

In the 1960s, a proposal to build two hydroelectric dams in Grand Canyon that would have flooded the natural wonder was greeted with a huge outcry of opposition. There might not have been anything to protect if not for the actions of an unlikely hero, Forest Service Chief Henry Graves, a half-century earlier.

HOW THE FOREST SERVICE SAVED GRAND CANYON

Between 1963 and 1968, the Sierra Club battled the Bureau of Reclamation over a plan to build hydroelectric dams downstream from the Grand Canyon National Park and National Monument. The idea that water would back up through the national monument and into the national park galvanized a nation and

spurred the growth of the environmental movement. The plan was scuttled—by both the Sierra Club’s massive public relations campaign and the unraveling of a political compromise among the seven states of the Colorado River basin—and the Grand Canyon has remained free of hydroelectric dams.¹ But that was not the first time that developers had tried to turn the canyon into a lake. At the beginning of the 20th century, a threat of at least equal magnitude arose and was averted—not by conservationists, but by a committed utilitarian forester.

Before the National Park Service’s establishment in 1916, the federal government distributed monuments, parks, and other fed-

erally protected lands to various bureaus for administrative oversight. After President Theodore Roosevelt declared Grand Canyon a national monument in 1908, it was given over to the U.S. Forest Service, perhaps the most utilitarian of federal agencies. The agency, established in 1905 to protect watersheds and to ensure the efficient use of the nation’s timber resources, not to preserve landscapes because of their scenic value, already managed land on either side of the canyon as national forests.

Gifford Pinchot, a leading utilitarian conservationist and close adviser to President Roosevelt, served as the Forest Service’s first chief. After Pinchot’s dismissal in 1910, his protégé and like-minded

BY BYRON E. PEARSON

fellow forester Henry S. Graves succeeded him. Historians have characterized Graves as being interested only in carrying out Pinchot's conservation policies and having little interest or sympathy for preservation. As evidence, they point to the Hetch Hetchy controversy, in which Pinchot and Graves supported construction of a dam in a remote corner of Yosemite National Park to supply water for San Francisco. Neither man saw the need for a parks bureau because they believed that purpose of the national parks and monuments aligned well with that of the national forests.² Other environmental historians have argued that the Department of the Interior has generally held to a more preservation-oriented philosophy than has the Forest Service, that this was certainly true at the turn of the 20th century, and that any Forest Service designs upon national parks and monuments were bound to be detrimental to the cause of preservation. In his history of the National Park Service, Ronald Foresta goes even further and

argues that Graves actually constituted a greater threat to the implementation of a centralized preservation effort than did Pinchot because the former favored allowing some recreation in the forest reserves—a major argument for creating national parks—while Pinchot's unyielding utilitarian attitude did not.³

However, such arguments fail to consider the individual personalities in both the Forest Service and the Interior Department and the differing perceptions of the meaning of the Hetch Hetchy precedent and its applicability to water development in national parks and monuments. Indeed, this article will contend that but for the actions of Chief Forester Graves, in all likelihood a massive hydroelectric dam would have been constructed in the heart of what is now Grand Canyon National Park in the early 20th century—and with the approval of Interior and most of the early supporters of the National Park Service.

This dispute over the development of the Colorado River within Grand Canyon, like the better-publicized dam controversy of the 1960s, must be placed in the larger context of late-19th-century water development and, in particular, the evolving ideas that would give rise to federally sponsored irrigation and power generation. The roots of the debate can be traced to John Wesley Powell, the famous Colorado River explorer and U.S. Geological Survey (USGS) director who became the first advocate of a systemic national approach to land settlement and the development of the west's water resources.

WESTERN WATER DEVELOPMENT

During the 1870s, western migration reached beyond the 98th meridian. Lured by the promise of cheap land and spurred on by



Havasupai Falls in Cataract Canyon, the site of the Johnson-Baum dam proposal. Havasupai Falls is one of the most visited and photographed places in the American West.

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the myth that “rain follows the plow,” thousands of hopeful farmers poured into the virtually uncharted Southwest, an area so dry that for years it had been designated on maps as the Great American Desert. Fearing a disaster of biblical proportions, Powell, who had been exploring the region since 1868, published his Report on the Arid Region of the United States in 1878 and attempted to implement it as national policy when he became the director of USGS in 1881.⁴

