chapter 3

heritage themes and related resources

DEVELOPMENT OF THE HERITAGE THEMES

The seven heritage themes in this chapter emerged directly from public input. During Meeting Two of the series of four Working Group meetings described in Chapter 1, participants were divided into small groups and given large maps of the Little Colorado watershed. They were then asked a series of four questions designed to elicit responses that would describe the heritage of the region.

- If you had a two-week dream vacation in the Little Colorado River watershed, where would you go?
- If you had to describe this area to someone who had never been here, what would you say?
- When friends or family come to visit, where do you take them?
- If "something" were to leave this area forever, what would you miss most?

Participants drew or wrote their responses on the maps. In most cases, the maps were completely covered with sites, references to historical events, notes about the current diversity of cultures found in the watershed, and lists of activities related to outdoor recreation or local festivals. Continuing in their small groups, participants reviewed all of the items placed on the maps and devised between four and six themes that would capture all of the items. Each small group then reported its themes to the whole group. The whole group then worked all of themes suggested by each smaller group into one set of between four and six themes. This process took place at five meetings in five different locations across the watershed and resulted in a total of 25 heritage themes being suggested. Many of the themes from a Working Group in one meeting location were virtually the same as themes suggested by one or more Working Groups in other meeting locations, thus giving evidence that particular themes indeed identified prevalent, consistent, and over-arching characteristics of the region. The Heritage Programs Coordinator reviewed all 25 suggestions and found seven common themes that united the most frequently suggested themes by the Working Groups. Those seven unifying themes became the seven

heritage themes described in this chapter:

- Sacred and Enchanted Landscapes
- Trails, Roads, and Rails of the West
- Native Nations
- Living from the Land
- Archaeology
- Expressions of Art and Life
- Outdoor Recreation

After establishing the seven heritage themes, the next round of Working Group meetings focused on identifying resources within the watershed that reflected, interpreted, or embodied one or more themes. The seven themes were written on large pieces of paper and participants wrote down the name of the resource (a site, event, organization, business, etc.) and its general location on the paper of the particular theme the resource fit. Participants were asked to identify resources that related to tourism as well as those that served local communities, although often a single resource fulfilled both functions. Often, too, a single resource reflected more than one theme. The related resources sections that appear in each heritage theme chapter are a direct result of data generated during these Working Group meetings.

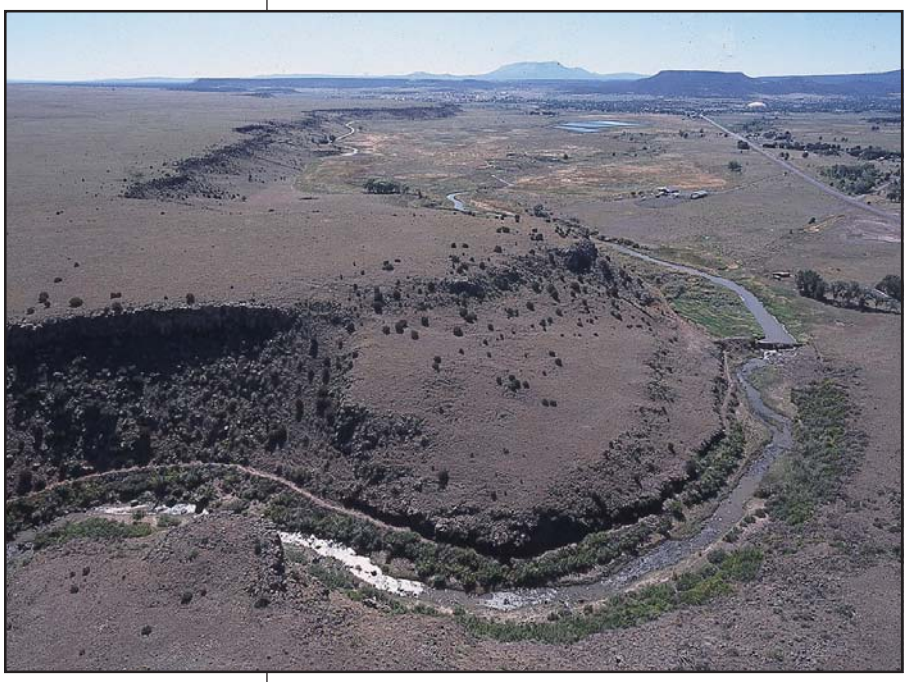
Theme 1
Sacred and Enchanted Landscapes

"The valley is vast. When you look out over it, it does not occur to you that there is an end to it. You see the monoliths that stand away in space, and you imagine that you have come upon eternity. They do not appear to exist in time. You think: I see that time comes to an end on this side of the rock, and on the other side there is nothing forever."

– *The Names*, N. Scott Momaday

SUMMARY OF THEME

The Little Colorado River Valley is a landscape of mesmerizing colors, astounding views, deceiving distances, immense quiet, and ancient, remembered places. For a very long time, people's lives have been intricately linked to this land, with meaning attached to nearly everything in it and everything it produces—sacred mountains, springs, streams, rocks, plants, animals—each honored or carefully marked by shrines, prayer feathers, petroglyphs, corn pollen, and story. A Hopi farmer looks toward a particular mesa on the horizon and tracks the sun's position through the year; a Zuni man follows an old trail to a revered place beside the river; Apache school children take a field trip into the mountains and learn plants along the way; a Navajo grandmother gathers fragrant sprigs of a shrub she'll use for medicine.



