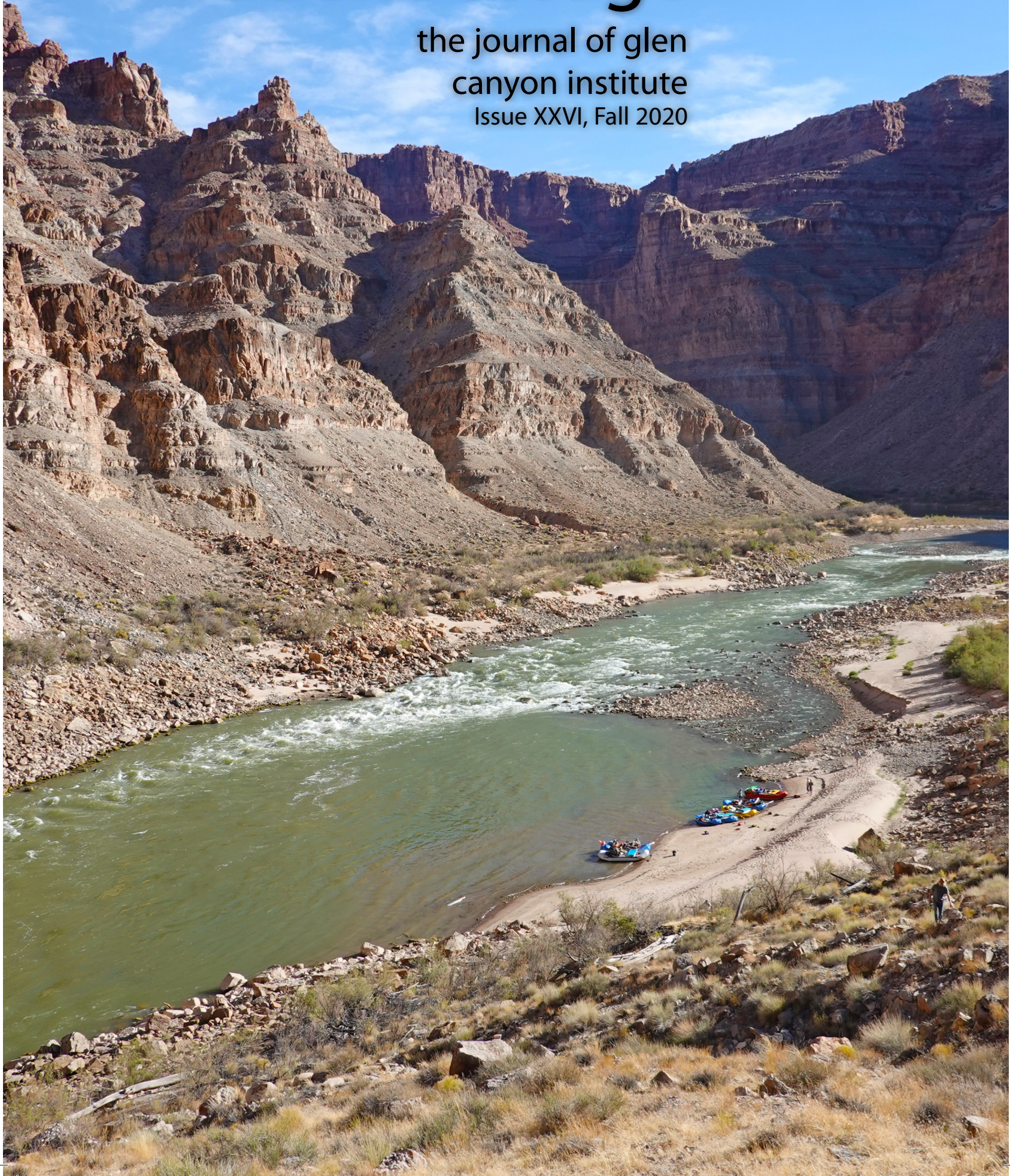


Hidden Passage

the journal of glen
canyon institute
Issue XXVI, Fall 2020



Glen Canyon Institute

President

Richard Ingebretsen

Board of Trustees

Scott Christensen

Tyler Coles

Ed Dobson

Wade Graham

Michael Kellett

Paris Latham

Lea Rudee

Mike Sargetakis

David Wegner

Executive Director

Eric Balken

Outreach Director & Office Manager

Jack Stauss

Advisory Committee

Bruce Mouro

Tom Myers

Carla Scheidlinger

Roy Webb

Bill Wolverton

3090 East 3300 South
Suite 400
Salt Lake City, Utah 84109
tel (801) 363-4450
fax (801) 363-4451
info@glencanyon.org
www.glencanyon.org

Hidden Passage
Issue XXVI Fall 2020

Editor

Wade Graham

wade@wadegraham.com

Cover: Looking down on Imperial Canyon Rapid, one of the many white water restoration sites in lower Cataract Canyon. Photo by Jack Stauss.

Director's Introduction

by Eric Balken

2020 will be a year we all remember. The pandemic, a civil rights uprising, and a heated election all coalesced into a moment of sweeping change in this country. All the while, significant changes were taking place on the Colorado River too. What promised to be a strong winter with a healthy snowpack quickly devolved into a surprisingly dismal runoff. As Bill Hasencamp of California's Metropolitan Water District described it, "what was most unfortunate was that the upper Colorado Basin had a 100% snowpack, yet runoff was only 54% of normal."

This newly-emerging disconnect between snowpack and expected runoff is striking fear into water managers across the basin. A new study from Columbia University showed that we may already be in a multi-decade "megadrought", and new models from the Future of the Colorado (FTC) group, on which GCI serves as an advisor, show the drought models used as "stress tests" need to anticipate even drier conditions down the road. A result of all this is that the odds of a declared shortage at Lake Mead jumped to 30% in August, up from 10% in April.

