River Flowing From The Sunrise

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Navajo, Ute, and Paiute sacred views of the San Juan River and its environs were about to meet their greatest challenge when the Spaniards arrived in the eighteenth century. The ways in which the Indians eventually adopted European ways of life, however, were slow and selective. In fact, the process was indirect at first because these Spanish and later American explorers never settled in the San Juan area. Nevertheless, the exploration of the San Juan basin by Spaniards and Americans from 1765 to the mid-twentieth century forms an important precursory chapter in the story of Anglo exploitation of resources that began in the late nineteenth century.

European and American exploration of the San Juan occurred during what historian William H. Goetzmann calls “the Second Great Age of Discovery.” An outgrowth of the European Enlightenment, this age marked the emergence of science, whose prime objective was no less than a complete empirical rendering of the planet and its peoples. Material progress was equally important. The exploration of the San Juan by geologists and archaeologists in particular contributed significantly to unraveling the great scientific issue of the later nineteenth century—time. In that sense, those scientists thrust the San Juan onto an international stage. In the mid-twentieth century, scientists with the Glen Canyon Survey put it there again. Their work established benchmarks for ecological studies and archaeological salvage operations.

A full hundred years or more before that first group of scientists and even Anglo settlers came to wrestle with the San Juan, however, the Spanish ventured up from Santa Fe in search of silver, slaves, and converts. Spaniards and Mexicans crossed and skirted the river and commented about the area, but generally stayed away from it. During the early nineteenth century, American trappers operating out of Taos and Santa Fe penetrated the area in search of beaver. They spent considerable time along the river—more in the Upper San Juan—and probably hastened erosion by overtrapping. Unfortunately, their comings and goings are poorly documented. Soon after, the first in a long series of United States military and scientific expeditions set out to explore, map, and catalogue the resources of the San Juan region. The legacy of those largely government-sponsored expeditions continues today. Their progeny—various federal agencies—still have jurisdiction over the area. Intermixed and sometimes connected with government expeditions have been numerous archaeological explorations that have helped publicize the area not only to the rest of the nation but to the larger world beyond. In all, scientists have mattered most in San Juan exploration.

Besides knowledge and its practical applications, the ideas informing these pursuits need to be considered as well. At the same time that these explorers were traversing and studying, formally or informally, one of the most difficult-to-penetrate landscapes in North America, they were evaluating it, commenting upon its features, and passing on that information to prospective settlers. In short, the exploration of the San Juan area between 1765 and the mid-twentieth century established the contradictory terms by which we still measure the basin today—wasteland, treasure trove of resources, adventureland, home, and sacred space.

Although these explorers did not remain very long, their stories are important vignettes.
in the narrative sequence of the San Juan environment. The Spanish, for example, had a very direct effect on the Utes' impact on the landscape because they introduced horses and perhaps guns. The horse greatly expanded the Utes' range and pushed them from a hunting-gathering lifeway, which emphasized the latter, to one which relied more on the former. It increased the Utes military strength, as it did their southern neighbors and frequent enemies, the Navajos. Guns compounded that strength. To a lesser extent, other kinds of trade goods undoubtedly changed some Ute, Navajo, and Paiute subsistence patterns. The acquisition of cloth, metal goods, and even foodstuffs altered the way these Indians interacted with their environment. Agriculture and herding profoundly affected the San Juan landscape.

Spanish exploration of the Southwest in general and the San Juan in particular appears more important today than it actually was. Now that the region, especially the canyon country, has become scenically and scientifically famous, Spanish exploits have captured some of the attention. But as historian Stephen J. Pyne has written, the Spanish did not make the canyon country famous. Instead, they surveyed and explored the edges of the region, then turned their backs to it. Moreover, what they knew and wrote about it stayed locked away until twentieth-century historians began combing archives in Mexico and Spain. What maps, diaries, reports, illustrations and other scientific discoveries Spanish explorers and scientists produced largely ended up lost, unpublished, or secreted away in royal archives. The Spanish Enlightenment imploded because of prevailing attitudes that generally hid geographical information from enemies and because of the influence of the French Revolution. Outside of Spain, few contemporaries in the European scientific world read the considerable data amassed by conquistadors.

The first known Spanish entrada into the San Juan corridor took place in the summer of 1765, when Juan Maria Antonio de Rivera explored the area north and west of New Mexico in two separate expeditions. The first took place in June, the second in October. His reports commented on the landscape near the river and the surrounding area but gave the general impression of inaccessibility and unsuitability for settlement. Rivera had obtained an official license from Governor Tomas Velez Capuchin. Royal order prohibited trade with the Utes, probably because Spain was interested in converting Indians, and traders often reflected some of the worst aspects of Catholicism. In reality traders had preceded Rivera into the area because he obtained guides from one group which had already contacted the Utes. These guides were probably part of a covert group of contraband traders operating out of northern New Mexico.

Governor Capuchin ordered Rivera to search for the source of a silver ingot that a Ute Indian had brought into Abiquiu. Word had come from cash-strapped Madrid to the Royal Corps of Engineers in the New World: Locating mineral sources was a growing priority. Rivera's mission formed part of that effort to replenish the royal coffers with gold and silver. The expedition also had the equally important but hidden goal of military reconnaissance: locate the great river (the Colorado), find a way across it, scout for settlement opportunities, and establish relations with the Indians who lived on the far side. According to historian Iris H. W. Engstrand, Spanish exploration and science in the New World always had a very pragmatic goal: to improve everyday life. In this way, it prefigured much of the work of American reclamation scientists more than one hundred years later.

Rivera's 1765 trips took him into southwestern Colorado, followed by southeastern Utah. During the first foray, a detachment led by Gregorio de Sandoval possibly worked south from the Hovenweep area to the San Juan River near present-day Aneth and Bluff. There they were greeted by a group of Weeminuche Utes, whose three encampments stood on the south side of the river. When the Spaniards appeared, "one of them [Indians] dove into the river to see who our people were. At the same time one
of ours dove in and they met in the middle of the river . . . ours persuaded him . . . to cross to our side and converse.” Their eagerness to talk to their visitors suggests lack of fear; the Utes probably wanted to trade, reinforcing that other traders had preceded Rivera into the area.

On the second expedition, Rivera penetrated the canyon country all the way to the Colorado River at the present site of Moab. He found no gold and silver, but his report provided valuable topographical and anthropological information to his superiors. Moreover, these reports shed light on the way eighteenth-century Spain viewed the Four Corners landscape: They hoped as always to locate mineral wealth and make converts to Christianity; they probably had a geopolitical interest in finding another route to the West Coast (even though Junipero Serra would not travel to California for another four years); but they did not view the area as a potential settlement. Rivera’s October-November route eventually became part of the Old Spanish Trail, developed during the next century. That trail brought many Mexicans into the San Juan area, increasing knowledge of the river basin and its inhabitants. But none of Rivera’s discoveries seeped outside the Spanish world.