The Little Colorado River begins its winding journey to the northwest after starting as a mountain spring high in the White Mountains. The higher land on the left side of the picture is the result of lava that bubbled up from a shield volcano and spread across the land slowly. (Photo credit: Adriel Heisey)

The 26,000-square-mile watershed of the Little Colorado extends from the Continental Divide in New Mexico, south to the Mogollon Rim and White Mountains of Arizona, west to the San Francisco Peaks, and north to Black Mesa on the Navajo and Hopi reservations. It's big country, 16.5 million acres, with unending vistas across empty grasslands, broken badlands, undulating volcanic fields, and hidden canyons.

Travelers speeding by on the interstate might not notice much of interest. The enchantment comes with a detour off the main road, permitting more time for a closer look at the subtleties. It grows with a walk down into painted hills littered with

gleaming chips of petrified wood, on a hike up a trail into the mountain headwaters of the Little Colorado, or at a roadside pullout where a flashflood steamrolls down a normally dry wash. Then that sense of endless time and silence seeps in, working magic and instilling appreciation of why this landscape is viewed as enchanted and sacred.

DESCRIPTION OF THEME

Geology

The Little Colorado Basin occupies the southeast section of the Colorado Plateau, a major physiographic province and geologist's paradise. Like the larger plateau of which it is part, the predominant rocks of the Little Colorado Basin are sedimentary and volcanic in origin, recording more than 200 million years of geologic time. Underlaying most of the basin are the same sedimentary layers as those that occur in the upper portion of Grand Canyon. Two of those layers, the Kaibab Limestone and Coconino Sandstone, crop out in a few places.

Mostly exposed on the surface are progressively younger, mostly horizontal, sedimentary layers that make up the Plateau's classic Mesozoic sequence: the Moenkopi, Chinle, Wingate and Moenave, Kayenta, Navajo and Gallup sandstones, and Dakota and Mesa Verde Formations.

The brick-red Moenkopi Formation is composed largely of siltstones and fine-grained sandstones veined with gypsum. The sediments were deposited by a northwest-heading river flowing across a coastal plain 250 to 228 million years ago, the early Triassic Period of the Mesozoic. This part of the American Southwest was much closer to the Equator then, and the environment was humid to subtropical.

The defining formation of the Little Colorado Basin, known best in the Painted Desert and Petrified Forest National Park, is the Chinle. The Chinle's multicolored pastel layers—red, purple, blue, green, gray, white—consist of clays, mudstones, and sandstones deposited by streams that flowed slowly across a low basin about 225 million years ago, in late Triassic times. The Chinle also contains significant amounts of ash blown in from surrounding volcanoes. The ash weathered to bentonite clay that swells and shrinks with wetting and drying, giving the formation the common name "badlands." The Chinle reaches greatest expression near the border of Arizona and New Mexico, where it is nearly 2,000 feet thick. The soft clays erode rapidly, at the rate of one to two feet a century. The weathering and erosion reveal animal and plant fossils that have made the Chinle famous among paleontologists for well over a century.

About 200 million years ago, at the end of the Triassic and beginning of the Jurassic, uplifted land held sand waiting to be picked up and carried by the wind to accumulate as the Wingate Sandstone. To the south, the Wingate grades into the Moenave Formation, laid down partly as windborne dunes, but also in ephemeral lakes and local rivers. Atop these rest the Kayenta Formation, river-laid silts and sandstones interspersed with purplish beds of shale. The Navajo Sandstone, one of the plateau's outstanding rock layers, started as dunes in a paleo-desert as large as today's Sahara. The nearly pure quartz sand grains were compressed into rock that forms steep, sculpted cliffs and rounded domes. Moving eastward into New Mexico, the

Zuni and Gallup Sandstones form similar cliffs, overlain by Cretaceous-Period Dakota and Mesa Verde Formations.

In the ensuing Cenozoic Era (65 million years ago-present), riotous volcanic activity spewed voluminous quantities of lava, cinders, and ash across the land. Thick caps of resistant basalt cover many mesas; hundreds of cinder cones and associated lava flows punctuate the landscape. Three volcanic regions, among the largest in the country, occur in the basin—the San Francisco and Hopi Butte fields in Arizona, and the Springerville field near the White Mountains which extends into the Datil area in New Mexico. The youngest cinder cone in the basin is Sunset Crater just east of the San Francisco Peaks. It erupted sometime between A.D. 1050 and 1100 for up to several years, and left behind a cone rimmed with reddish-yellow cinders, hence the name and protection as a national monument.

The San Francisco Peaks, a stratovolcano, mark the western edge of the basin. At 12,633 feet elevation, the Peaks are the highest point in Arizona. They are sacred to more than a dozen Native groups. To the Navajo they are the Dook'o'osliid, the "abalone shell mountains," one of the four sacred peaks that mark the boundaries of their land. The Hopi call them Nuvatekiaqui, home of the kachina, spiritual beings that live half the year on the Peaks and half the year on the Hopi Mesas. To the Zuni they are Sunha K'hybachu Yalanne, to the Apache Dzil Tso.

About 20 million years ago, the landscape began to assume its present configuration with uplift of the Colorado Plateau as a single, largely undeformed, crustal block. Renewed movement along faults, and formation of large-scale folds such as the East Kaibab Monocline, shape the modern course of the Little Colorado River. Thus the fundamental geologic processes of deposition, uplift, and erosion have occurred, and are still occurring, throughout the Little Colorado Basin. Erosion is an especially visible, and exceedingly rapid, process in rocks such as the Chinle Formation, and accounts for the huge sediment loads the river carries.

Minerals occur in minable amounts in some of the rocks, especially uranium deposits in the Chinle and coal in the Mesa Verde Formation.