Another noteworthy development is that the aforementioned FTC group has begun modelling variations of GCI's Fill Mead First proposal using CRSS, the Bureau of Reclamations high-end river simulation software. While it may seem wonky or esoteric, the fact that FMF is being modelled by leading river scientists is a milestone for Glen Canyon's restoration. It is no longer a fringe idea, but a concept now being analyzed by the brightest minds in the basin.

Another glimmer of progress has emerged on the Colorado. The Lake Powell Pipeline, which GCI, its members, and partner organizations have battled for over a decade, has hit a snag so serious, it may portend a new era of management on the river. During an EIS comment period this summer where conservationists and citizens across the country spoke out against Utah's wasteful diversion proposal, the six other basin states also submitted a letter asking that the project be put on hold. This monumental development upends almost a century of tradition where the states have stayed out of each other's business when it comes to their water use. The gloves have come off, and it's clear that traditional attitudes toward water management are no longer an option.

This is all serves as a backdrop for the upcoming renegotiation of the Interim Guidelines, which will guide how Mead and Powell are managed in the decades to come. The new guidelines won't go into place until 2026, but the talks begin next year. The current guidelines follow a protocol of "equalization" between the reservoirs, but with the onslaught of pressure on the system and new data on alternative paradigms, the concept of prioritizing water downstream in Mead instead of Powell is gaining momentum. All of these factors are creating an unprecedented opportunity for FMF and Glen Canyon's restoration to be a central part of Colorado River management.

Most importantly, the physical transformation of Glen Canyon is continuing on the ground. The marquee article in this year's issue focuses on a recent trip with the Retuning Rapids Project in Cataract Canyon, where GCI helped a team of researchers survey the reemergence of once-forgotten rapids, plant life, new river channel, and the washing away of Lake Powell's sediment. What began as a personal project for the team, led by Mike DeHoff and Pete Lefebvre, has quickly evolved into a broader undertaking that's gained attention from researchers at the US Geological Survey, the Grand Canyon Monitoring and Research Center, the Center for Colorado River Studies at Utah State University, and more. GCI is looking forward to working more with the Returning Rapids Project in the years to come, as the evolution of lower Cataract Canyon and upper Glen Canyon endures.

Geology in Real Time: A Trip Down Cataract Canyon with Returning Rapids

by Wade Graham



Looking downstream to "The Chute", one of the many restored rapids in Cataract Canyon. Photo: Eric Balken.

As Lake Powell began to fill in 1963, its pool backed up the canyon of the Colorado River and its myriad tributaries and side canyons, steadily drowning their moving waters in the growing, stagnant reservoir. The sediment carried by the river and stream currents quickly dropped out in the still water, laying down layers of mud, sand, and rock over their former beds. As the reservoir filled, the sediment deposition moved farther up each canyon, until Lake Powell reached "full pool," its maximum elevation of 3700 feet above sea level, in 1983.

From then on, as the reservoir level began to drop and fluctuate, a transformed landscape emerged: receding lake water revealed vast mudflats, some dotted with bubbling mudpots just like those in Yellowstone, quicksand wallows, gravel bars, and slippery ooze, mostly devoid of vegetation except for wind-blown piles of dead tumbleweeds collected in draws. The worst feature, from the point of view of river runners and hikers, are the steep sediment banks, at times vertical cliffs, formed when reservoir level receded far enough for river currents to return and scour sediment out of the

middle of their former channels, but leaving the sides caked and choked. This Anthropocene geological stratum is what has been dubbed the "Dominy Formation," after Floyd Dominy, the commissioner of the Bureau of Reclamation who built Glen Canyon Dam.

Such nightmarish landscapes exist throughout the reservoir, but the most impacted places are those where sediment loads flowing into the reservoir are highest, including the largest side canyons and tributaries, especially the Dirty Devil, San Juan, and Escalante Rivers. No place has been more altered than Cataract Canyon, the 46-mile long section of the Colorado River just upstream from Glen Canyon. At full pool, Lake Powell extended 186 miles up the river—including halfway up Cataract, drowning all but 26 of its 46 rapids. River runners, after floating the last free rapid, Big Drop 3, a maelstrom of whitewater and one of the most feared rapids in North America, suddenly found themselves bobbing in the slack waters of the reservoir, at times in the company of jet skiers.