The immediate benefactors of Rivera’s topographical information were insiders, fathers Francisco Atanasio Domínguez and Silvestre Vélez de Escalante, who skirted the San Juan area in 1776. They initially crossed the river near the present New Mexico-Colorado border. The natural tendency of explorers like
the fathers was to follow a river, but they kept on their northward course, apparently aware of the impassibility of the San Juan canyons. On their return to Santa Fe, they passed within forty miles of the confluence of the San Juan and Colorado when they forded the latter at Padre Creek. Now under Lake Powell, this famous spot was known as the Crossing of the Fathers for years. The expedition struggled through this slickrock area but eventually limped back to Santa Fe via the Hopi villages in Arizona.

The expedition’s most important scientific accomplishment was a set of fairly accurate maps of the Colorado Plateau by Captain Bernardo de Miera y Pacheco, a retired military engineer who accompanied the padres. Although de Miera mistakenly identified the San Juan as a tributary of the Navajo River (Rio de Nabajoo) rather than the other way around, he showed that it ran east-west out of the San Juan Mountains. He indicated how the river related topographically to various mountain ranges like the Abajos (Sierra de Abajo) and tributary rivers like the Los Pinos and Animas. He also correctly located the tribal areas of the Payuchis (Paiutes), Yutas (Utes), Nabajos (Navajos), and Moquis (Hopi) in relation to the river. Finally, he clearly showed where the San Juan emptied into the Colorado. It was a wonderful piece of work which actually had some influence outside Spain. The great German geographer, Alexander Humboldt, apparently saw a copy of a de Miera map in Mexico City and included some of its features in his *Political Essay on the Kingdom of Mexico* (1810).8 This was a rare instance of Spanish science crawling out from behind its rock into European light.

De Miera’s maps included the names Rivera gave to many of the area’s rivers—Animas, Dolores, and, most importantly, the San Juan. Also significant from a contemporary point of view were these Spaniards’ comments on the landscape, which mirrored the shift in thinking about nature, especially wild nature, that was taking place in Europe and the New World during the late eighteenth century.9

Since the Renaissance, western thinking had presumed that nature was made for human exploitation. This attitude still largely prevailed with Rivera and Domínguez-Escalante. Rivera was looking for trading routes and silver, while the padres were searching for trading routes and souls. But as for landscape aesthetics, a subtle but revolutionary change was occurring in the West, one reflected in these Spaniards’ writings. In the seventeenth and eighteenth centuries, the most beautiful natural scene for Europeans was a humanly modified one—the neatly plowed field, the symmetrical hedgerows, the grazed pasture. This kind of human order demonstrated nature’s usefulness.

Both the padres and Rivera reflected this idea when they described the beauty and utility of certain natural scenes around the Colorado Plateau. For example, the priests commented extensively on the attractiveness of Cedar Valley, Utah (San Jose), because it was well watered and thus farmable. But they also appreciated the wild, redrock formations in Paria Canyon, downstream from the San Juan, as “a pleasingly jumbled scene.”10

A decade earlier, Rivera had continually remarked about the beauty of flowing water, lush meadows, and striking vistas. That he did so at least seventeen times on his first expedition is especially striking given the sparseness of his journal. In his first encounter with the San Juan near Pagosa Springs, Rivera enthusiastically described the valley as “a river very much larger than the last one, much wider, very lovely and fast flowing, which we called the San Juan. It has many meadowlands, well-provided with grasses.” On his second expedition, after he and his men crossed through a mountain pass near Placerville, Colorado, Rivera waxed romantically rhapsodic, saying, “There we stopped and viewed the vastness of its beautiful valley, its meadows with various springs that flow directly west.”11

Both the fathers and Rivera, then, in their descriptions of the landscape represented their times in appreciating both the ordered agricultural landscape and the wild, unordered scene. At the beginning of the eighteenth century, Europeans had valued the regularity of nature, seen in man’s orderly imprint on the land. But by the end of the century, wild nature had assumed greater prominence as a place to experience the most sublime and intense emotions. Whether they realized it or not, both Rivera in his spare diary and Domínguez-Escalante in their expansive journal reflected evolving ideas about nature as they described the landscape on their respective journeys: utility and pure aesthetic delight. In
many ways, they embodied the competing opinions that persist about the San Juan country.

Economics and politics, not aesthetics, however, dominated affairs in New Mexico. After Mexico achieved independence from Spain in 1821, official policy toward the San Juan/Ute area changed. Northern New Mexicans were eager to trade with both the Indian tribes to the north and Americans. Royal decrees had previously forced them to buy goods from Chihuahuan traders at inflated prices. While there had definitely been contraband trade in goods and slaves between 1765 and 1821, overland trade now became legal. Traders were already exchanging horses, guns, and other manufactured goods with the Utes for deer, antelope, and bear pelts as well as slaves. The Utes, who had military supremacy because of the horse, raided Paiute villages, stole children, and sold them to traders, even though Spain and later Mexico officially outlawed the practice. Scant records about trade exist, but at least two other official expeditions passed near the San Juan country: Vizcarra in 1823 and Armijo in 1829. The former was a punitive raid against Navajos who had been stealing livestock, and the latter a trading trip to southern California. Reports from both excursions emphasized the aridity of the San Juan area and thus encouraged avoidance.

So it appears that both Spaniards and Mexicans flirted with the San Juan region up to the early nineteenth century, contacting and sometimes trading with various Indian groups. Some official and a lot more unofficial knowledge of the area spread throughout northern New Mexico, but little of it seeped outside the Hispanic world. Clearly people knew enough of the San Juan area to realize that for mineral and settlement purposes, it was best left alone. Spaniards and Mexicans recognized a few agricultural possibilities and admired some of the scenery. Mainly, however, because of the defensiveness of Spanish culture and politics, the San Juan canyons remained terra incognita.

Even though New Mexicans traded with Utes and Comanches for deer, antelope, and buffalo pelts, they did not generally trap animals. The San Juan became a little better known after it was exploited by American fur trappers, who wandered into Taos and Santa Fe after 1821. The first trapper known to have ventured into the San Juan country was William Wolfskill. The twenty-four-year-old Kentuckian arrived in Santa Fe with William Becknell in 1822 on the latter’s second expedition to New Mexico. Two years later he outfitted a party that trapped first in southwest Colorado, then split up and moved, with Ewing Young and Isaac Slover, down the San Juan. It is difficult to know how far downstream they traveled, but it is doubtful they penetrated the canyons below Chinle Wash.