Meteor Crater, a national landmark, is a large indentation in the grassy plain south of Interstate 40 and west of Winslow, Arizona. Early establishment geologists thought the pit resulted from a volcanic explosion. But mining engineer Daniel Barringer believed the crater—500 feet deep and 4,000 feet across—was left behind after a meteorite crashed into Earth. He intended to mine the iron-rich deposits left behind by the meteorite. Barringer, it turns out, was correct. Meteor Crater now is understood to have been the result of such an impact, and it is now a world-renowned feature among planetary geologists and nonscientists alike.

While dramatic events like meteorites, and the sometimes less spectacular work of water, have shaped the landscape, wind is a force to reckon with here. Geologists set up weather stations on cliffs in the Painted Desert as part of the Desert Winds Project. But the wind blew so hard, and carried so much sand, the equipment soon became jammed. Remote monitoring systems replaced it, and geologic and meterologic data have been collected

for many years. The information is useful in studies of climate change and desertification in the region. Sand in the basin tells another interesting story. Westerly winds blow sand up off the bed of the Little Colorado, ramps of dunes climb the cliff faces to the east, then some of the sand is brought back down the washes to the river, the process continually repeating in a giant recycling system.

Paleontology

The late, famed paleontologist Edwin Colbert wrote that the Petrified Forest "is in many ways unique . . .[and] is. . . an outstanding segment of a world-wide record of the earth as it existed more than 200 million years ago."

The Petrified Forest—and a major portion of the Little Colorado River Basin—preserves that significant, unique record of life on earth. Here, the door opens into the Mesozoic Era, the Age of Reptiles, especially those great reptiles known as dinosaurs. With major rock layers dating to the late Triassic of the Mesozoic, they hold the key to a time of transition in life forms. It was the time when the earliest dinosaurs and modern predecessors of other animals, and plants, stood poised on the threshold; during the same period, doors were being closed on some of nature's failed experiments.

During the late Triassic, a diverse group of animals populated what would become the American Southwest. Small and large, predator and prey, meat-eaters, plant-eaters, dwellers both on land and in water, they added up to an incredibly diverse lot. There were giant amphibians, crocodile relatives, freshwater sharks, bony fish, clams, insects, and those earliest dinosaurs. Much of the remarkably full reconstruction of the late Triassic has come from the rich fossil record of the Little Colorado River Basin, particularly from the Chinle Formation in and around Petrified Forest and the Painted Desert.

The first fossil plants and vertebrates were collected in the Chinle by exploring parties in the mid 19th century. Scientists combed the area through the 20th century. Research and excavations into the first decade of the 21st century are still posting many "firsts" in paleontology, with new and exciting finds at Petrified Forest in particular. The discovery of several well-preserved skeletons of an animal named *Revueltosaurus*. Determined to be a relative of crocodiles rather than dinosaurs, this discovery has led to a wholesale reexamination of evolutionary lines in the late Triassic. Other crocodile relatives—the aetosaurs—have been found. New phytosaur skeletons, including complete skulls, have also been uncovered.

A pair of quarries in the Chinle near Saint Johns, Arizona, along the Little Colorado River, have also been motherlodes for paleontologists. The *Placerias* and Downs quarries have yielded more bone than almost any other Triassic site in the hemisphere. Among the most common fossils are the namesake *Placerias.* This mammal-like reptile was shaped like a barrel, with some specimens weighing two tons and sprawling to nine feet in length. Also, lizard-like reptiles, aetosaurs, and big amphibians known as metoposaurs have been recovered at these locations.

An array of plant fossils has added to the reconstruction of the Triassic environment. Some 200 species have been identified from Petrified Forest

alone—fossilized leaves, stems, cones, pollen, even charcoal. Cycads, horsetails, and ferns indicate an environment that was then much wetter, some say tropical. Of course, the area's best known fossil is petrified wood, from large conifers that were washed downstream, buried in ash and mud, and the wood literally turned to stone over time. (Arizona's state fossil, *Araucarioxylon arizonicum*, is the source tree that has produced most of the petrified wood.)

Other rock layers in the basin have also yielded fossils, ones that indicate a change to a drier environment and that show dinosaurs assuming their full reign. Though a few plant fossils have been found in the Moenave Formation, mostly it is known for trackways of animals. The three-toed tracks of large carnivorous dinosaurs are notable, along with those of archosaurs, therapsids, and possibly small mammals. On Navajo land near Cameron and Tuba City, Arizona, dinosaur track sites have been known for more than a century. One of the most extensive ones in the West is in the Ward Terrace area. Barnum Brown, curator of vertebrate paleontology at the American Museum of Natural History in New York, learned of it from local residents. He visited the site in 1929, and Museum of Northern Arizona paleontologists rediscovered and studied it in the 1980s and 1990s.

Still more tracks and fossils—of dinosaurs, frogs, turtles, lizards, pterosaurs, and more—have been found in the Kayenta Formation and layers above it.

Hydrology

The 26,000-square-mile basin, about the size of the state of West Virginia, is a bowl rimmed on all sides by higher country. All runoff drains into the Little Colorado River, the seam that stitches the watershed together. Along its 350-mile course, the Little Colorado can be divided into three distinct sections. The river begins life as springs that rise on 11,400-foot Mount Baldy, a wilderness area in the White Mountains of eastern Arizona. These headwaters are sacred to the White Mountain Apache, home of their benevolent *gaan* spirits. The East, West, and South Forks join to form a single stream, a cool brook narrow enough to step across in the upper reaches.

This character persists as the river flows north past Greer, through Round Valley and beside the town of Springerville to Saint Johns. Zunis make pilgrimages to the river near Saint Johns, at a sacred place they call Kolhuwaa la:wa, or Zuni Heaven.