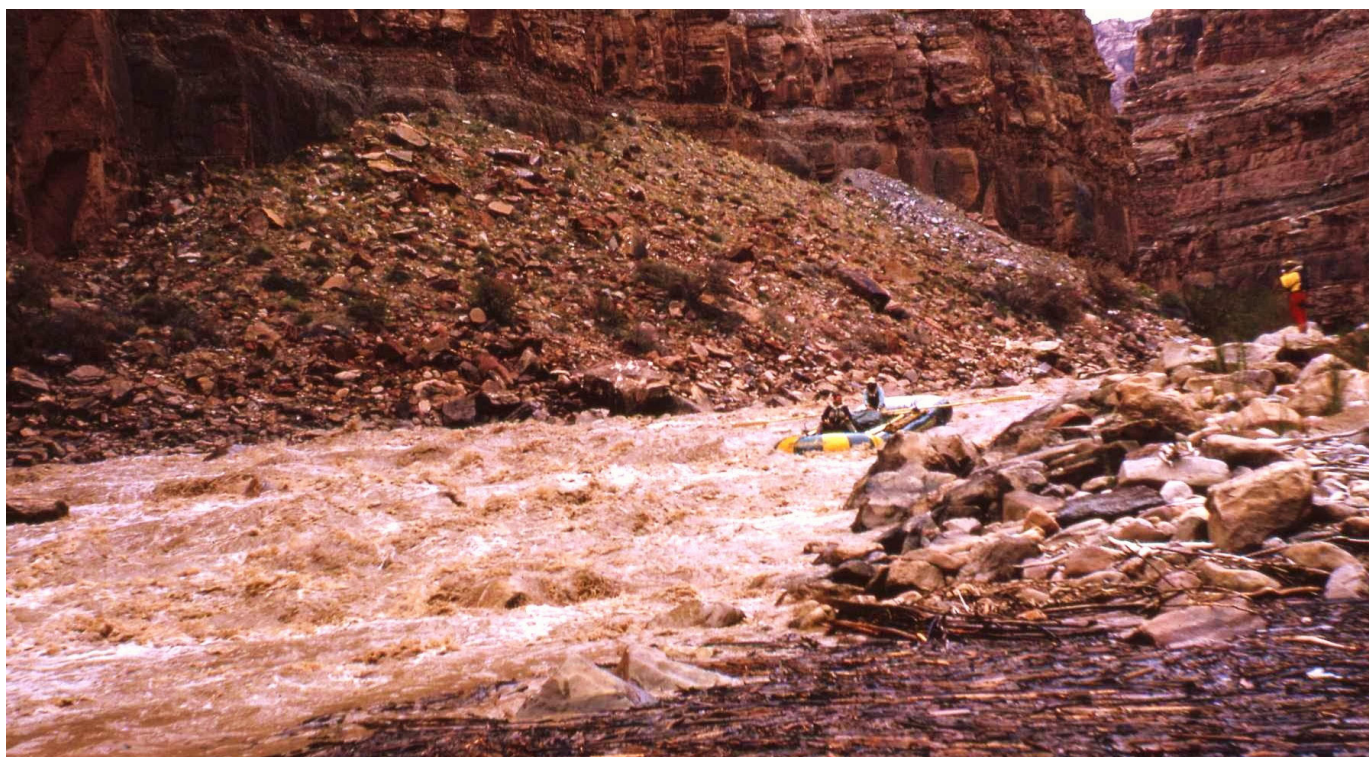
A topographic map compilation of Cataract Canyon and Glen Canyon by E.C. La Rue circa 1921. Courtesy of USGS E.C. La Rue collection.

Following the reservoir’s high stand in the flood year 1983, it began to drop. The 1990s saw it fluctuate up and down as precipitation in the basin whipsawed from stretches of drought years to occasional wet ones. Imperial Canyon Rapid (rapid #27), immediately below Big Drop 3, poked its rocky teeth above the water in some years, only to be submerged again in others. As the reservoir level dropped below 3,680 feet, the rapid began to permanently reemerge.

As the water receded it left high sediment banks, up to 70 feet in some places, which plunged straight into the river. River trips looking for a place to camp faced a grim scene: no beaches, instead slick mudbanks at river’s edge, and the need to climb and carry gear up eroding mud cliffs to find a flat spot high above to make camp.

Then, in the 2000s, due to drought and overuse in the basin, a steady drawdown occurred. The river began to change, quickly, with new features emerging not just every year, but almost every river trip, for those with sharp eyes. Two such attentive observers were Mike DeHoff and Pete Lefebvre, Moab-based river runners and friends. On frequent Cataract trips, they noticed changed shorelines, beaches, and especially, riffles and rocks appearing in the water where none had been previously. They began to take notes, and pictures, and compare them. Their “eureka” moment occurred several years ago when they saw a 1921 photo of a boat running a rapid in lower Cataract and were able to match it to the same contemporary location and take a picture of a boat running down. Where there had been a rapid in 1921, there was not a rapid, yet, but “a little character” had returned to the water’s surface, in Lefebvre’s words. They knew that, with some detective work, they could try to predict when the other drowned rapids of Cataract might reemerge. Thus began the “treasure hunt” of the Returning Rapids Project, according to DeHoff. They pored over old maps and historical photos, greatly aided by the skills of Mike’s wife, Meg Flynn, who has a master’s degree in library science, able to search deep in the archives of Northern Arizona University, the University of Utah, and other collections. Inspired by the 2012 film *Chasing Ice*, about using repeat photography to document receding glaciers, they began to systematically take repeat photos of rapids coming back—only they were documenting restoration, not destruction.

Gradually, rapids have returned that are marked on no modern river map: Imperial Canyon Rapid (#27), Short Rapid (#28), The Chute (#29)—which, as the river cut back down to its steep, pre-reservoir gradient, again became an event to remember, a powerful wave train at high water—Waterhole Canyon Rapid (#30), Can Opener (#31), and Benchmark Rapid (#32). Number 33 they named “La Rue’s Riffle” after E.C. LaRue, the USGS hydrologist who had taken the original photograph they had first paired. Number 34, Gypsum Canyon Rapid, unseen for 40 years, is now playful whitewater, though its rapid is not back to its former, full splendor. Below Gypsum, more are waiting to return: Palmer Canyon Rapid, Clearwater Canyon Rapid, Dark Canyon Rapid, and more.



Boaters run Dark Canyon Rapid in 1964, one of the most challenging rapids in Cataract Canyon before it was flooded. Photo by Grant Reeder.

To help boaters prepare to run these and to use common names and mileage, Returning Rapids has published an online river guide—truly a guide to a reborn world. And more than just boaters have taken notice. More accurately, a number of avid boaters with other, relevant vocations have taken notice, among them some of the most active river scientists in the West. Last year, ecologist Seth Arens of the Western Water Assessment helped RRP organize a science trip down Cataract, to further the process of documenting the changes happening in the canyon. This past October, 2020, a larger trip launched to build on 2019's data. Participants included GCI executive director Eric Balken, outreach director Jack Stauss, and myself (GCI Trustee since 2000), Mike Fiebig from American Rivers, a journalist and a photographer, joining Arens, and geologists from the USGS, Utah State University, and the University of Utah. The expedition was expertly organized and guided by Mike and Meg and Pete and his wife Jaime Moulton, both professional river guides.

