against intensifying threats. Two proclamations issued by President Donald Trump on December 4, 2017—proclamations that almost certainly overstretched the authority delegated to presidents by Congress in the Antiquities Act—dramatically downsized Grand Staircase-Escalante (54 percent) and Bears Ears (85 percent). Congress clearly gave presidents the power "to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Federal Government to be national monuments." Moreover, the proclamations by Presidents Clinton and Obama state that the boundaries of their new monuments "are confined to the smallest area compatible with the proper care and management of the objects to be protected."



Grand Staircase-Escalante and Bears Ears National Monuments were radically downsized by President Trump in 2017. MAP: CATHERINE GILMAN

President Trump's two proclamations assert that he knows better regarding the proper size of Grand Staircase-Escalante and Bears Ears, though empirical evidence does not support that claim (pages 24–25 and www.archaeologysouthwest.org/fighting-the-bears-ears-downsizing). Both of Trump's 2017 proclamations swiftly drew three major lawsuits. The resulting six lawsuits have been consolidated and are slowly moving forward under a single federal judge because the core legal question is the same—whether a president has the authority to downsize previously established national monuments.

The answer to that question has dramatic implications for these two remarkable national monuments and for the Antiquities Act as a tool for protecting public lands. The outcome of the case will make history. As the legal process trundles on, we must continue to engage with and advocate for these places and all public lands.

back sight (băk sīt) n. 1. a reading used by surveyors to check the accuracy of their work. 2. an opportunity to reflect on and evaluate Archaeology Southwest's mission.