Here the Little Colorado veers northwestward, winding across the Painted Desert past Holbrook and Winslow to Cameron. It transforms to a "flashy" desert river, crisscrossing a wide, flat floodplain, flowing intermittently with winter snowmelt and summer monsoon rains. Its average flow is about 250 cubic feet a second, 18,000 cfs is considered high flow, and historic extreme flows of 50,000 cfs have been recorded. But the word "average" has little meaning for this mercurial river. The water can rise by feet in a matter of hours, then recede to a trickle by the next day. Early Mormon colonists learned this when they arrived in the valley in the spring of 1876 to settle homes and farms. They remarked that the river looked "like a running stream of mud of reddish color." But by July, it was reported dry. The Mormons tried repeatedly to construct brush and rock dams to divert irrigation water, but a

rampaging Little Colorado swept away the dams as fast as they could be built.

Ideas of where the Little Colorado *originally* flowed engender lively discussions among geologists. Depending on how far back one goes in geologic time, the river's course probably was not what it is now. One prevailing theory proposes that an ancestral river flowed out of the north and turned toward the southeast, opposite the Little Colorado's modern direction. An uplift blocked the southeast flow, caused formation of a large lake, and sent the Little Colorado in a reverse direction. It was then "captured" by another major drainage system and pulled into what became the through-flowing main Colorado River. A look at a map today shows the Little Colorado entering the mainstem Colorado just as the Colorado makes a 90-degree turn into the heart of the Grand Canyon. This critical positioning thus ties any theory into the evolution of the Grand Canyon and Colorado River, and uplift of the Colorado Plateau. It's a very complex story, destined to keep geologists busy for many years to come.

Studies of the Little Colorado in the 20th century, at least, show the river constantly adjusting to climatic, land use, and other factors. From 1900 to around 1940, large floods eroded and widened the river channel. With a decrease in rainfall in the 1940s-1950s floods were less frequent, and flow was about half the preceding period. The channel narrowed. Wetter years from 1952 to 1978 again built up the floodplain.

Grand Falls is a notable landmark in the middle stretch of the river. This stairstep waterfall formed where the Little Colorado encountered a basalt flow that dammed the river and forced it to go around and back down into its old channel. At nearly 190 feet high, Grand Falls is higher than Niagara Falls.

The river continues on through the Painted Desert to Cameron, Arizona. From this point, it enters the final 50-mile reach, dropping precipitously over 2,000 feet in that short distance, down through a sheer-walled gorge to its confluence with the mainstem Colorado in Grand Canyon. In flood, the Little Colorado enters the main Colorado as a frothy silt-rich chocolate brew. At such volumes, the water carries enormous loads of sediment—in January 1993 the Little Colorado shuttled an estimated 10 million tons of sediment into the Colorado.

Perennial base flow in this lower reach, however, is supplied by Blue Springs, emerging from limestone layers several miles above the confluence. The high carbonate load precipitates out to form travertine terraces in the river, and turquoise waters swirl into the Colorado. Near the confluence is the *sipapu*, which the Hopi identify as the place where they entered this, the Fourth World.

The Little Colorado's own major tributaries enter from the east. The Zuni River meets it near Saint Johns, while the Puerco River, rising at the Continental Divide in New Mexico, comes in near Holbrook. From north and east ephemeral washes—Oraibi, Dinnebito, and Moenkopi among main ones—drain Hopi and Navajo lands. From south and west Silver Creek, East Clear Creek, Chevelon Creek, and Deadman Wash enter.

The basin also holds important groundwater sources, including the C- and N- aquifers. Where groundwater encounters an impermeable rock layer,

springs and seeps come to the surface. Notable ones include those at the base of Black Mesa, which provide crucial water for Hopi agriculture. Heavy drawdown of the aquifers for industrial, municipal, and power generation uses are raising concerns about the long-term sustainability of groundwater resources and springs. Native people of the region, with others, are working to protect and restore the valuable springs and wetlands.

Biology

The Little Colorado River Basin is a land of extremes. That's a fairly obvious statement, but numbers reinforce it. Precipitation varies from about 8 to 30 inches, both as snow in the higher elevations and as summer rains. Elevational extremes, from 2,500 feet above sea level to over 12,000 feet, along with complex geology, topography, and microclimates combine to produce high biological diversity. It was these extremes that brought biologist C. Hart Merriam to the region in the late 19th century, and from his work here he formulated the pioneering concept of "life zones."

Top: A small herd of pronghorn thunder across open land in Navajo County. Right: Arizona and New Mexico are famous for their deserts, but snow is a frequent winter visitor in the higher elevations of the Little Colorado River watershed.

The region resides in the rainshadow of the higher Mogollon Rim to the south and the San Francisco Peaks on the west, accounting for the region's general arid and semiarid climate. But with so many life zones present within the geographic area, there are amazing surprises. A small but significant piece of alpine tundra exists on the San Francisco Peaks. Below that is a forest of mixed conifers (Englemann and blue spruce, subalpine fir, Douglas fir) and quaking aspen in the mountains of New Mexico, the headwaters of the Little Colorado in Arizona's White Mountains, and on the San Francisco Peaks. Damp meadows and small lakes in the White Mountains host cattails, sedges, reeds, and rare bog orchids. Once the heart of grizzly bear country, these mountains are still home to black bear, elk, wild turkey, deer, and the endangered Mexican wolf. The Mexican spotted owl seeks the dark forests, while bald eagles and ospreys rule the sky.