Our trip began with a motor-pushed flotilla of seven, strapped-together rafts winding through the 44 miles of meandering flat water of the aptly-named Meander Canyon, to the confluence of the Colorado and the Green River. Here, we camped on a sandbar, at the same spot that the first exploring expedition led by Major John Wesley Powell camped for several days in July of 1869. The water's surface at the confluence is calm, but beneath, the currents of the two largest rivers in the American Southwest join forces. Below this spot, things change: the river enters a steep and narrow canyon, among the deepest in Utah. And it begins to drop. Steeply. In

one four-mile section, the Colorado descends 80 feet—the biggest cumulative drop of any stretch of the river. At high water, Cataract Canyon can seem like one continuous rapid. Even at lower flows, it has some of the wildest whitewater in North America.

Once through the rapids, trip members began three days of work in the "carving zone" below reservoir high water mark, fanning out to do surveys of sediment and vegetation. At Waterhole Canyon, the geologists marked extraordinary signatures of sand "ripples": tiny, sinuous, repeating, sand dune wave patterns formed as currents moved and dropped sediment, now exposed in the side canyon's vertical sediment walls. Some resemble tapestry weaving panels with a pattern of little waves stacked on one another for many yards. These are called "supercritically climbing ripples," and were laid down by flows carrying more sediment than could be transported, sometimes moving in an upstream direction—clear evidence to the geologists of how high flows in the main Colorado deliver huge quantities of sediment to some side canyons, where it accumulates, and of eddies or upstream currents in those canyons. What looks like a jumble of mud and rocks to the untrained eye is legible to experts as a literally fine-grained record of alternating lake stands, debris flows, and flood events, sometimes moving downstream, sometimes upstream in eddies, all laid down year-by-year.

This was geology in real time—unusual for researchers who typically study river and sediment dynamics in systems thousands or millions of years old. And it was proactive science, aimed not only at documenting what is happening as

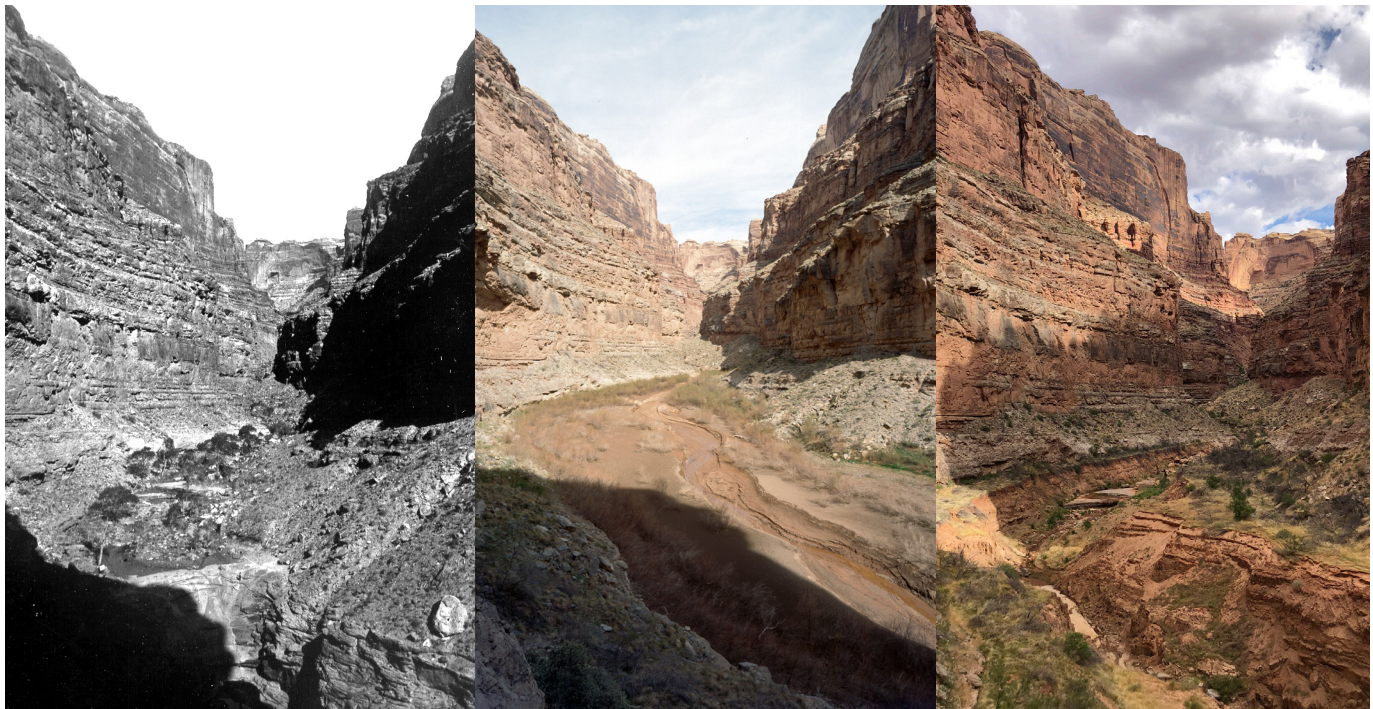


(Above) A perfect cross section of "ripple train" deposition in Waterhole Canyon. Photo by Cari Johnson.

the Colorado retakes its canyon but at helping the public and decision-makers understand its importance. And it was high-tech. The down-running team was met at Gypsum Canyon by two boats that motored up from the reservoir, from the USGS and Grand Canyon Monitoring and Research Center. They intended to determine elevations, using advanced GPS technology, setting two metal benchmarks into rocks to join the one placed on last year's trip, and painstakingly scanning the river channel with a towed underwater multibeam sonar unit that looked like a torpedo to record bathymetry (depth contours), current velocity profiles, cross sections, and other underwater imaging to "see" how the river is carving into the sediment deposits.