In June, though, they returned to Taos with a whopping ten-thousand-dollars worth of furs and the distinction of being the first known trappers to venture to the west. According to historian David Weber, they also motivated an exodus to the area, probably on many of the trails blazed by Spanish traders. Other trappers who entered the San Juan area shortly after Wolfskill’s group were Thomas L. (Peg-Leg) Smith and Antoine Leroux. In 1825 an alarmed but exaggerated report to the Mexican government in Santa Fe claimed that Americans had built a fort on the San Juan, probably above Four Corners. In all likelihood, it was merely a trapper’s encampment.

Another mountain man who may have trapped up the San Juan from the lower end was James Ohio Pattie, author of the self-aggrandizing, often-inaccurate, but nevertheless-important *The Personal Narrative of James Ohio Pattie of Kentucky*. Working along the Gila and lower Colorado in 1826, Pattie joined Ewing Young’s group and apparently pushed up the Colorado, across the Arizona Strip north of the Grand Canyon, then down to the mouth of the San Juan in Glen Canyon. Anthropologist A. L. Kroeber thinks he trapped up the San Juan a few days and then continued east to Navajo country. If Kroeber is right, Pattie and his colleagues were the first white men to see the lower San Juan and trap its beaver. Their hasty departure suggests that trapping was poor. Biologists in the 1950s concluded, however, that the area contained as many beavers as any place in Utah.

Fur trappers, then, explored more of the San Juan River than their Spanish and Mexican predecessors. If Wolfskill’s 1824 haul is any indication, their impact on beaver populations may
Beaver are coming back in the San Juan drainage. Dams like this one at Butler Wash prevent erosion and provide a rich habitat for birds and other wildlife. Locals say that because of its beaver dams, Butler Wash, a large side canyon of the San Juan, never flash floods. (James M. Aton photo)
have been significant. Historian David J. Wishart believes that overtrapping hastened the Rocky Mountain fur trade’s demise. As exemplified by Wolfskill, trappers approached their trade with an attitude “that emphasized short-term exploitation rather than long-term sustained yield.” By 1838 Mexican officials had recognized this fact and declared a six-year moratorium on trapping along the Rio Grande. If the Rio Grande was overtrapped, the same situation probably existed on the San Juan and elsewhere in the Southwest. Unfortunately, officials did not patrol the northern Mexican frontier, although it probably would not have made much difference. Historian William deBuys believes that the ruling came too late to help beaver populations and was unenforceable anyway. Nevertheless, the law indicated the severity of the problem on southwestern rivers.

Fortunately for western beaver, European fashions changed in the late 1830s and the fur trade diminished. Close to extinction, the beaver rebounded somewhat, as they have along the San Juan and tributaries like Butler Wash. Beaver populations will probably never reach their pre-trapping high. Man-made dams, continued trapping, and a host of other environmental factors have conspired to keep their number down along the San Juan. Recent anecdotal evidence suggests, however, that these aquatic rodents may be making a comeback near the river.

The decline of beaver in the early nineteenth century did not just affect the animals. Whole watersheds suffered. Most beavers construct their dams on tributaries of major rivers like the San Juan. Their ponds function as silt traps and hence form “a second line of defense against significant erosion.” Moreover, these ponds create a moist environment that protects water-loving plants. These in turn attract dense, riparian bird life. The mountain men, who “trapped every beaver they could locate, with no thought for the morrow,” did not consider the long-term effect of exterminating the beaver on rivers and creeks: bigger and muddier floods when abandoned dams broke upstream. This may have led to greater erosion along the San Juan and other rivers. Moreover, the riparian life around beaver ponds would also have suffered serious impact. There is no way of knowing exactly what the Taos trappers did to the San Juan, but the riverine environment encountered by the first settlers in the late 1870s was probably vastly different from what it was a mere fifty years earlier.

Fur trappers can hardly be called scientists, but the nature of their work required them to be keen observers and gatherers of information about topography, ecology, and native cultures. Robert M. Utley and William H. Goetzmann have shown that most of the “scientific information” trappers collected passed through an informal communication network, which ended in government map rooms, ethnographic society meetings, and laboratories. Indirectly, then, the fur trappers were unofficial, advance “scientists,” whose information about the San Juan was noted and classified. The trappers did not, of course, essentially disagree with their Spanish predecessors: The San Juan did not promise much in terms of resources, settlement, or travel routes.

Travel to and through San Juan country did not end when the fur trade declined. The section of the Old Spanish Trail through present-day San Juan County remained an especially active trading route from 1829 to 1848. We know little or nothing, however, about the traders’ side trips. In contrast, a well-documented Mormon expedition entered the country from the opposite direction shortly thereafter in 1854. Having arrived in Utah seven years before and settled the Great Basin, the LDS church sent W. D. Huntington and his men to explore the San Juan area. Brigham Young directed Huntington to survey the territory and establish relations with the Utes and Navajos in preparation for settlement. Huntington “discovered” the ruins around Hovenweep and commented extensively on them in a report published in the Deseret News.

In May of the next year, the Mormons established the Elk Mountain Mission at Moab. By August they had sent an exploratory-trading-proselytizing expedition, led by Alfred N. Billings, south down Comb Wash to the San Juan and forty miles up Chinle Wash. In his journal, Billings described the landscape where Comb and Chinle Washes enter the San Juan: “The most Sandy Barron [sic] Country I ever Saw the soil is A fine red sand . . . the settlement [sic] is on Cottonwood Creek [Chinle Wash] from the cottonwood that grows on its Banks from the
Dr. John S. Newberry was the first geologist to study the canyon country—the Grand Canyon in 1857–8 with the Ives Expedition and the San Juan in 1859 with the Macomb Expedition. He named the geological province the Colorado Plateau, and his insights into the power of erosion gave the region visibility in the world science community.

(Manuscripts Division, Marriott Library, University of Utah)
St Johns River [San Juan].” These observations are echoed in the journal of Ethan Pettit, a member of the trip. The Elk Mountain Mission fizzled out after conflict with the Utes, but the Mormons had explored the area, noted its natural resources and native people, and prepared themselves, perhaps unknowingly, for settlement two-and-a-half decades later. Unlike the discoveries of the trappers and the Spaniards, Mormon geographical knowledge stayed inside the confines of Zion and did not benefit American science. The Civil War, however, soon made this country interesting to the U.S. government and thrust the San Juan into the consciousness of the international scientific community.

Shortly after the Elk Mountain Mission members scurried back to Salt Lake, the Mormons entered into conflict with the federal government, the so-called Utah War of 1857–58. Although the war, such as it was, ended quickly, it forced the U.S. military to realize how little they knew of supply routes into Utah. Since Santa Fe was the nearest supply center, the army dispatched Captain John N. Macomb of the Topographical Corps in 1859 to explore the area north and west of Santa Fe, the San Juan country. Macomb was the first of a century and a half of systematic, scientific explorers, backed by government or educational funding, who surveyed and studied the San Juan drainage. Applying modern methods of mapping, topography, and geology, the Macomb report, which appeared in 1876 because of Civil War delays, represented a benchmark in scientific knowledge of the San Juan. It also contained the first published aesthetic appreciation of the river area. Like many army surveys, it primarily compiled topographic information for troop and supply movements. But in common with other government surveys, it ultimately stimulated commercial activity and facilitated settlement.