Powell advocated replacing the Homestead Act and other private-landownership laws developed in the humid East with settlement policies designed for the West's arid environment. Specifically, Powell proposed a system of grazing and irrigation districts with irrigation farms of no more than 80 acres and pasturage farms of four sections. Powell's most revolutionary idea was to replace the rapidly emerging western water law doctrine of prior appropriation, which allows claimants to divert water great distances away from rivers

and streams, with statutes tying water rights to land within the watershed. Water usage and regulation policy would be determined locally rather than at the state or federal levels. However, Powell also believed that the federal government should assess the water resources of the West, and he initiated a comprehensive irrigation survey he hoped would guide settlement and water planning at the local level. Although Powell did not advocate for centralized federal water development, the very idea that the federal government should catalog and guide western settlement and water development and usage at all elicited strident protests from western politicians, cattle interests, real estate speculators, and government bureaucracies. Though the intensity of the opposition drove Powell from his position at USGS in 1894, he spent the rest of his life vigorously opposing uncontrolled western expansion. Powell's survey, thought incomplete, identified 147 potential reservoir sites throughout the American West. None were located in the Grand Canyon of the Colorado.⁵

Powell died in 1902. With centralized planning out of the picture, individuals, promoters, and corporations tried to construct irrigation works to bring water to potentially rich western farmland. However, most sites where water could easily be diverted onto prospective farmland had been settled by the late 1880s, and millions of acres of fertile soil lay uncultivated because farmers and small irrigation districts lacked the resources to construct large-scale water projects. As a result, several western states, including California and Colorado, attempted to construct irrigation works; most of these efforts ended in failure.

The lower Colorado River bisects one of the most arid places in the American West. Though the soil is fertile, the region's

meager rainfall, just 2.4 inches a year, prevented the development of a viable agricultural industry on either side of the Arizona-California border. Charles Rockwood, an eastern visionary, sought to irrigate these potentially rich farmlands with water from the Colorado by building a canal from the river to California's Imperial Valley. This project, the first attempt to divert water from the main stream of the Colorado on a large scale, resulted in one of the most spectacular failures of private irrigation in the history of western reclamation.

Rockwood and his partner George Chaffey constructed a canal that delivered water to the Imperial Valley in 1901. They soon discovered why the river had been nicknamed Big Red, for the canal soon filled with silt. Undaunted, they dug another—with the same result. Still determined to bring the Imperial Valley into cultivation, they constructed a temporary channel while the first canal was being cleared of silt during the spring rainy season of 1905. A flood surge destroyed the headgate to the channel and the rampaging waters of the Colorado flowed unimpeded into the Salton Sink, a natural depression in the Imperial Valley that, when full of water, is known as the Salton Sea. The river widened the fissure in its west bank to a half-mile and washed away a vast amount of topsoil in addition to Rockwood's investment. Finally, after two years of nonstop effort, the Southern Pacific Railroad sealed the breach in 1907, returning the impetuous river to its former bed.⁶

Even as this reclamation boondoggle was moving toward a seemingly inevitable epic failure, other development interests from California and Arizona had begun to seek federal assistance to construct a great dam to control the Colorado's flood peaks and provide a constant flow for downstream agriculture. Rockwood's debacle had made it painfully clear that construction of projects of the necessary scale was beyond the capability of individuals, corporations, or even states. Ironically, in the same year John Wesley Powell died, Congress passed the Newlands Reclamation Act of 1902, which created the Federal Reclamation Service and charged it with the task of opening vast areas of the West to agriculture through the construction of massive, federally constructed water projects.⁷

As the Reclamation Service began to prioritize its potential projects, Arthur Powell Davis, Powell's son-in-law, a Progressive Republican and a strong supporter of federal water development, began to argue for federal development of the entire Colorado River system, including the Grand Canyon.⁸ Although Davis thought his Colorado River scheme should be the highest priority, the Reclamation Service initiated its first comprehensive river basin development on a much smaller scale. Citing the need to provide water for agriculture in the Phoenix area, the service initiated the construction of Roosevelt Dam on the Salt River in central Arizona in 1905 and completed it in 1911. This majestic stone structure was assembled from hand-hewn blocks of native red granite and stood 280 feet tall. The project also included a small hydroelectric generator that produced the first Reclamation Service electricity.⁹ The Reclamation Service next engaged in extensive water development throughout the West; however, given the technological challenges of developing the water resources and hydroelectric potential of the Colorado River in the Grand Canyon, Davis's dream of constructing a large dam near Grand Canyon National Monument would not reach fruition until Congress approved the Boulder Dam project in 1928.¹⁰

Despite the obvious geological and technical obstacles, some

private western water developers had viewed the Grand Canyon as an ideal place to construct hydroelectric and water storage projects even before Congress passed the Newlands Act, and they continued to argue for dams on the Colorado in the first two decades of the 20th century. Stating that the "supply of water in the Colorado is an unfailing one and sooner or later it will be the source of all great irrigation enterprises in Arizona," in 1893 the *Salt Lake City Tribune* advocated the construction of a steel-framed dam in the Grand Canyon at the same time that Utah was attempting to wrest all land north of the Colorado River from Arizona Territory. Although Utah's attempted land grab did not succeed, this dam proposal is noteworthy because it was conceived as a hydroelectric project rather than for water storage and was thus a precursor of future Bureau of Reclamation policy.¹¹ David Babbitt, of Flagstaff, formed the Grand Canyon Electric Power Company in 1902 and initiated the construction of another private hydroelectric enterprise. Babbitt's company built a small generating plant on Bright Angel Creek, a major tributary of the Colorado in Grand Canyon. Unlike many western water ventures, Babbitt's actually succeeded, and his small power plant supplied electricity to residences and hotels on the canyon rim until 1965.¹²