Seth Arens and various helpers (me for one day) surveyed changes in vegetation, getting real-time documentation of how the riparian ecosystem is restoring itself, with the return of willows, cottonwoods, native shrubs, and even cryptobiotic soil crust that had formed since 2000—far faster than generally thought possible. These in turn sustain the returned beavers, otters, and herds of bighorn sheep that we saw as we floated. From his preliminary data, Arens ventured another conclusion: since, in places, the Dominy Formation will not be washed away, but remain indefinitely, and the sediment contains more nutrients than the rocky landscape it lodged on, post-dam riparian vegetation may be lusher and more diverse than before the dam—a small silver lining.

Our hope is that the science being done in Cataract can help change the broader conversation about the Colorado River, by helping people to see the values of keeping reservoir levels low, so as not to lose the restored landscapes that the river is winning back from the muck.



The restoration process in Clearwater Canyon. Photos from left to right: E.O. Beaman - 1871, Oldershaw - 1998, Returning Rapids - 2020.



A photo match looking upstream at Gypsum Rapid in 1953 (above) courtesy of the SJ Quinney Collection, Special Collections, J. Willard Marriott Library. The photo from same location in 2020 (below) shows Canyonlands Park Ranger Steve Young (AKA T-Berry) on a high-water trip in May 2020

A Sediment Survey in Waterhole Canyon —Jack Stauss



After a blissful and exciting three days in Meander Canyon and the rapids of Cataract we had finally arrived at our research basecamp. On the way downstream, we had stopped at Imperial and Waterhole Canyons to observe some returning rapids and the sediment banks left behind from Lake Powell. In Waterhole we watched the geologists gawk at the high walls of “the Dominy Formation,” the new geologic sediment layer formed from the long-receded reservoir, cleverly named after former commissioner of Reclamation during the construction of Glen Canyon Dam, Floyd Dominy.

At Waterhole, the group wandered past the 50-foot sediment walls visible from the river and made its way up the drainage. Here, years of flash-flooding had carved out a channel exposing walls of the tiered stratigraphy of Lake Powell’s annual sediment layers—the perfect cross section for the trip geologists to analyze when, where, and how much sediment was deposited from the reservoir over the years. Jack Schmidt, head of Utah State’s Center for Colorado River Studies, USGS geologist Scott Hynek, and University of Utah geologist Cari Johnson set markers in the walls adapted from tent stakes donated by trip members marking the different layers of sediment their trained eyes saw in the banks of sand.

At the mouth of the canyon I locked eyes with a bighorn sheep grazing among the river boulders. When we boated down river to the next camp, I thought that would be last time I explored the short but beautiful Waterhole—that evening I was proven wrong. The geology team who started their survey wanted to return the next day with GPS tools to take exact measurements of the layering they observed. As youngest on

the trip I was tasked with helping them make the trek up the banks of the river back to the canyon. I would carry a waterproof suitcase with two state-of-the-art GPS Real Time Kinematic (RTK) rover devices that allow pinpoint elevation readings, and we would get data from the markers left behind. Always being up for an adventure and the occasional suffer fest, I obliged.

In the morning we started our two-mile journey upriver from camp. One of the USGS motorboats ferried us part of the way, then we walked the remaining distance along the cobble river bank. We rock-hopped and zigzagged for a couple hours until midday when we finally made it to the mouth of Waterhole.

We unpacked the survey tripods and the RTK’s and got to work. Cari Johnson collected samples from individual layers while Scott Hynek and I took GPS reference points from each marker. We set up one RTK device on a tripod on the top of the Dominy to collect to baseline elevation, then I followed Scott along the canyon with the “rover” RTK and collected data points he found important. As we catalogued all of the points of interest, we climbed up and down the steep, loose, and at times precarious Dominy layer to position the unit where we needed it. The data collected will help these geologists understand how the sediment was deposited from the reservoir, and how it is eroding away with time. Maneuvering through tumbleweeds and tiers of sediment that would occasionally collapse underfoot, it was like mountaineering in the desert.

After several hours we were exhausted and still had a long walk down to camp. We were dreading this, knowing that the sun would be setting before we got back. I badly needed a river bath to wash off the reservoir dust covering me. About 20 minutes into the hike we heard a sound coming from upstream ... a group of five boats flying a Jolly Roger was approaching. I climbed on a rock and started waving. They pulled up and were happy to row us down to camp, saving us an hour or more of scrambling in the dark. After we masked up and hopped on their boats they asked, “Hey do you guys want a beer?”

Above: The crew heads up waterhole canyon. Below: University of Utah Geologist Cari Johnson observes “Dominy” formation of Lake Powell sediment adjacent to Waterhole Canyon. Photos: Eric Balken.



Benchmarks and River Elevation Surveys —EB

One of the most exciting research goals of the 2020 Returning Rapids trip was the placement of two new USGS benchmarks along the river corridor and the survey of the river channel and elevation near Gypsum Canyon. When the group arrived at the research base camp on day four of the trip, I eagerly volunteered to help install the benchmarks. Aside from it being a dream of mine to help install one of the brass-cap benchmarks I've seen on mountain tops my whole life, the placement of these USGS markers below Lake Powell's high-water mark and along the river's edge implies a new era of permanent recovery for this part of the river. Having been above the "fluctuation zone" or seasonal highpoint of the reservoir for many years, this stretch of river now more resembles its original self than its inundated version of the 1980's and 90's.

This is the reason DeHoff and the other researchers on the trip chose to focus their efforts on Gypsum Canyon—it's ground zero for the newest emerging rapid in the Cataract, and offers an opportunity to measure the river's return in real-time as it breaks free from sediment loads left by Lake Powell. The return of rapids at Gypsum Canyon has been notable—in the past couple years alone, large upstream boulders have emerged, revealing "La Rue's riffle", named after famed geologist EC LaRue. And Gypsum Canyon rapid itself, formed by the debris fan of the side canyon, has become more pronounced. Through historical photo matching, Returning Rapids has established that the rapid is well on its way to restoring to its former self. The big question is when will the rapid fully return? The answer to that question may lie in data collected by the survey from this trip.