Macomb was fortunate to acquire the services of geologist John S. Newberry for the expedition. A year before, he had served under Joseph Christmas Ives in his upriver exploration of the lower Colorado River and Grand Canyon. Like Ives, Captain Macomb found the canyon country “a worthless and impracticable region.” But geologist Newberry, influenced by Romantic landscape aesthetics and the geologic wonders before him, disagreed with his boss. In his “Geological Report,” Newberry waxed eloquent about the “grand view” of the San Juan flowing through Comb Ridge: “The features presented by this remarkable gate-way are among the most striking and impressive of any included in the scenery of the Colorado country.” He could barely contain himself as he rhapsodized about the beauty he saw around him. For example, he said, “Illuminated by the setting sun, the outlines of these singular objects came out sharp and distinct, with such exact similitude of art, and contrast with nature as usually displayed, that we could hardly resist the conviction that we beheld the walls and towers of some Cyclopean city hitherto undiscovered in this far-off region.” Newberry expressed the first true appreciation of the landscape in a language not very different from the hordes of twentieth-century nature lovers who currently flock to the San Juan. Although a renowned geologist, Newberry was also the first nature-loving tourist to visit the region and report on its scenic wonders.

If Romantic aesthetics inspired Newberry’s love of the canyon country, erosion brought out the true geologist in him. With his work in the lower Grand Canyon and on the San Juan River, Newberry made a significant contribution on erosion to world geology. Up to that time, most geological authorities had argued that marine activity or structural catastrophes had created eroded regions like the Colorado Plateau (named by Newberry). But Newberry demonstrated clearly in his reports that, as Stephen J. Pyne has written, “rivers shaped the land, not merely the landscape its rivers.” This theory is called fluvialism.

After Newberry’s two reports, the canyon country immediately became the “textbook case of American Fluvialism.” But perhaps more importantly, his arguments for the power of erosion contributed to the larger debate about the earth’s age. Fluvialism buttressed Darwin’s case in the Origin of Species for the antiquity of the earth. Thus, the San Juan and Colorado Rivers, thanks to Newberry, became world famous among geologists as the place to read the geologic book of time, one primarily crafted by erosion. His study of erosion helped geologists push back the age of the earth and rethink geomorphology.

Besides helping rewrite American geology, Newberry, along with his boss Macomb,
commented on the extensive Anasazi ruins near the river. These were the first descriptions of these sites by western scientists, and both men theorized about why they had been abandoned. Macomb thought the Anasazi froze to death, while Newberry more accurately speculated that warfare and drought were chief causes.\textsuperscript{32} The Macomb report and especially John Newberry’s contributions marked the beginning of an important period for the San Juan River. The region became geologically significant. In addition, the report also revealed the San Juan as the site of “lost civilizations.” Indeed, as Newberry commented, “from the time we struck the San Juan we were never out of sight of ruins.”\textsuperscript{33} American archaeology grew up in the Four Corners region. Anasazi ruins, more than any single factor, brought scientists, pothunters, tourists, and other visitors into the country. Ferdinand V. Hayden was one of the first.

Government surveyor Hayden sent two of his men, W. H. Holmes and W. H. Jackson, to survey and photograph prehistoric ruins in the San Juan drainage. They were part of Hayden’s United States Geographical and Geological Survey in 1874 and 1875. Although his work was similar to the other three major surveys of the postwar era—King, Wheeler, and Powell—in its orientation toward resource exploitation and agricultural possibilities, Hayden had a special knack for playing to the expansionist ideas of nineteenth-century America. He cranked out popular scientific reports that became what one historian has described as an “annual geological Cook’s Tour of the territories.”\textsuperscript{34} He also knew how to use Jackson’s photos to interest the general populace in his work, seizing upon the appeal of Anasazi ruins along the San Juan.

Jackson’s photos of these ruins appeared at the Great Exposition in Philadelphia in 1876, where they astounded audiences. Due to Jackson’s and Holmes’s written reports, as well as those by journalists like E. A. Barber and F. W. Ingersoll, who accompanied Hayden, San Juan country suddenly became familiar to the eastern public and even Europeans.\textsuperscript{35} The four Hayden surveyors who commented on the Anasazi ruins—Holmes, Jackson, G. B. Chittenden, and Hayden himself—compiled the first environmental history of the Anasazi in the San Juan basin. Their discussions of the ways these Indians lived in the landscape and thought about it and why they abandoned it posed pertinent questions and hazarded still-relevant answers about prehistoric lifestyles and attitudes. They also piqued curiosity about southwestern prehistory among preprofessional archaeologists, pothunters, and tourists.

Archaeological ruins and environmental history notwithstanding, the Hayden Survey also gave more precise descriptions than Macomb and Newberry had of the “most excellent” grazing potential of White Mesa, mining opportunities in the nearby Abajo and La Sal Mountains, and general settlement possibilities along the river. On the last item, Hayden and Jackson disagreed with topographer George B. Chittenden. He saw the river bottom as “utterly worthless” farmland, but they believed that the San Juan corridor “will undoubtedly prove a rich agricultural possession at no distant day.”\textsuperscript{36} Both prehistoric and historic experience has shown that farming on the San Juan lies somewhere between these extremes. For the Anasazi, as we already learned, the San Juan’s agricultural possibilities proved a little closer to Hayden’s and Jackson’s views; for the Mormons, Navajos, and others, they more nearly matched Chittenden’s dour predictions. Nonetheless, the Hayden Survey was significant because it described the San Juan environment, popularized the ruins along the river, extolled the agricultural potential of the region, and initiated the study of environmental prehistory. It put the San Juan, literally and figuratively, on the United States map.

Besides Macomb’s and Hayden’s government-funded expeditions, a number of private institutions financed scientific study in the region. Many of these were archaeological expeditions, along the lines of Holmes’s and Jackson’s surveys. But at least one of the privately funded scientists came to study plants. Her name was Alice Eastwood, and her explorations and collections of San Juan flora in 1892 and 1895 constitute another important chapter in the development of San Juan environmental history.

This Canadian native grew up in Denver, where she taught high school. During the summers, she collected plants all over Colorado, eventually meeting the Wetherill clan of Mancos in 1889. By 1892 she and Al Wetherill had arranged to horse-pack from Thompson Springs, Utah, south through Moab and
Monticello, then down Montezuma Creek, and up the San Juan. Three years later, at age thirty-five, Eastwood again met Wetherill, and they rode down the San Juan past Bluff and Butler Wash, over Comb Ridge, through Mexican Hat, under the Muley Point Overlook, and up into John’s Canyon. By that time, Eastwood had shifted jobs and was working for the California Academy of Sciences in San Francisco. Her colleagues there included Hayden Survey botanist T. S. Brandegee and his wife, Kate, also a botanist.