Around 7,000 feet in elevation, ponderosa pine becomes dominant, part of the largest continuous ponderosa forest on the continent. This pine has been the focus of intensive studies of forest fire and restoration ecology. Gambel oak is the main understory tree. Hundreds of thousands of acres of pinyon and juniper woodlands grow across mesas, hills, and ridges at 6,000 to 5,000 feet. Though they grow slowly and do not attain great heights, some specimens are a thousand years old or more. Pinyon pines at Sunset Crater and Wupatki National Monuments in the western part of the basin are being studied to assess different climate change scenarios. Pinyons on cinder soils of Sunset Crater ("high-stress" sites drier and lower in nutrients) grow more slowly, produce fewer cones, and are more susceptible to insects than those on the lower-stress, sandy-loam sites in Wupatki.

Around 5,000 feet elevation, high-desert shrubs such as four-wing saltbush, shadscale, sagebrush, and

rabbitbrush begin to appear, representing a southern extension of the high, cold Great Basin Desert. In addition, Great Basin grasslands (gramas, sacaton, ricegrass) merge with the farthest west extension of Plains shortgrass prairie. Often muted and gray-green in appearance, the grass and shrubs morph into vivid green with only a few days of good summer rains. After a wet winter, an unexpectedly colorful wildflower display adds interest.

The grasslands of the Little Colorado Basin are ideal habitat for pronghorn, and the region's herds are important to the animals' populations. Optimum food for these ungulates is a mix of forbs and grasses. The fastest land mammals on the continent, they can sprint up to 60 miles an hour and flee any predator. Fawns, however, are more subject to predation and need grass high enough to stay hidden during their first weeks of life. Pronghorn also have adapted both to survive days of freezing temperatures, and extreme heat and drought. Other animals of the grassland live below ground. Burrowing owls, badgers, prairie dogs, and ground squirrels assume tenancy of empty burrows, and occasionally these different species will share a burrow.

The Navajo have a number of stories and uses for these grassland mammals. The prairie dog, "dloo," is lured from its burrow with a shiny object, then killed with a special, single-barbed arrow. Though the Navajo consider ground squirrels thieves, a squirrel tail hung on a cradleboard makes the child agile. Black-tailed jackrabbits, commonly seen in the grass and shrublands, in the past sustained the people through periods of starvation. They say that killing one before going deer hunting will bring good luck in the hunt. Coyote, the Trickster, figures in many Navajo stories. Ma'ii is magical, and though often guilty of greed is a wise messenger of morality. It was Coyote who threw the North Star and the Milky Way into the sky.

The "breaks" of Chinle Formation, interspersed with the grass and shrublands, are nearly barren of plants. The few species that can survive on the poor soils often are specialists that can tolerate soils high in salts and gypsum for example.

The Little Colorado and tributaries—along with hundreds of isolated springs, seeps, and shaded pools—are riparian areas that add immensely to the basin's biodiversity. The river's old channel is marked by Fremont cottonwoods that tree-ring studies show sprouted between 1800 and 1905. Those cottonwoods, and native willows, have mostly been outcompeted by aggressive exotics, especially tamarisk and camelthorn. Tamarisk was first noted near Winslow in 1909, but by the mid 20th century it had spread along the riverbed.

These rare wet areas are the only places where amphibians (true toads, spadefoot toads, tiger salamanders, and leopard frogs) can survive. These species exhibit fascinating adaptations to the extreme fluctuations in temperature, moisture, and salinity presented by intermittent water sources. Among invertebrates in the basin, unique species include the California floater (a freshwater mussel), the White Mountain water penny beetle, and long dash butterfly, found in Arizona only along East Clear Creek, a tributary of the Little Colorado.

One aquatic species, the introduced crayfish, has become a problem. Especially common in the upper

reaches of the Little Colorado, crayfish have altered plant and invertebrate communities in streams wherever they live. Likewise, introduced fish compete with unique native fish such as Apache trout, a minnow called the Little Colorado spinedace, the Zuni bluehead sucker, and the humpback chub. The Apache trout and Little Colorado spinedace are both targets of intensive recovery programs in the region's streams. For the endangered humpback chub, the remaining breeding grounds are the warmer backwaters at the mouth of the Little Colorado. Protection of the chubs' critical habitat has led to changes in the operation of Glen Canyon Dam upstream of Grand Canyon.

For birds, particularly migrating birds, the green ribbon of riparian habitat serves as an essential corridor. The endangered Southwest willow flycatcher, when present in the watershed, is completely dependent on this zone.

Like the larger Colorado Plateau of which it is part, the Little Colorado watershed contains a high number of endemic creatures, known only from the basin, along with ones identified as species of special concern. Botanical examples include Peebles Navajo cactus, gladiator milk vetch, Arizona willow, White Mountain paintbrush, Sunset Crater penstemon, and San Francisco Peaks groundsel. Among mammals are endemic subspecies of chipmunk, spotted ground squirrel, Botta's pocket gopher, silky pocket mouse, Ord's kangaroo rat, and Stephen's woodrat.

The Little Colorado River watershed is a region unto itself. It possesses internationally known geologic and paleontologic features, and numerous unique species and significant biologic wealth. The land is inseparable from the indigenous people who have lived here for generations, inseparable from their language, imagery, traditions, and religions. For these reasons, this watershed qualifies as a distinct part of the country, worthy of national heritage designation.