Soon after sunrise on October 21st, I accompanied USGS Hydrologist Chris Wilkowske and Dehoff on a trek through the dead tamarisk bushes to the upper terraces of the Dominy layer above our Gypsum camp on river left. They were searching for an ideal site to install one of the brass-cap benchmarks. When they found a large, stable rock that was in view of the river and the other benchmark locations up and downstream, Chris drilled a hole with a power drill, mixed and poured a small cup of cement, and dropped the tack-shaped cap snugly in. Wilkowske even indulged me and let me give it a ceremonial tap with a mallet I brought along. We then made our way to another location downstream and installed the next benchmark.

A few hours later I joined USGS researchers Mike Freeman and Travis Gibson on their mission to "tie the benchmarks together" with a land survey along the banks of the river. Using large USGS tripods, we took readings every 500 feet between the benchmarks. The tediously precise process of the survey gave me a new respect for all the USGS maps I've casually read over the years.

With the benchmark above Gypsum from last year and the two new ones installed on this trip, combined the land survey data collected between all three, the USGS now has highly-



Above: Mike Dehoff in front of a newly installed USGS benchmark. Below USGS researcher Travis Gibson sets up a survey tripod.



accurate data about the elevations of the benchmarks and the elevation of the river. With this information, the team can make comparisons between the river today and the river's historical elevations, thereby telling us how close the river has come to its original channel. Based off initial data from this year's trip compared to elevation readings from 2019, DeHoff estimates the river channel below Gypsum Canyon rapid has already dropped by about a meter in the past year.

The restoration process on this stretch of the Colorado River is complicated, with a multitude of variables that need to be studied. But the data from this trip will amount to a huge leap forward in understanding the reemerging river corridor, whitewater, and ecosystem. Stay tuned for detailed trip reports from the Returning Rapids trip as this story unfolds.

Ecological Succession in Cataract Canyon

by Seth Arens



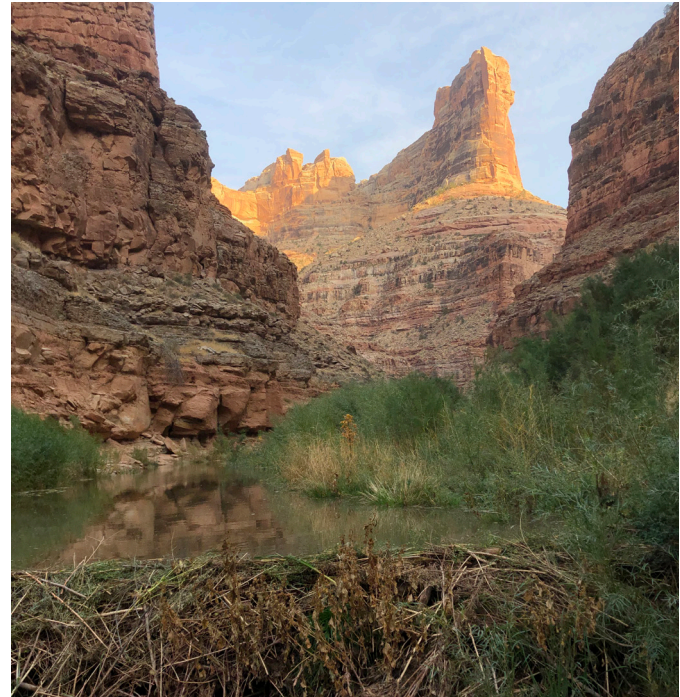
Seth Arens uses a historic photo to match a bend in the river in Cataract Canyon—a technique that tells him how much the plant life is returning to the river corridor. Photo by Eric Balken.

Cataract Canyon is perhaps the most rapidly changing landscape in the United States. Change in canyons of the Southwest is typically measured in hundred thousand year increments as sediment-laden rivers slowly grind deeper courses through desert rock. Lower Cataract Canyon is singularly unique in the speed with which it is changing from a system buried by a reservoir to a recovering and thriving riparian ecosystem.

I first experienced the dramatic changes in Cataract Canyon on a trip in October 2018 with my family and others, including Mike DeHoff of the Returning Rapids Project. Early in the trip, Mike casually mentioned his work to catalogue the changes occurring within the canyon. The changes occurring in the canyon came into clear focus for me on a walk up Clearwater Canyon with my family. After fighting through and around 70-foot tall banks of Lake Powell sediment and the invasive plants thriving on them, I heard my 7 year-old daughter say, “Look Dad, a baby cottonwood!” And sure enough, there was a cottonwood sapling growing in the reservoir-deposited sediments along Clearwater Creek. I was witnessing primary succession in action. Could the barren landscape of reservoir sediments and invasive plants could give way to a healthy riparian ecosystem and how long might that take?

In fall 2019 and 2020, interdisciplinary teams of scientists and river-runners traveled down Cataract Canyon to study the canyon’s rapidly changing hydrology and ecology. The broad goal of this research is to detect and understand the changes occurring to plant communities and what future ecosystems may look like in Cataract Canyon. Data from plant surveys was collected from two tributaries in 2019 (Gypsum and Clearwater Canyons) and three tributaries in 2020 (Gypsum, Clearwater and Dark Canyons). Within each tributary-canyon, plant surveys were conducted at two sites above the high-water mark of Lake Powell and at two sites that were once inundated by waters from the reservoir. Data from a single year can be used to examine differences between plant communities that were affected by Lake Powell and those that were not. Differences in species abundance and diversity and presence or absence of invasive species can be detected with these data. Perhaps the greatest value of collecting plant survey information along lower Cataract Canyon is to detect longer-term changes in riparian ecosystems of the Colorado River and its tributaries. Another tool for detecting long-term change in plant communities is repeat photography; ten repeat photography sites were set up in 2020 to track long-term vegetation changes.