Eastwood was a fearless and tireless collector of plants. A feminist, Sierra Club member, and flouter of social conventions, she and her journeys are memorable not only because she was the first woman botanist in the Four Corners region but also because her collection provided a baseline study of San Juan flora. In her many published reports and memoirs, Eastwood painted an excellent picture of the area’s biota. Her general comments, for example, noted the abundance of tall grass, box elders, greasewood, cottonwoods, and willows along San Juan bottomlands between Four Corners and Comb Ridge. She also complained that the combined odor of beeplant and jimsonweed (sacred datura) “made the atmosphere almost unbearable.”

Eastwood observed the Bluff settlement’s continuing struggle with its irrigation ditch as well as the many Anasazi ruins along the river. Although she had little time to explore the ruins, she nevertheless intelligently discussed the way the “cliff dwellers” had farmed corn, beans, and squash and used yucca. Had she diverted her attention longer from plant collecting, Eastwood might have pioneered the field of Anasazi ethnobotany.

First and foremost, however, this woman was a botanist. During her two trips, she collected 475 specimens, representing 162 species and varieties. Nineteen species were completely new, and almost all were rare. In addition to her important contributions to San Juan flora identification, Eastwood brought something to her work that was uncommon for scientists of the time: an almost religious passion for the sacredness of life. She shared with fellow Sierra Club member John Muir a sense of the uniqueness of all life. Her collecting was not just a dry exercise in taxonomy but belonged to the larger effort of preservation. An incident from her 1892 trip illustrates her fervor.

She and Wetherill camped in a small cave to escape inclement weather while traveling from Moab to Monticello. After they started a fire to dry off and warm up, Eastwood suddenly
looked up and saw their fire was suffocating cliff swallows, which had built their nests in the cave’s roof. Writing about this many years later, she said, “I am distressed even now when I think of the destruction of the little birds.” This sympathy for nature was unusual for nineteenth-century science.

If the Hayden Survey reports, photographs, and subsequent photo display at the Great Exposition in Philadelphia in 1876 splashed the San Juan in front of the American public, the discovery of Mesa Verde in 1888 and the international Columbian Exposition in Chicago in 1893 made the region world famous. The San Juan basin became known as an archaeological wonderland. And just like today, many of the people who traveled to the region in the 1890s and early 1900s came because of the “cliff dwellers’ ruins.” This gold rush of a different sort attracted looters, relic collectors, museum-directed excavators, tourists, and budding archaeologists. The distinctions between these enthusiasts for Anasazi ruins, however, were much vaguer in 1890. The discoveries of amateur archaeologists like Heinrich Schliemann and Austen Layard at Troy and Mesopotamia had excited Europeans and Americans about the wonder of “lost civilizations.” But archaeology, as a scientific discipline, was in its infancy.

The period following Mesa Verde’s discovery by Charlie Mason and Al and Richard Wetherill in 1888 started a stampede to the San Juan country. When reports blew east of a lost American civilization in the Four Corners area, the public and especially eastern museums jumped at the chance to collect and exhibit an American counterpart to relics excavated by Europeans in the Near East. In fact, part of the motivation behind these ventures—both European and American—was nationalistic. As the self-perceived preservers of civilization, European and American museums had no qualms in appropriating any treasures from lost cultures that their scientists unearthed. Not surprisingly, most artifacts dug up in the San Juan between 1890 and 1910 ended up in eastern museums or the private hands of looters from Colorado, Utah, Arizona, and New Mexico.

The first excavation in Utah was probably conducted by Charles Cary Graham and Charles McLoyd in Grand Gulch in the winter of 1890–91. Both were friends of the Wetherills and had helped them excavate Mesa Verde. Depending on which of their contemporaries one believes, McLoyd and Graham either looted sites in Grand Gulch and left a mess or excavated as scientifically as their limited backgrounds allowed. But the specter of amateurs looting important cultural sites quickly prompted Frederick Putnam of Harvard’s Peabody Museum to organize and sponsor an expedition, headed by Warren K. Moorhead, to the San Juan area in 1892.

Supported by the Peabody, the Smithsonian, the American Museum of Natural History, corporate sponsors like Armour, and the Illustrated American Magazine, Moorhead’s group spent April to August of 1892 photographing, mapping, measuring, and, in a few cases, excavating along the San Juan valley. As science, the expedition failed, even though the series of articles that appeared helped publicize the area. And as explorers, group members were inept. For example, their ill-fated attempt to boat the Animas and then the San Juan to Noland’s Trading Post at Four Corners ended in near disaster; they bailed out at Farmington, right above the confluence of the two rivers. Moorhead later wrote this puffery of the Animas trip: “The most dangerous feat of river navigation attempted since Major Powell and his party floated down the Colorado River has been accomplished by the Illustrated American Exploring Expedition.” River runners today would laugh at this incredible boast.

Moorhead also described the famous San Juan sand waves, though he could not account for their cause. Apparently, however, the group camped next to the San Juan at flood stage because the river inundated them. To add to their misfortunes, they found the landscape threatening. The red sandstone wonderland that had so moved a geologist like Newberry more than thirty years earlier hit Moorhead with a dull thud. He wrote, “You cast your eyes about to something of beauty, but you see nothing save great frowning sandstone cliffs, an occasional cow, a coyote, or a sand crane. You sigh for the green fields and shady woods of the East.”

Moorhead and his men possessed an arrogance about their scientific credentials and experience which ultimately torpedoed their
efforts. The strangeness of the landscape and its aridity, the haste of their travels, and their general unfamiliarity with Anasazi ruins combined to make the expedition a study in ineptitude. To put it bluntly, they did not know where they were in every sense of the phrase.

Two scientists who accomplished something of lasting value, in good part because they took the time to get to know the region, were T. Mitchell Prudden and Byron Cummings. Prudden was a New York physician who spent many summers between 1892 and 1915 exploring the San Juan watershed. Like many archaeologists of the time, Prudden taught himself stratigraphic excavation. He was the first to describe in print the Basketmaker culture which Richard Wetherill had discovered in Cottonwood Wash in 1893. His 1897 article in *Harper’s New Monthly Magazine* was followed by the first overall description and mapping of San Juan ruins, “The Prehistoric Ruins of the San Juan Watershed” (1903). His 1907 memoir, *On the Great American Plateau*, also helped publicize the area and professionalize excavation. While Prudden talked mostly about archaeology and ethnology, his description of the San Juan sounded like much turn-of-the-century nature writing: “The San Juan, muddy and treacherous, rolls sullenly westward through hot reaches of desert, and then rushing along deep gorges, merges at last into the Colorado.”