Still others sought to avoid the difficult task of dam construction and built waterwheels designed to generate power from the Colorado River's main stem, but none of these schemes worked. Water developers conceded that seasonal fluctuations in water flow were so extreme that a waterwheel would be unable to generate power during periods of low water and torrential spring floods might destroy it.¹³ As in other parts of the West, it seemed as though efforts to develop the full hydropower potential of the river could succeed only with federal backing.

IN THE WAKE OF HETCH HETCHY

Despite the past failures and difficulties, construction of a dam on the Colorado soon entered the realm of possibility, with debates surrounding these proposals eerily foreshadowing the bitter controversy of the 1960s. In 1910, Ralph Cameron, the last congressional delegate from the territory of Arizona and a future U.S. senator, held most of Arizona's political power. Cameron was a figure of some notoriety, with a reputation of advancing his varied interests through means both legal and extralegal. He came to the Grand Canyon in 1884 and by 1900 had staked more than 35 mineral claims, built a hotel, and was charging tourists a dollar apiece to ride mules down the Bright Angel Trail, which he had constructed.¹⁴ Boasting that he "would make more money out of the Grand Canyon than any other man," Cameron moved forward with his plans for development even after President Theodore Roosevelt proclaimed the eastern portion of Grand Canyon a national monument in 1908. By the time Arizona became a state in 1912, Cameron had sold options to mining consortiums in Philadelphia and New York and had formulated plans to provide power for these and other mining interests by constructing a hydroelectric dam in the heart of Grand Canyon National Monument, on the main stem of the Colorado River itself.¹⁵

As Cameron was framing his dam proposal for Grand Canyon, the struggle over the construction of a dam in Yosemite National Park's Hetch Hetchy Valley reached its climax. John Muir and the Sierra Club had fought to preserve Hetch Hetchy because of its scenic grandeur, while Gifford Pinchot contended that the valley should be used as a reservoir site, even though it was located in a national park. Pinchot, the father of Progressive Era resource



PHOTO BY ISAIAH WEST TABER, SIERRA CLUB



COURTESY OF JAMES G. LEWIS

Hetch Hetchy Valley in Yosemite National Park seen before and after the dam was built. The threat of building a dam in the park became a national issue. When Canyon National Monument was threatened with the same fate at the same time, the case stirred little national attention.

management in the United States, espoused a policy of utilitarian conservation, stating that “[c]onservation stands for the development and use of water power now, without delay.” Pinchot and Muir, good friends at one point, parted over the issue of preservation versus conservation. After 1905, this break became more and more acute as preservationists and conservationists fought over Hetch Hetchy, the first major environmental battle of the 20th century.¹⁶

Although Muir managed to persuade Theodore Roosevelt to withdraw his support for the project, Pinchot and the city of San

Francisco gained the upper hand after the disastrous San Francisco earthquake and fire of 1906. Despite a national letter-writing campaign and impassioned arguments from preservationists, the Hetch Hetchy bill passed both houses of Congress with substantial majorities in fall of 1913. Politically outgunned and outnumbered, Muir and the Sierra Club lost this battle when, on December 19, 1913, President Woodrow Wilson signed the Raker Act into law, granting San Francisco all water rights in the valley.¹⁷

The Hetch Hetchy debate gave rise to two opposing political impulses that had immediate effects on the Grand Canyon

project. By passing the Raker Act, Congress had established a precedent that resource development would trump preservationist values even in parks established to protect areas of natural splendor from exploitation. But the lost cause of Hetch Hetchy also motivated the Sierra Club and influential preservationists and politicians to press Congress for increased federal protection of national parks, a sentiment that was gaining momentum by the end of 1914.¹⁸

Cameron and Arizona power interests kept a close eye on these two congressional impulses and the possible ramifications for their own plans to develop the hydroelectric and reclamation potential of Grand Canyon. Despite the push to protect the national parks, it appeared as though supporters of water projects had won. Congress appeared to confirm their success when it passed the Ferris Bill in May of 1914—a predecessor to the Federal Power Act of 1920—to promote federal water and power development. This legislation would have granted the secretary of the Interior the discretionary right to lease power sites on all public lands managed by the department *except* for national parks and monuments. But a relative newcomer to Arizona politics, Representative Carl Hayden, initiated his six decades of reclamation advocacy by sponsoring an amendment to the Ferris Bill allowing water development in two national monuments. Hayden argued, “The use of the water power in the Mount Olympus and Grand Canyon Monuments would not interfere with our enjoyment of any of the beauties of nature. That was the case in the Hetch Hetchy bill which we debated at great length in this house not long ago. This is a parallel one.”¹⁹