Observations over the last two years show that native



Recovery photos from Dark Canyon. The photo on the left shows plant life returning along the canyon's previously-inundated stream, the second shows one of several new beaver dams in the canyon. The return of beaver populations in this area is a strong sign of a recovering ecosystem. Photos: Seth Arens.

ecosystems and plant communities are rapidly re-establishing in locations that were underwater 5 – 20 years ago. It appears that the first plant species to colonize the sediment banks left by the receding Lake Powell are often invasive plants, such as Russian thistle or cocklebur, but native plants such as willows and cottonwoods also grow. There are many areas along the Colorado River, near the mouth of Gypsum Canyon and in Clearwater and Dark Canyons where native robust stands of coyote and Goodings willow thrive and the occasional narrowleaf cottonwood grows. Another sign of a healthy ecosystem is the presence of beavers and otters. In October 2020, two otters were observed downstream of Gypsum Canyon and signs of beaver were present in many areas along the Colorado River, and in Clearwater and Dark Canyons. In Dark Canyon, two beaver dams are present within 1 mile of the river and in an area that was underwater approximately 10 years ago.

Although only two years of plant survey data exist, one site experienced a notable change. In 2019, a plant survey site in Gypsum Canyon below the reservoir's high water mark was dominated by the invasive plant Russian thistle. When the site was revisited in 2020, a large area of lake sediments that was previously covered with 5-foot tall Russian thistle was completely gone. A medium-sized flood had apparently eroded large areas of sediments in this part of Gypsum Canyon. A short distance away from the recently eroded sediments, relatively robust cryptogamic soil crust was observed growing on lake sediments. This area of sediments likely emerged from under the lake in the early 2000s.

Ecosystems along the river and its tributaries in lower Cataract Canyon have changed dramatically since Lake Powell

was full in 1999. What is the future of these ecosystems? Will they return to the pristine river landscape dotted with cottonwood groves of John Wesley Powell's day or will the ecosystems be something completely different? The answer likely lies somewhere in between. An important legacy of Lake Powell is the deposition of sediments. Lake Powell sediments will be washed downstream from many locations, but roots from establishing plant communities may stabilize soils and prevent further erosion from other locations. The presence of thick layers of lake sediments today presents an important difference from Cataract Canyon before Glen Canyon Dam. There is now relatively nutrient-rich soil for plants to grow, where rocky, poorly developed and nutrient-poor soils existed before the dam. Looking at historical photographs from before the dam, the reach of the Colorado between Gypsum and Palmer Canyons had a few isolated stands of cottonwood trees, but no willows. In 2020, stands of coyote and Goodings willows line much of the river corridor of this reach. Healthy stands of willows now line much of the river corridor below Gypsum Canyon until the river exits Narrow Canyon. If these stands of willows persist and withstand future spring floods, the overall coverage of shrubs or trees would be significantly greater than before the dam and it would represent a marked change from the ecosystem present before the dam. The presence of more willows and cottonwoods would likely lead to a richer and more diverse ecosystem. At this point, the future of riparian ecosystems once buried by Lake Powell is unknown and there is no place in the world where changes like these have been previously observed. The beautiful and dynamic landscape of lower Cataract Canyon is one that deserves continued study to catalogue and understand the canyon's transformation.

Oral Histories: Charley Bulletts on Glen & Grand Canyon

—Interview by Taylor Graham



In 2018, filmmaker Taylor Graham interviewed Charley Bulletts for the documentary film *Glen Canyon Rediscovered*. Bulletts was a member of the Southern Paiute Consortium, a member of the Adaptive Management Program for Glen Canyon and Grand Canyon, and the Kaibab Paiute Tribe’s Cultural Resources Director. Bulletts had a deep wealth of knowledge about Glen Canyon, Grand Canyon, and the surrounding areas that he learned from his extensive family including his grandparents who were traditionalists and healers from the region. Those who knew Charley like Sarah Bauman of Grand Staircase Partners describe him as a bridge builder who helped conservation groups understand the importance of Native voices and culture. He was a believer in education, hosting youth powwows to pass on indigenous knowledge to younger generations and an indigenous “teach-in” to educate nonnatives. Charley passed away in 2020.

TG: Would you mind giving me a bit of the history of the Kaibab Paiute territories in this area and about the folks who lived in those regions?

CB: Well, it just wasn’t the Kaibab Paiute, it was blends of the Southern Paiute from the Antarianunts, and the Kaiparowits, the Kaibab, the Uinkaret, the Shivwits, and also the Moapa and the Las Vegas bands along the Colorado River. And then on the other side we had our sister band, the San Juan, which range from Colorado all the way down to the Little Colorado River, where their ancestral lands go all the way back to Kayenta. And Monument Valley was ancestral land of the San Juan Paiute too.

But right now, we’ve all learned to live together. There are some things we all had to do to actually still be here. It’s like you and your ancestors, your ancestors are not all full-blooded Germans or anything like that, you’ve got a little Swedish or Spanish or stuff like that. That’s kind of the way we view ourselves. Because over the years, over the centuries, we’ve had to take in other bands that were slowly disappearing.

Paiutes are well-known for structured family lifestyles. Small families, taking care of what you guys refer to as “seep springs.” So, there were many along the Colorado River, a lot of seep

springs and areas to farm, and side canyons to farm in as well. That's what we were always told, was that to take care of the water because that's who we are as people, as Paiutes. We refer to ourselves as Nuwuh. But you get further past Shivwits and the Moapa and Nevada areas, and they say Nuwuhvee, which means "people of the land."

TG: Talking about those springs, and the connection, the way people managed those springs. What was the connection to the river? Were there a lot of people who spent time along the river and farmed in those areas?