Cummings, a classics professor and dean of arts and sciences at the University of Utah, was another self-taught scientist. He began excavating up Montezuma Creek at Alkali Ridge in 1908 under the guidance of Edgar L. Hewett, director of the School of American Research in Santa Fe. Two of his student excavators, Neil Judd of Utah and Alfred V. Kidder of Harvard, later earned distinction in the field of southwestern archaeology. Besides helping professionalize San Juan archaeology and train future archaeologists, Cummings, along with W. B. Douglass, became famous as the discoverer of Rainbow Bridge in 1909. This spectacular arch on the west side of Navajo Mountain near the confluence of the San Juan and Colorado continues to attract many tourists. Some of them, like Theodore Roosevelt and Zane
Grey, wrote about the area in national magazines and increased the tourist traffic.48

Others besides Cummings and Prudden also excavated the San Juan area at the time. Some of their stories, like those of Richard Wetherill and his brothers, have been told before in many places.49 Others, like Mormon patriarch Platte D. Lyman of Bluff, have had their tales related in different contexts. But most who dug possessed the same get-rich mentality as their fellow prospectors of the 1892–93 San Juan gold rush and later oil exploration. Locals like McLoyd, Wetherill, Graham, and Lyman did not publish their findings. Eastern, foreign, or scientific visitors like Moorhead, Cummings, Prudden, and Frederick Chapin, however, did. They not only promoted the archaeological wonders of the area to a national and worldwide audience but also extolled the beauty of the landscape where the ruins sat.

While most who wrote about the San Juan appreciated its beauty, not all professed Alice Eastwood’s love of wildlife. *Illustrated American* leader Warren Moorhead offers a striking contrast to Eastwood’s sympathy for animals. Describing hunting down a rattlesnake in the bushes, he wrote, “With great pleasure you put a bullet through its head.”50 Nevertheless, one of the many attractions of the San Juan between 1890 and 1910 was the setting of its magnificent ruins in a stark, redrock landscape. Little has changed except that visitors one hundred years later have these archaeologists’ writings to guide their own explorations.

The most important scientist who traversed and wrote about the San Juan country was Yale University and U.S. Geological Survey (USGS) geologist Herbert E. Gregory. During many summers between 1909 and 1929, he explored the country south and north of the river. Although he never actually floated the San Juan, he crossed it, camped near it, and studied it and its tributaries. As a result, he produced a superb series of scientific and historical articles.

Professor Byron Cummings (center, front) of the University of Utah led an expedition to discover Rainbow Bridge. The famous canyon country guide, John Wetherill, is seated to his right. W. B. Douglass, Cummings’s rival, sits to his left. (Stuart Malcolm Young Collection, Cline Library, Northern Arizona University, NAU.PH.643.1.130)
and professional monographs.\footnote{As one historian put it, he was “the preeminent field geologist of the Colorado Plateau whose reports have been revised and supplemented but never superseded.”} If previous explorers added bits to the geographic, geologic, hydrographic, historical, topographic, archaeological, and biological knowledge of San Juan country, Gregory surpassed them by doing it all and doing it better. Not only did he write groundbreaking geologic reports—his main field of study—but Gregory also completely covered the territory. He was essentially writing environmental history well over a half century before it became common among late twentieth-century historians. Nearly every scholar who studies the area—no matter the discipline—begins with Herbert E. Gregory.

Gregory first ventured into what he called Navajo Country, south of the San Juan and east of the Colorado, in 1909. The USGS and Office of Indian Affairs sent him to survey the region’s water resources in the hope of developing them for the Paiutes, Hopis, and Navajos. A progressive-era conservationist, Gregory saw his scientific work in the paternalistic, culturally biased terms of the times: “I believe also that the sanest missionary effort includes an endeavor to assist the uncivilized man in his adjustment to natural laws... . To improve the condition of this long-neglected but capable race... by applying scientific knowledge, gives pleasure in no degree less than that obtained by the study of the interesting geologic problems which this country affords.”\footnote{Like his hero, John Wesley Powell, Gregory hoped his scientific knowledge would hasten the “natural” cultural evolution of Native Americans toward civilization. If his values seem a bit dated, his research and writing are still extraordinarily fresh and full of crucial information for contemporary scholars. Besides completing an exhaustive study of water sources in this arid region and suggesting ways to develop them, Gregory made crucial studies of San Juan flora and fauna. While he drew in part on the work of earlier botanists such as T. S. Brandegee and Alice Eastwood, his field notes and reports showed he went far beyond just copying them. He not only used his own powers of observation but also interviewed locals, both Anglo and Indian, to understand the area’s animals, plants, and environmental conditions. For example, from local government trapper Seth Shumway, he learned about a vigorous campaign in the 1880s that exterminated wolves and bears and nearly eliminated mountain lions from the San Juan. Local Paiutes and Navajos told him that mountain sheep and antelope populations had crashed after Anglo stockmen took over the ranges; the Indians also informed Gregory that overgrazing had intensified a twenty-year period of severe arroyo cutting and encouraged the proliferation of nonnative weeds.} Gregory was a Gifford Pinchot-Theodore Roosevelt conservationist who frowned on the mismanagement of natural resources. While no tree hugger like Alice Eastwood or John Muir, Gregory would have felt...
at home with the “land of many uses” philosophy of the later Bureau of Land Management or Forest Service.

In addition to compiling the most complete natural history of the San Juan to date, Gregory possessed a great interest in both prehistory and history. Large sections of his texts summarized the most up-to-date information about the Anasazi. He did the same for the Spanish and Mormon history of the area, consulting both published texts and living participants. For example, he interviewed Mormon pioneer Kumen Jones of the Hole-in-the-Rock group and E. L. Goodridge, the first man to float the San Juan in 1882 and discoverer of oil at Mexican Hat and Slickhorn Gulch. Gregory’s descriptions of Paiute, Navajo, Ute, and Hopi economies are also quite accurate.

Although his love for the stark beauty of the San Juan landscape clearly underlies everything he wrote, he mostly kept his personal feelings in check and stuck to informing the reader. He nevertheless foresaw that tourism would soon be a major part of the San Juan’s economy.\textsuperscript{55} In fact, one of the first tourist-adventurers to come to the area, a wealthy cotton broker from New York named Charles L. Bernheimer, said he was drawn partly by Zane Grey’s novels and partly by Gregory’s paper, \textit{The Navajo Country}.

Gregory’s guide, John Wetherill, also deserves mention here. The third son of the famous Wetherill clan of Mancos, Hosteen (or Hastiin) John, as the Navajos respectfully called him, figured in many of the important archaeological and geological expeditions of the San Juan. Few white men knew the country between Mesa Verde and Navajo Mountain better than Wetherill. Likewise, few knew the Utes, Paiutes, and Navajos better than Wetherill, who operated a trading post with his wife, Louisa Wade. In addition to guiding scientists like Gregory and Cummings and wanna-be scientists like Bernheimer, he introduced celebrities like Zane Grey and Theodore Roosevelt to Rainbow Bridge and the surrounding country. Wetherill was not a writer, so his considerable knowledge did not get published. But no one, as historian Gary Topping has written, was more at home in the desert.