Meanwhile, Cameron obtained financial backing from a New York firm and on November 14, 1914, made an informal application to the U.S. Forest Service, the parent agency of Grand Canyon National Monument, seeking permission to construct a hydroelectric project just downstream from the terminus of Bright Angel Trail. Another developer, W. I. Johnson, hired Frank Baum, chief hydrological engineer for Pacific Gas and Electric Company and one of the most important proponents of the Hetch Hetchy dam, to design a power project for Cataract Canyon, which lay just inside the western boundary of the monument, and to make the necessary applications.²⁰ Cataract Canyon contains some of the most spectacular scenery in the Grand Canyon system, including the dramatic Havasupai and Mooney falls of Havasupai Creek, two of the most visited and photographed places in the American West.

Thus, in the wake of Hetch Hetchy, Congress seemed to favor hydropower potential over the preservation of scenic resources in national parks and monuments. Furthermore, Franklin Lane, the former San Francisco city attorney who had advocated for the construction of the dam in Hetch Hetchy, had just been named secretary of the Interior. Two proposals to construct dams in Grand Canyon now sat before the Forest Service, the agency founded by Gifford Pinchot, the most vigorous governmental exponent of resource utilization. The construction of a dam in the heart of Grand Canyon National Monument and the inundation of some of its most scenic features and archaeological sites now seemed inevitable.²¹

AN UNLIKELY HERO

In the summer of 1910, the U.S. Forest Service had a new chief forester, Henry S. Graves. A former subordinate of Pinchot’s in the old Division of Forestry, the predecessor to the Forest Service,

Graves had been appointed to succeed his close friend and mentor Pinchot with the expectation that he would carry out Pinchot’s utilitarian policies but without Pinchot’s political grandstanding. Indeed, Graves continued Pinchot’s efforts to stop Congress from establishing a separate national parks bureau, declaring that his agency should administer the lands “because of the need to salvage the dead and down timber.”²² Graves and his agency were viewed with mistrust and skepticism by park service advocates, especially after Hetch Hetchy. Those feelings only deepened in the case of the Grand Canyon. Even as Graves was weighing construction of a dam in Grand Canyon National Monument, he was fighting efforts by Grand Canyon National Monument supporters to have Forest Service land transferred to the monument, to control access to the proposed Grand Canyon National Park.

By the summer of 1914, it had become apparent that Chief Graves was not going to approve these proposals without carefully considering all the ramifications of Hetch Hetchy. As historians Roderick Nash and Steven Fox have argued, perhaps the most remarkable thing about the Hetch Hetchy debate is that it occurred at all: construction of a dam there would not have been controversial had it been proposed 50 years previously.²³ Consequently, the fierce congressional debates and the public outcry against the damming of Hetch Hetchy forced Graves to balance the agenda of water developers with that of the emerging preservation movement in the case of the Grand Canyon just one year later.

As a result, Graves now found himself in a dilemma. He knew that the Ferris waterpower bill had run into opposition in the Senate, yet both houses of Congress seemed to favor the establishment of an agency to oversee the national parks. He was also aware of growing sentiment in Congress to strengthen the protection given to Grand Canyon by incorporating the national monument into a new national park. Knowing that their window of opportunity could close, Cameron and Baum sought quick approval of their projects before Congress enacted protective measures that would in all likelihood nullify their applications. They also persuaded powerful politicians and influential citizens, including Interior Secretary Lane, Representative Hayden, and Arizona Senator Henry Ashurst, to pressure Graves to grant his approval. Lane, who had recently succeeded in obtaining the authorization for the Hetch Hetchy dam, contended that Graves should sign the permits because the Grand Canyon would come under Interior’s jurisdiction when it became a national park, thus making it eligible for power development once the Ferris Bill became law.

In January 1915, however, Chief Graves denied the Cameron and Baum applications. He wrote to Secretary Lane and acknowledged that the Grand Canyon would probably come under jurisdiction of Interior, through its “Bureau of National Parks.” He also noted that the Ferris Bill was in trouble in the Senate, suggesting that Lane’s assertion about development once the Grand Canyon became a national park was not necessarily a foregone conclusion.²⁴