DISTINCTIVENESS OF THEME

The landscape of the proposed Little Colorado River National Heritage Area is one that has been familiar to people who have both lived in and traveled through the region. For Native Americans, it encompasses the San Francisco Peaks, arguably the singlemost important sacred mountain, the central landmark, in the religions of every group. Both nationally and internationally, the region is known among geologists and paleontologists for the extraordinary exposures of Mesozoic-aged rock and the fossil wealth sequestered in that rock. The geologic resources of the region have yielded fossil remains that have allowed a detailed reconstruction of a key time in earth's evolutionary history, the late Triassic. Further, the presence of extensive volcanic fields, and the impact feature Meteor Crater, brought attention to the region in the mid 20th century. Astrogeologists determined this landscape to be the closest analog to the terrain of the Moon, and so it served as an important "real-life" training ground for the Apollo astronauts. In addition, the extreme ranges of natural environments and climates led to formulation of the seminal biological concept of life zones. Though later modified by ecologists, the concept still offers a way to explain the interrelationships of climate and assemblages of plants and animals. In summary, all of these unique attributes

add up to a sound rationale for the worthiness of this region as a national heritage area.

RELATED RESOURCES

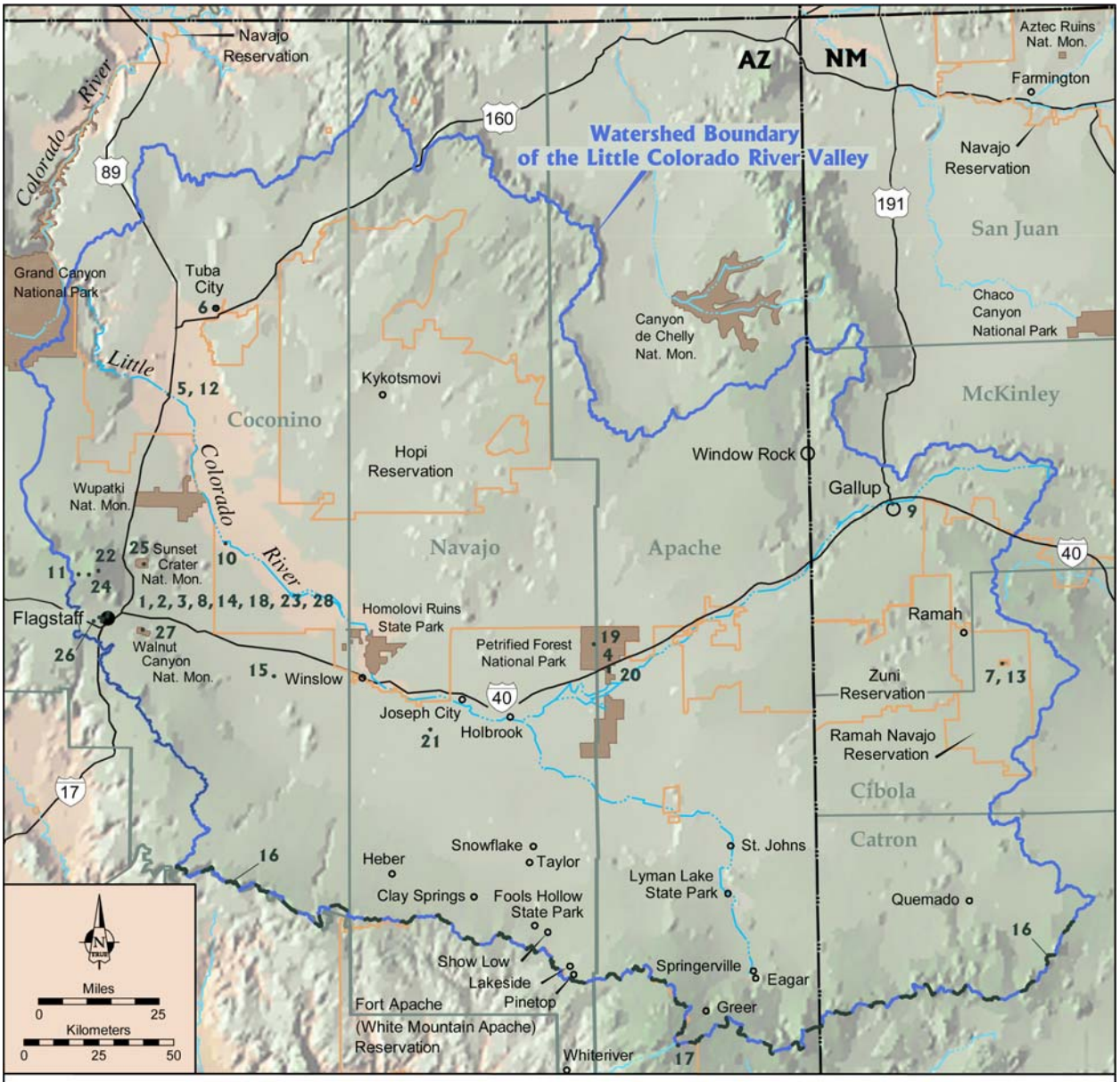
Visitors and residents of the Little Colorado Valley have many possibilities to experience and learn about the region's natural history. Three national forests—Apache-Sitgreaves, Coconino, and Cibola—offer several million acres of public land and hundreds of miles of backcountry roads. Forest district offices have good maps and knowledgeable people. National parks and monuments display and interpret the wealth of geology, paleontology, and biology resources. Among them are Petrified Forest National Park, and Sunset Crater, Wupatki, Walnut Canyon, and El Morro National Monuments, with scenic drives, trails, ranger programs, and exhibits. State parks in Arizona, Homolovi Ruins, Fool Holow, and Lyman Lake, and Red Rock State Park in New Mexico, offer hiking, camping, and interpretive opportunities. The Little Colorado River Gorge Navajo Tribal Park, operated by the Navajo Nation, offers overlooks of the dramatic gorge leading to the confluence of the Little and main Colorado Rivers and, for the brave, spectacular hiking. Arizona Game & Fish Department manages several wildlife areas, including Becker Lake, Chevelon Canyon, Sipe, Wenima, and White Mountain Grasslands. The Little Painted Desert County Park near Winslow contains bright exposures of the Chinle Formation. Meteor Crater National Natural Landmark has an interesting visitor center and rimside walk for a full view into the crater. The Museum of Northern Arizona in Flagstaff offers exhibits and trips into parts of the basin. The Nature Conservancy's Hart Prairie Preserve sits at the foot of the San Francisco Peaks, and The Arboretum at Flagstaff features native plants. Each Native American tribe generally has departments of fish and wildlife, natural resources, parks, or outdoor recreation that are good sources of information. Check Web sites of specific tribal governments: Hopi Tribe (www.hopi.nsn.us), Navajo Nation (www.navajo.org), White Mountain Apache (www.wmat.nsn.us), and Zuni (www.ashiwi.org). Maps and publications are available at visitor centers in parks and towns, local libraries, museum bookstores, trading posts, and outdoor shops.