\textit{Defining Terra Incognita}  57
Indirectly Wetherill contributed greatly to the publication of information about the San Juan. He was an important link in the chain that ended with the work of scientists like Herbert E. Gregory.56

Gregory’s reports, complete with excellent photographs of landscapes and native peoples, stand as landmark studies of the San Juan and its residents. They appeared just as land use in the area was fundamentally changing from native subsistence to western agriculture and mineral extraction. Gregory admitted he had come to the area to facilitate that change. But he was both scientist and humanist enough to document as fully and clearly as possible the people and nature of the San Juan watershed. As much as anyone, Herbert E. Gregory deserves the title of “chronicler of the San Juan.”

If Gregory’s initial foray into the country was prompted by the desire to survey water resources, the next explorers, the Trimble Expedition, stand as the first sentence in the climax of the water story. The Bureau of Reclamation and Southern California Edison (SCE) sent the expedition to survey the river for dams. The Federal Water Powers Act of 1920 had made damming the Colorado River system politically and economically feasible because water development became a joint venture between the federal government and private industry. The technology for generating hydroelectric power was also coming of age. In the same year, the Kincaid Act authorized the secretary of the interior to make a geological, topographical, and mineral survey of the Colorado, Green, and San Juan Rivers. Under the terms of the act, Southern California Edison, a private power company in Los Angeles, agreed to fund part of the survey and provide men and materials.57

By July of the next year, the USGS-SCE joint expedition met in Bluff. Under the leadership of Kelly W. Trimble, they spent the next six months mapping and studying the San Juan between Bluff and Lees Ferry on the Colorado. Part of their mission was to suggest potential dam sites along the San Juan, but they also wanted to see how far a reservoir would back upriver from a proposed dam near Lees Ferry. Besides Trimble, the USGS sent geologist Hugh D. Miser. The portly Missourian eventually wrote the final report, took many of the expedition’s photos, and, by general consensus, held the group together with his unfailing good humor. Engineer Robert N. Allen represented the power giant’s interests, and Bert Loper, later known as the “grand old man of the Colorado,” signed on as head boatman. He, in turn, hired young H. E. Blake, who later worked for USGS-SCE expeditions on the Green River and in the Grand Canyon. Two local Mormons, Hugh Hyde and Heber Christensen, rounded out the seven-man, two-boat crew.58

Miser’s report, now considered the classic study of the San Juan, attempted to do for the river what Gregory had done for the surrounding country. In a letter to crew member Heber Christensen four years after the trip, Miser said that he had intended to write a “more or less popular report” of the region, combining the technical aspects of a geologic, topographic, and mineral survey with the day-to-day experiences of expedition members.59 This trip narrative is one area where Miser’s report differs from Gregory’s. On the other hand, Miser’s sections on history and natural history pale in comparison to Gregory’s. He does include, however, valuable historical information on San Juan River travel.

The photographs from the Trimble Survey have proven invaluable for comparing vegetation changes along the river. So have some of Miser’s field notes. For example, he noted that they slept at Slickhorn Canyon on a mattress of Russian thistle, which “served well.” Thistle’s presence indicates that cattle had come down the trail and overgrazed Slickhorn. Today this area has recovered, and Russian thistle is rarely seen.60 Miser also noted that thistle covered the bottomlands of Paiute Farms. His observations contrasted with boatman Bert Loper’s experience during the gold-rush days of the early and mid-1890s. According to Loper, the whole wide bottoms of Clay Hills and Paiute Farms had been covered with cottonwoods. The floods of 1911 and thereafter, exacerbated by watershed destruction on the San Juan and its tributaries, as well as overgrazing by livestock, probably accounted for the altered landscape in 1921. Like Gregory, Miser believed that overgrazing had caused severe arroyo cutting in the more than twenty-five years since whites began running stock around the river.61
His report also contained anecdotal environmental evidence that healthy populations of flannelmouth suckers swam the San Juan in 1921. At the foot of the Honaker Trail on August 1, a flash flood so loaded the river with silt that hundreds of suckers surfaced in the eddies, trying to get oxygen. The party harvested scores of them to eat. Loper told Miser that he had seen similar floods “last long enough to kill thousands of fish.”

The end result of the USGS-SCE surveys on the San Juan, Green, and Colorado Rivers in the early 1920s, however, was dams. And those dams, Navajo and Glen Canyon, have had the most profound effect on life along the San Juan. Although the Trimble Survey did not focus on dam sites along the San Juan, it formed part of a larger effort to alter the flow of every river in the Colorado system and so marked a defining moment in San Juan environmental history. What had begun with expeditions by Rivera and other Spanish explorers to discover and describe the territory, trappers to extract beaver, and archaeologists to uncover lost civilizations ended with the government-funded, scientific surveys of Macomb, Hayden, Gregory, and Trimble. The story of dams on the San Juan, covered in chapter 8, is a big one. The Trimble Survey marks the transition point.

But between government surveys, an unlikely scientific expedition was organized during the 1930s to explore the Navajo country—Monument Valley, Navajo Mountain, and the San Juan River. Organized by National Park Service educator Ansel F. Hall, the Rainbow Bridge–Monument Valley Expedition (RBMVE) was a multidiscipline effort that spanned six summers between 1933 and 1938 and involved more than 250 people. Privately funded, its purpose was twofold: to allow a diverse staff of scientists to explore, map, study, and record one of the last scientifically unexplored areas of the United States (then under consideration as a national park) and to provide young men with the chance to live outdoors and study nature. Most student members paid three to four hundred dollars for the summer adventure-classroom, a considerable sum during the Great Depression. Hall recruited many well-known scientists from universities and museums across the country. Many came from...
his alma mater in Berkeley and went on to distinguished careers in various scientific disciplines.64

The RBMVE produced more than forty technical publications, even though most were mimeographed and poorly circulated. Some scientific work went unreported, but other discoveries became finished pieces of outstanding science. Many valuable archaeological finds came out of the RBMVE; much of this work, especially defining pottery types, was conducted by Lyndon L. Hargrave of the Museum of Northern Arizona. Perhaps even more significant for both southwestern archaeology and San Juan environmental history was the work of

Hugh Hyde and Robert Allen of the Trimble Expedition at the Honaker Trail after clubbing scores of flannelmouth suckers that had risen to the surface seeking oxygen when the river was at flood stage. (Hugh D. Miser photo, #584, U.S. Geological Survey)
Ernst Anteus of the Carnegie Institute and John T. Hack of Harvard. They collected sediments that were “the first in the Southwest to be analyzed for fossil pollen.” Hack ultimately concluded that erosion was an important factor in the great abandonment of the San Juan country by the Anasazi. Pollen analysis has since been extremely important in charting human impact on past environments.\(^6^5\)

Perhaps the most important product of the RBMVE was Angus M. Woodbury’s and Henry N. Russell’s monograph, “Birds of the Navajo Country.”\(^6^6\) It was a model of ecological science. The study discussed habitats and ecological relationships, in addition to cataloguing all the avian life of the region. Woodbury, from the University of Utah, and Russell, from Harvard, called themselves ecologists long before that was standard practice or even fashionable. Woodbury’s participation, as we will see, was an important prelude to his work in the Glen Canyon-San Juan region nearly two decades later. Likewise, the RBMVE, in its own way, began what was later accomplished by the Glen Canyon Survey: a complete study of the ecology and cultural history of the area.