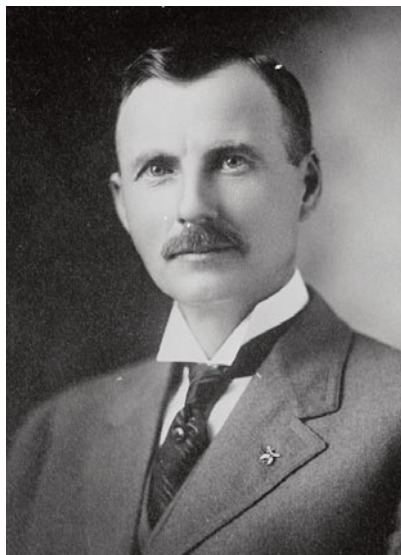
Despite Graves’s meticulous assessment of the status of the Ferris and national parks bills, both still pending before Congress, neither was applicable to the Cameron and Baum applications. Federal policy governing water development in national parks and monuments had been established by Congress in the Hetch Hetchy case, and Graves could have easily justified approving the Cameron and Baum proposals based on that precedent. Instead, he cited a

clause in the National Park Service Bill, passed by the House, stating that no development could take place in a national park: Cameron's Grand Canyon dam application, he wrote, would "allow rights to be secured while action is being taken to create the park that would not be permitted if the creation of the park were an accomplished fact."²⁵ Graves had weighed the *existing* year-old precedent of Hetch Hetchy against *potential* congressional protection of national parks and, despite tremendous pressure, he upheld the latter.

The depth of Graves's convictions was shared by his colleagues in the Forest Service until he resigned in 1920. His chief engineer, Lyle A. Whitsit, echoed his sentiments. After concluding that the power plant designed by Baum was feasible, Whitsit argued, "The writer believes that the scenic beauty of the canyon, the falls, and the rapids possess greater value and is one of the important features of Grand Canyon National Monument.... Should this hydro-electric development be made, all the scenic beauty of the falls and rapids that makes the trip to this country worthwhile would be destroyed.

Therefore, the writer believes that the Service is perfectly justified in refusing an application for water power permit for these resources and would so recommend."²⁶ Even while Graves was absent from the Forest Service for military service during World War I and while on medical leave in 1919, the agency continued to rebuff inquiries from Cameron about the construction of hydroelectric projects in Grand Canyon. Baum finally notified his employer that it would be "useless to carry the matter further"; Cameron's mining claims remained tied up in court until 1920, when the Supreme Court invalidated them.²⁷

Whereas Hetch Hetchy provoked a furor, preservationists seemed unaware of—or, at the very least, unconcerned about—the Cameron and Baum Grand Canyon dam proposals. So Graves's decision must be read in this light: it was made with virtually no pressure from environmental organizations such as the Sierra Club. Although many environmental historians have portrayed the early-20th-century Forest Service as a strictly utilitarian agency, Chief Graves assigned greater weight to the aesthetic values of Grand Canyon and its potential as a national park. He did so despite immense pressure from powerful politicians, government bureaus, and development interest groups, and despite the Hetch Hetchy precedent favoring utilitarian and



Ralph Cameron



Henry Graves



Carl Hayden

Ralph Cameron vowed to "make more money out of the Grand Canyon than any other man," and as his congressman, Carl Hayden stood ready to help. The decision to block construction of a dam in Grand Canyon by Chief Henry Graves surprised both men.