RELATED RESOURCES LIST

- **1,000-yr. old junipers, New Mexico:** Some species of juniper can live to be more than 1,000 years old. Western New Mexico has numerous such awe-inspiring specimens in their forests.

- **The Arboretum at Flagstaff, Flagstaff:** Previously a working cattle ranch, the Arboretum's 200 acres now showcases plants native to the region and conducts ongoing research and education programs related to the natural flora and flora of the area. One research project in particular focuses on the Little Colorado spinedace fish.

- **Arizona Ethnobotanical Research Association, Flagstaff:** Founded in 1983, the Association promotes the study, documentation, and use of traditional plants from the American Southwest. It also promotes the development of bilingual and multicultural educational programs about plants, sustainable cultivation, the protection of natural habitats, the



Landscapes

1 Arizona Ethnobotanical Research Association
2 Biennial Colorado Plateau Conference
3 Buffalo Park
4 Dinosaur footprints and fossils
5 Dinosaur footprints and fossils
6 Dinosaur footprints and fossils
7 El Morro National Monument
8 Flagstaff Chapter of the AZ Plant Society
9 Gallup Public Library fine arts collection
10 Grand Falls on the Little Colorado
11 Hart Prairie (Nature Conservancy interpretive hikes
12 Little Colorado River Gorge
13 Los Gigantes
14 Lowell Observatory and dark skies
15 Meteor Crater
16 Mogollon Rim
17 Mt. Baldy
18 Native Plant and Seed
19 Painted Desert and Little Painted Deserrt
20 Petrified Forest
21 Rock Art Ranch
22 San Francisco Peaks
23 Save the Peaks Coalition
24 Scenic Skyride at the Arizona Snowbowl
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development of a seed bank, and the creation of a medicinal plant herbarium.

- **Biennial Colorado Plateau Conference, Flagstaff:** This conference brings together land

managers, biologists, and other professionals to share information and develop better strategies to manage the natural resources of the Colorado Plateau.

- **Buffalo Park, Flagstaff:** This city park in Flagstaff offers uninterrupted and spectacular views of Mt. Elden and the San Francisco Peaks. Deer and other wildlife sightings are not uncommon.

- **Dinosaur footprints and fossils:** Found in several locations throughout the watershed (Petrified Forest National Park and Cameron and Tuba City Chapters are two well-known places), well-preserved footprints and bones have added significantly to scientists' understanding of the world during the dinosaurs' time.

- **El Morro National Monument, New Mexico:** A striking, 200 ft. sandstone bluff in western New Mexico with an important, ancient pool at its base. The Mesa Top Trail leads visitors to see the nearly-eroded rock layers at the top, to take in an incredible view of the surrounding landscape, to see the beautiful box canyon in the center of the bluff, and past the ruins of a sizeable pueblo.

- **Flagstaff Chapter of the Arizona Plant Society, Flagstaff:** The Arizona Native Plant Society promotes knowledge, appreciation, conservation, and restoration of Arizona's native plants and their habitats. The Flagstaff Chapter hosts a series of lectures and plant walks in the general area for the enjoyment and education of participants.

- **Gallup Public Library Fine Art Collection, Gallup:** Contains artwork that reveals the dynamic landscape of the region through a variety of media.

- **Grand Falls on the Little Colorado, Leupp Chapter:** A 190 ft. waterfall, dramatic for its height, the two distinct kinds of rock that converge at the site, the 90-degree turn of the Little Colorado River after the Falls, views of the San Francisco Peaks, the depth of scale of the gorge after the falls, and the chocolate milk color of the sediment-laden water which gives the Falls one of its nicknames, Chocolate Falls.

- **Hart Prairie (Nature Conservancy interpretive hikes):** Free, guided nature walks and hikes aid in peoples' understanding and appreciation of the geological and ecological features of the San Francisco Peaks.

- **Little Colorado River Gorge, Cameron Chapter:** The Little Colorado descends 2,000 ft. in just 30 miles as it approaches the mainstem Colorado. The massive sandstone walls that form the steep gorge are topped with limestone and reach 1,000 ft. tall in places. The gorge is the site of many ancient trails and is currently a Navajo Tribal Park and open to visitors.

- **Los Gigantes, Ramah:** Rock formations near Ramah, New Mexico that look like giant male and female figures. These "figures" are considered sacred by the Ramah Navajos and Zunis.