If the Rainbow Bridge–Monument Valley Expedition in the 1930s marked a first attempt to study the lower, south side of the San Juan, the Glen Canyon Survey of the late 1950s was a landmark multidisciplinary, scientific study. When the Colorado River Storage Project (CRSP) passed Congress in 1956, the 1935 Historic Sites Act required that funds be provided for salvage. The contract that the National Park Service signed with the University of Utah and the Museum of Northern Arizona called for salvage and study of the archaeology, biology, geology, paleontology, and recent history of the whole area to be inundated by Glen Canyon Dam. This meant Glen Canyon and the lower San Juan.

Angus Woodbury was a National Park Service naturalist before becoming a biology professor at the University of Utah. One of the first scientists to call himself an ecologist, his studies of flora and fauna with the Glen Canyon Survey were groundbreaking.

(Manuscripts Division, Marriott Library, University of Utah)
Under the general direction of Dr. Jesse D. Jennings of the University of Utah’s anthropology department, the different survey groups began reconnaissance in 1957, were in the field by the next year, and worked continuously until 1963, when the backed-up waters of the reservoir stopped them. In the process, the survey helped rewrite the methodology of historic salvage. For the first time, the entire Glen Canyon-San Juan area came under the scrutiny of an organized team of scientists. As director Jennings stated, “The survey’s comprehensive multi-discipline approach . . . will surely remain a hallmark in the history of scientific salvage endeavor.” Indeed it has. Jennings also noted, with some pride, that by the time the survey completed the work and published it in 1965, its methods had become the norm for salvage operations.67

The Museum of Northern Arizona handled archaeology on the lower San Juan, concentrating largely on Anasazi sites. The work was summarized in Survey and Excavations North and East of Navajo Mountain, Utah, 1959–1962 (1965) by Alexander J. Lindsay, Jr., et al. Historic research for the San Juan canyons fell under the direction of Dr. C. Gregory Crampton of the University of Utah. He published numerous monographs at the time on the Glen Canyon and San Juan areas and four popular books later. His San Juan Canyon Historical Sites (1964) was a thorough, mile-by-mile history of the river.68

Many archaeologists (and pothunters) had combed the San Juan area, some biologists had collected plants and studied fauna, and others like Gregory and Miser had analyzed geological processes. No one, however, had attempted to synthesize all that information before the Glen Canyon Survey. The concept that drove the survey’s scientists and historians was ecology. Thus, researchers examined data,
asking about the relationships between the landscape’s resources and its inhabitants and how people made a living. Although the researchers worked in concert, perhaps the most important studies of animals and plants again came from Angus Woodbury. His Glen Canyon-San Juan reports drew upon his previous study of birds, which he expanded into a complete baseline analysis of flora and fauna along the two rivers. Unfortunately, his untimely death in a 1964 car accident prevented him from completing further studies on the ecology of these river corridors. Nevertheless, Woodbury and his associates' findings were significant in many ways. They gained insight into the way different plants and animals along the rivers occupied certain biological territories. For example, Woodbury defined three distinct plant communities: the narrow streamside or riparian zone, where most vegetation and animal life is concentrated; the terraces; and the sparsely vegetated hillside. He showed how and why these zones’ plant communities remained distinct, as well as how invasion and competition occurred. In addition, one of Woodbury’s reports contained a valuable history of biological study in the area. Woodbury also broached the question of disease among prehistoric populations. While a common subject in environmental history
today, it was new territory in the 1960s. Finally, Woodbury planted valuable seeds for discussion when he introduced the idea that parasites, allergens, and other environmental diseases affected populations.

Like the rest of the Glen Canyon Survey, Woodbury’s research focused on relationships. It was not enough, for example, to list the ninety-six kinds of birds in the canyons. He wanted to know how they functioned in communities, which birds lived in which plant zones and what they ate, which predators preyed on what birds, and how climate changes or localized environmental phenomena affected populations. Woodbury envisioned his reports becoming the “standard of comparison with the biological resources of the future reservoir,” and that’s ultimately what the Lake Powell Research Bulletins, discussed in chapter 8, became in the 1970s. He set a fine standard for research.

The Glen Canyon Survey stands at the end of two centuries of Spanish and American exploration of the San Juan River. A common goal of all explorers was topographic information. Most viewed that information as part and parcel of exploitation—of silver and gold, scenery in photographs, Anasazi pots, beaver pelts, or water. Many were repulsed by the starkness of the area, but probably more found the sandstone landscape beautiful. These people, along with the artists and writers discussed in chapter 9, helped shape the consciousness of the many tourists who visited the region in the twentieth century. Coupled with an aesthetic appreciation, the salvage work of Woodbury and his colleagues unveiled a new, ecological approach to studying the San Juan. In total the survey ranks with John S. Newberry’s work in possessing international importance in two scientific fields: archaeology and ecology. Once again, research in the San Juan rippled outward into the larger world of science.

At the same time, however, the survey’s organizers, the Bureau of Reclamation, proposed the grandest scheme of exploitation southwestern canyons had ever seen: damming the San Juan and Colorado Rivers for power, water, and flood control. In a sense, the ecological ideas of Woodbury and the Glen Canyon Survey were too new to have political impact and keep the San Juan flowing free. Theirs was a kind of pre-National Environmental Policy Act (NEPA) environmental impact statement (EIS). But the result, unlike a normal EIS, was already known: The area would be drowned and could no longer be studied, much less appreciated or enjoyed, by humans. Federal law gave scientists the money to study the Glen Canyon-San Juan area, although the patient was scheduled to die.

However, ecological surveys such as the Glen Canyon one ultimately led to laws like NEPA, which required that areas be studied before decisions are made about their fate. Before we get to dams, perhaps the most important story in this narrative, we need to look at the uncontrolled river and late nineteenth-century settlement. The civilizing process that occurred simultaneously with livestock, agriculture, city building, and mining continued during the construction of the dams and eventual harnessing of the San Juan River.