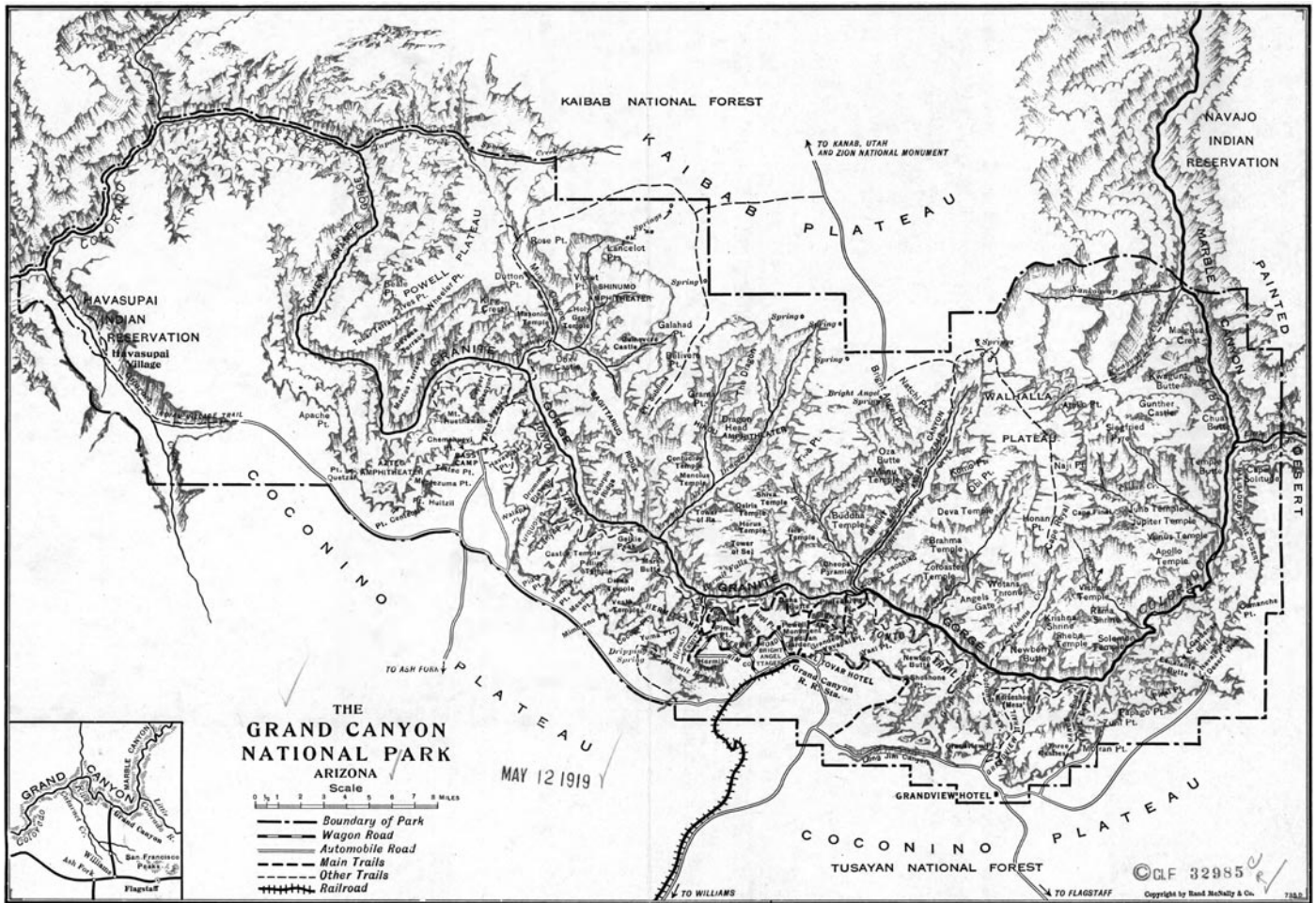
economic development inside national parks and monuments—a policy he had strongly supported in the case of Yosemite National Park.²⁸

FROM MONUMENT TO PARK

When the National Park Service was created in 1916, jurisdiction over Grand Canyon National Monument remained with the Forest Service. Three years later, Carl Hayden sponsored a bill to convert Grand Canyon National Monument into a national park. Although the park boundaries—and national park protection—included approximately 100 miles of river, they did not encompass all 277 miles of the Grand Canyon system. Additionally, because the National Park Service Enabling Act of 1916 prohibited water development in national parks and monuments, Hayden inserted a provision in his 1919 bill granting the secretary of the Interior the power to authorize reclamation projects inside the newly established Grand Canyon National Park.²⁹

Scarcely debated at the time, this reclamation clause constituted an almost insurmountable legal obstacle for environmentalists defending the canyon in subsequent disputes because it established congressional endorsement of water projects inside

CAMERON AND HAYDEN PHOTOS COURTESY OF WIKIMEDIA COMMONS; GRAVES PHOTO FOREST HISTORY SOCIETY PHOTOGRAPH COLLECTION



When the Grand Canyon National Park was established in 1919, the year this map was made, not all land in the national monument was incorporated into the park, leaving some land at risk for development.

the park itself, and the Park Service was powerless to do anything about it. Hayden's provision states clearly that a reclamation project in Grand Canyon would not impair the canyon's scenic beauty and thus would not violate the primary purpose of the park's establishment.

When denying the Cameron and Baum hydroelectric proposals in 1915, Chief Graves had argued that since Grand Canyon National Monument would soon be established as a park, it should be managed as though it already was one, and he assumed that hydroelectric development would not be permitted. But he had not anticipated Hayden's reclamation provision, included in the final version of the Grand Canyon National Park bill of 1919. Ironically, in creating the Grand Canyon National Park and transferring it to the National Park Service, Congress reduced the protection the Grand Canyon had enjoyed as a national monument under Forest Service jurisdiction. And because the Colorado River drops 950 feet as it flows through the park, and almost 2,000 feet through the entire canyon, it would remain the subject of intense scrutiny as western water interests prepared to divide its waters and initiate comprehensive development of the basin.³⁰ Fights over Colorado River water would bring the debate of development versus preservation of the West's rivers to a head in the mid-20th century and force environmental organizations into the political arena to fight for the protection of scenic values in national parks and monuments.