- **Lowell Observatory and dark skies:** Visitors to rural Arizona and New Mexico marvel at the night sky. Many long-time residents still do, too. With no major urban areas and few cities greater than 10,000 people, the night skies are both infinitely

dark and infinitely filled with stars. The experience of the night sky is as much a part of the landscape of the Little Colorado region as are its mountains and canyons. Pluto was discovered from Lowell Observatory in Flagstaff and the research institution holds regular public viewings through its historic telescope. Flagstaff is also has the distinction of being the first International Dark Sky City. Quality stargazing for the average viewer and amateur astronomy enthusiast alike only increases in the more rural areas.

- **Meteor Crater, eastern Coconino County:** Meteor Crater was the first meteor impact site in the world identified as such my modern science. A young Eugene Shoemaker reached this conclusion in 1960 after building on the work of the Crater's early owner, Daniel Barringer. It has continued to contribute significantly to the study of meteor impacts and was also used by Apollo astronauts to train for their landing on the Moon.

- **Mogollon Rim:** A 200-mile escarpment that runs basically east-west across eastern Arizona to the New Mexico border. It defines the southern boundary of the Little Colorado River watershed and the southern boundary of the larger Colorado Plateau. The elevation difference between land above and below the Rim is as much as 3,000 ft. The central section of the Rim is characterized by dramatic sandstone cliffs. The Rim is a major geologic feature and a major divide for plant and animal communities.

- **Mt. Baldy, Apache-Sitgreaves National Forest:** Mt. Baldy is a sacred site to the White Mountain Apache, as well as the source of the headwaters of the Little Colorado River.

- **National Forest and National Park Service interpretive programs and hikes:** Ranger-led hikes or interpretive trails on both National Forest and Park Service lands help local residents and visitors both to better understand the treasures they contain.

- **Native Plant and Seed:** A retail nursery that specializes in native varieties of plants. Also provides full-scale, native plant restoration services.

- **Painted Desert and Little Painted Desert County Park, Navajo County:** The current name is derived from the label Spanish explorers gave to the region, *el desierto pintado,* because of the brilliant colors of its rock formations. It is a geologic formation to the north side of the Little Colorado River that extends in a gentle curve from the western Navajo Reservation through the Petrified Forest National Park. The desert is mostly comprised of the Chinle Formation, formed up to 225 million years ago mostly through river deposits. When the sun is low in the sky, as at sunrise or sunset, the stripes of gray, purple, blue, green, red, pink, white, orange, and combinations of any of these, are at their most dramatic. The interaction of rising and falling watertables, various minerals, and layers of volcanic ash created the colorful canvas that is still in an active and dynamic state of erosion, exposing more dinosaur fossils and petrified wood on a regular basis. Little Painted Desert County Park in Navajo County is an excellent viewing area.

- **Petrified Forest:** Trees buried under sediment more than 200 million years ago are now re-emerging as sparkling rainbows of rock. Quartz replaced the wood, minerals added color, and now erosion is wearing off sediment that buried the trees in prehistoric times, exposing thousands of petrified logs and other fossils. Petrified Forest National Park preserves many logs in their natural state, but the actual extent of the range of the ancient forest extends well beyond Park boundaries into state, private, and tribal lands.

- **Rock Art Ranch, Winslow:** Chevelon Creek/Canyon passes through the ranch, containing a rich riparian habitat, numerous petroglyphs, and a chance for visitors to experience the delights of one of the region's many smaller, but still spectacular canyons.

- **San Francisco Peaks:** A former strato-volcano, the Peaks dominate the skyline for as much as 100 miles and the tallest of the peaks, Mt. Humphries, is the highest point in Arizona. The Peaks are sacred to the Navajo, Hopi, Zuni, and 10 other tribes. Traditional Navajo land, or Dinetah, is bound by four mountains in the four cardinal directions that represent the four pillars of a worldly hogan, the traditional dwelling of Navajos. The Peaks are the western mountain, known as Dook'o'sliid or the Abalone Shell Mountain. To the Hopi, the Peaks are known as Nuvatekiaqui and the home of rain-making kachina spirits. To the Zuni, they are known as Sunha K'hybachu Yalanne and are also extremely sacred.

- **Save the Peaks Coalition, Flagstaff:** An organization dedicated to addressing cultural and environmental rights, in particular protecting the San Francisco Peaks which are held sacred by the Navajo, Hopi, Zuni, and 10 other tribes.

- **Scenic Skyride at the Arizona Snowbowl, Flagstaff:** In the summer months, the Arizona Snowbowl ski resort, located on the southwest side of the San Francisco Peaks, still operates its lifts for panoramic viewing of the Northern Arizona landscape. Views extend for 70 miles and include the Grand Canyon. Coconino National Forest interpretive rangers meet riders at the top and discuss the biology and geology of the region.

- **Sunset Crater Volcano National Monument:** Sunset Crater is the youngest and least-eroded cinder cone volcano in the San Francisco Volcanic Field, making it and the surrounding landscape an ideal setting for the study of soil formation, plant succession, and other ecological processes following an eruption. The Monument consists of 3,040 acres of cinder cones, lava fields, lava tubes, and an ice cave.

- **Walnut Canyon National Monument:** Walnut Canyon is 20 miles long (the Monument contains 6 of these miles), 400 ft. deep, and ¼ mile wide. Its extremes of topography, along with seasonal water, result in a place of concentrated biological diversity. Hot desert climates and shady forest climates occur nearly side by side when in most places they would be separated by hundreds of miles or thousands of feet in elevation. Cliff dwellings more than 700 years old line one side of the canyon.

- **Willow Bend Environmental Center, Flagstaff:** A non-profit environmental education center

sponsored by the Coconino Natural Resource Conservation District dedicated to nurturing a sense of place through hands-on environmental education programs. The site contains five gardens with slightly different microclimates to display the variety of plants, insects, and animals found in the diverse Northern Arizona ecosystem.

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