As odd as it may seem today, many individuals who supported

the creation of the National Park Service—Carl Hayden, Franklin Lane, and John Raker, author of the Raker Act—had all favored the damming of Hetch Hetchy Valley in Yosemite National Park and had supported hydroelectric development in Grand Canyon National Park and Monument. By dismissing the Forest Service and Chief Henry Graves as utilitarian opportunists, environmental historians have not addressed the complexity of interagency competition, the influence of individuals on resource policy, and the shifting perceptions of value in the immediate post-Hetch Hetchy period. It was Graves whose actions ensured that when Grand Canyon finally did become a national park, it would be one worthy of the name. Prominent environmentalist Ira Gabrielson once asked rhetorically, "If you can't save Grand Canyon, what the hell can you save?"³¹ Gabrielson's question is worth pondering. In denying those 1915 applications to build hydroelectric dams, Chief Graves preserved a world-renowned physical landscape for future environmentalists to defend during the epic battles of the mid-20th century—battles that ultimately reestablished the boundaries of national parks and monuments as hedges of protection for America's greatest scenic wonders. □

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NOTES

1. For more on this, see Byron E. Pearson, *Still the Wild River Runs: Congress, the Sierra Club, and the Fight to Save Grand Canyon* (Tucson: University of Arizona Press, 2002).
2. Harold K. Steen, *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 1976), 113–22, passim; and Gerald W. Williams, *The Forest Service: Fighting for Public Lands* (Westport, CT: Greenwood Press, 2007), 310.
3. Ronald Foresta, *The National Parks and Their Keepers* (Washington, DC: Resources for the Future, 1984), 20. See also Roderick Nash, *Wilderness and the American Mind*, 4th ed. (New Haven: Yale University Press, 2001); and Alfred Runte, *National Parks: The American Experience*, 2nd ed. (Lincoln: University of Nebraska Press, 1987).
4. John Wesley Powell, *Report on the Arid Region of the United States* (1878; Cambridge, MA: Harvard University Press, 1962), ix–xi, xvi, xxiii, 44, 48, and 54. Powell became head of USGS in 1881 after the publication of this report.
5. Donald Pisani, *To Reclaim a Divided West: Water, Law and Public Policy 1848–1902* (Albuquerque: University of New Mexico Press, 1992), 143–65, passim.
6. Donald Worster, *Rivers of Empire* (New York: Pantheon Books, 1985), 194–97; and Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water* (New York: Penguin Books, 1986), 127–29. Chaffey managed to escape the fiasco, having withdrawn from the partnership in 1901.
7. Norris Hundley, Jr., *Water and the West: The Colorado River Compact and the Politics of Water in the American West* (Berkeley: University of California Press, 1975), 9–10.
8. Norris Hundley, Jr., *The Great Thirst: Californians and Water, 1770s–1990s* (Berkeley: University of California Press, 1992), 203–204.
9. For detailed studies of the Bureau of Reclamation during this period, see William E. Warne, *The Bureau of Reclamation* (New York: Praeger Publishers, 1973) 13–14; and Michael C. Robinson, *Water for the West: The Bureau of Reclamation, 1902–1977* (Chicago: Public Works Historical Society, 1979), 19–21, 28. Until the late 1980s, Roosevelt Dam remained the highest rock masonry dam in the world; however, it was recently overlaid with concrete and raised an additional 35 feet.
10. Hundley, *Great Thirst*, 203–9.
11. *Salt Lake City Tribune*, November 28, 1893; *Coconino (Arizona) Sun*, March 22, 1902.
12. *Coconino Sun*, April 13, 1901, and August 30, 1902; and *Phoenix Republican*, June 21, 1902. See also A. B. West to Morris Udall, November 17, 1966, folder 23, box 483, Morris Udall Papers, Special Collections, University of Arizona. Another developer, Dr. A. J. Chandler, attempted to obtain European capital to finance the construction of a plant on Kanab Creek; reflecting the optimism of the times, he argued that one plant built on this relatively small stream could provide power for Prescott, Phoenix, and other Arizona communities.
13. *Kingman (Arizona) Miner*, February 22, 1902; see also *Coconino Sun*, June 21, 1902.
14. For a comprehensive discussion of Ralph Cameron's Grand Canyon enterprises, see Douglas Strong, "Ralph H. Cameron and the Grand Canyon" (Parts 1 and 2), in *Arizona and the West* 20 (1, 2), 41–64, 155–72.
15. Roosevelt used the Antiquities Act of 1906 to create the Grand Canyon National Monument. Robert Shankland, *Steve Mather of the National Parks* (New York: Alfred Knopf, 1970), 225–42; see also Bert Cameron, interview transcribed by William E. Austin, June 21, 1939, in *Grand Canyon Items*, Vol. 2, Grand Canyon National Park Reference Library, hereafter cited as GCNPR; and *Coconino Sun*, May 24, 1912. Cameron's claims predated the establishment of Grand Canyon National Monument, so some question existed as to their validity. The Supreme Court nullified them in 1920.
16. For an in-depth discussion of the Hetch Hetchy controversy, see Robert Righter, *The Battle over Hetch Hetchy: America's Most Controversial Dam and the Birth of Modern Environmentalism* (New York: Oxford University Press, 2006). See also Michael Cohen, *The History of the Sierra Club, 1892–1970* (San Francisco: Sierra Club Books, 1988), 22–31, passim; and Holoway R. Jones, *John Muir and the Sierra Club: The Battle for Yosemite* (San Francisco: Sierra Club, 1965), 6–8; Gifford Pinchot, *The Fight for Conservation* (Garden City, NY: Harcourt, Brace, 1910), 42–50; and Nash, *Wilderness and the American Mind*, 161–180; Steven Fox, *The American Conservation Movement: John Muir and His Legacy* (Madison: University of Wisconsin Press, 1981), 139–46.
17. Runte, *National Parks*, 77–82; see also Cohen, *History of the Sierra Club*, 22–31. The results of the initiative were 589 in favor of the preservation of Hetch Hetchy Valley and 161 opposed, of a total membership of about 1,000, most of whom lived in the San Francisco Bay area.
18. Runte, *National Parks*, 100–105. In 1916, Congress rewarded their persistence by passing legislation that created the National Park Service as an agency in the Interior Department.
19. "Informal Application by R. H. Cameron for Water Development in Grand Canyon National Monument," November, 18, 1914, 31, Fiche GCRA-04363, Grand Canyon National Park Museum Collection, hereafter cited as GCNPMC. For an exhaustive discussion of federal water power statutes before 1921, see Jerome Kerwin, *Federal Water Power Legislation* (New York: Columbia University Press, 1926). The Ferris Bill was eventually defeated in the Senate.
20. "Informal Application by R. H. Cameron," November 18, 1914, 1, and "Report on the Hydroelectric Project in Cataract Canyon," by Lyle A. Whitsit, District Engineer, 2–3, in GRCA-04363 (GCNPMC). The Forest Service chief had ruled on another application made by J. W. Waara, in August 1913, holding that he was averse to granting any permit "within this National Park." However, this occurred before the final disposition of the Hetch Hetchy controversy (and before the Grand Canyon's national park status), and hence this decision was not affected by that precedent.
21. Samuel Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890–1920* (Cambridge, MA: Harvard University Press, 1959), 168, 173; and Foresta, *National Parks*, 17–20. For an in-depth discussion of Pinchot's conflicts with President Taft, Interior Secretary Richard Ballinger, and his role in the Pinchot-Ballinger controversy over Alaska coal lands, see Hays, 147–74.
22. Steen, *U.S. Forest Service*, 114.
23. Nash, *Wilderness and the American Mind*, 181; and Fox, *Conservation Movement*, 146–47. Henry Graves's tenure as chief is discussed in Steen, *U.S. Forest Service*, 114–22; Char Miller, *American Forests* (Lawrence: University Press of Kansas Press, 1997), 91–93; and Michael Frome, *The Forest Service* (New York: Praeger Publishing, 1971), 14–16.
24. Henry Graves to Secretary of the Interior, January 22, 1915 in GRCA-04363 (GCNPMC).
25. W. I. Johnson to Henry Graves, September 13, 1915; see also Henry Graves to Secretary of the Interior, January 22, 1915; and A. F. Potter to Henry Graves, September 26, 1914, all in GRCA-04363 (GCNPMC).
26. "Report on the Hydroelectric Project in Cataract Canyon," by Lyle A. Whitsit, District Engineer, 3, in GRCA-04363 (GCNPMC).
27. *Cameron et al. v. United States*, 252 U.S. 450 (1920), passim.
28. See H. B. Greely to Stanley D. McGraw, March 18, 1915, and O. C. Merrill to Barklay, Parsons, and Klapp, Engineers, February 21, 1917, all in (GRCA-04363) (GCNPMC); see also J. Donald Hughes, *The House of Stone and Light: A Human History of the Grand Canyon* (Grand Canyon History Association, 1978), 85.
29. Grand Canyon National Park Establishment Act, 16 U.S.C. § 221 (1919); see also Steven Carothers and Bryan T. Brown, *The Colorado River through Grand Canyon* (Tucson: University of Arizona Press, 1991), 6; and "Grand Canyon National Park," *Congressional Record*, H1769–1774 (January 20, 1919).
30. U.S. Department of the Interior, *The Colorado River: A Natural Menace Becomes a National Resource* (Washington, DC: Government Printing Office, 1946), 168; and Bureau of Reclamation, "Memorandum Report on Reconnaissance Studies Marble Canyon Kanab Creek Power Development" (Boulder City, Nevada, 1961), 3 (GCNPR). These figures do not reflect the 1975 park expansion.
31. Quote from the author's interview with David Brower, July 1997.