CB: There was a lot of farming going on. But when you look at it, they say, "all river flows downhill." At that time, all rivers and seep springs flowed to the Grand Canyon. They still do today, but more of them are underground rivers which still connect to certain places, like Paiute Mountain, over there on the Navajo side. Or like San Francisco Peaks, there's still water sources that flow into those mountains that go into the Colorado River. But each spring would flow, especially those that were there around Glen Canyon area that are covered today, some of them still flow and some of them don't.

We have a lot of ties to that area on this side of the river. It's keeping those families acknowledged that used to live around there. Most of them live here in Kaibab. Some of them moved to Shivwits, some of them moved in with the Paiute and tribe of Utah, and the Koosharem and Kanosh bands.

TG: Can you talk more about those families who live there? What their lives were like before the dam and how the reservoir coming up affected them and where they moved to?

CB: For a lot of families that grew up in that area, it was very devastating to have to leave and know you can't come back to the area where you were born. You know, when we're born, when our umbilical cord falls off, we buried that back in the place where we come. To have this place backed up with water was sad because you couldn't go back there, you couldn't show your kids your history. All you can show them is the most powerful element in the world and that's the water that was built up and covering our ancestors, the human remains that are still there to this day.

And the San Juan's say they lost a lot of farms, but they lost a lot of their history with the people they cared about the most. When two cultures meet, you can't stop what they refer to as "love". And you have kids with them, and it's hard. And I think that was my cousins' downfall, the San Juan, was that love for the people that they took in and in and eventually lost their land, lost their land because of the dam.

A lot of people ask, "How do you feel about the dam?" There's no feeling towards the dam, it's not the dam's fault it was there, it's politics. Politics is the reason the it sits there. At the time, politicians wanted to provide electricity for the Southwest, not looking at the longer impacts, because of politics. Politics still leads the way today in everything we look at.

TG: Can you talk about how downstream areas are being affected by the dam?

CB: There's always some kind of conflict or inaccuracy with the science that takes place in the (Grand) Canyon. Since we've

been doing monitoring, a lot of my predecessors have seen a lot wrong with science and people who continue to do the same science, expecting it to change. Since that dam's there, there's no longer fresh sediment and to come in and provide nice farmlands, enriched soil for growing crops. It's really not there. Even with these mimic floods that we have, I've always said that science tends to forget that there's somebody higher than them, and that's Mother Nature. Sometimes she doesn't want certain fish there, sometimes she doesn't want certain landscapes to be open or backwaters to be open for certain species of animals, and it's not our decision to make.

TG: Have you put any thought into the idea of draining Lake Powell, or storing water in Lake Mead if there wasn't enough water for both? What would that mean to the people who were forced to move away, or for the tribe in general, if that became a reality?

I don't know. I don't think there's any good or bad to letting the water out. It's just dealing with the consequences of what the dam has covered and what the dam has possibly lost in certain places. Because, you know, to see the water run free is great. That's something that we as Paiute people say that water should do—it should always run free. When we go to side canyons and see areas where people have built dams to hold back the water to cool off, like in Deer Creek and the Little Colorado River, we knock 'em down and throw the water back because it's not healthy to see something laying there. Water isn't meant to lay like it does there, it's meant to flow like our blood line. You know everybody says that the Grand Canyon is the blood of mother earth. It runs to the ocean, which it doesn't anymore. But I think time only will tell. Hopefully, a lot of it we'll eventually see it touch the ocean and run free through the Colorado River.

TG: What are your future hopes for the river?

CB: Well, a few years back, when they were redoing the interpretive center at Carl Hayden visitor center on the dam, they asked the tribes, "Do you have pictures of the tribal people by the river, before the dam was built?" And we were like (rolling his eyes) did we have people down...? I mean it wasn't like we were down there taking pictures while we were on an outing. We were down there farming and enjoying life. We never took pictures. To us, the pictures were the rock writing. The rock writing that's covered back underneath the dam right now. But it was quite interesting to have that question asked, "Pictures of Paiutes down by the river?"

But I think in the long run, I think that if people start to understand and accept that you can't make change happen, and sometimes change happens slowly, that in an environment such as the Grand Canyon and the Glen Canyon reach or any environment that comes after a dam. The environment factors. As long as people start to broaden their minds and sometimes take a step back and let Mother Nature take her course in healing herself, just like the body heals itself from an addiction or anything like that, our bodies start to heal themselves. That's the way people should view the Grand Canyon and Glen Canyon.

The Fight Against Lake Powell Pipeline Continues

—EB

At a hearing in October of 2020, GCI Board Trustee Dave Wegner digitally testified in front of the Utah State Engineer's Office to protest a water right transfer that would carve a legal pathway under state law to pump water from Lake Powell to Washington County through the proposed Lake Powell Pipeline. Wegner spoke about the onslaught of new climate data projecting lower flows on the river. He also spoke about the delicate balancing act that Basin states are playing with one another—adapting their Colorado River policies in a way that maintain cooperation and prepare for future depletions in the river. Predictably, the Utah Department of Water Resources (UDWR), Washington County Water Conservancy District (WCWCD), and other pipeline proponents ignored this data, claiming the Colorado River will be a “reliable source” of water for decades to come. They provided no studies or data to support the assertions. As of this writing, the State Engineer's Office has not made a ruling on the transfer.

For those observing Utah's relentless push to build the Lake Powell Pipeline, it almost seems like the state is living in an alternate reality. While Utah eagerly attempts to build the massive new diversion, almost every other state in the Colorado Basin gears up for a future with less water, implementing ambitious conservation measures, and in the case of Arizona, Nevada, and California, proactively cutting their use of Colorado River water.

Although Utah maintains its bullheaded approach, the project has experienced a number of eye-opening bumps and twists in the past year, proving what GCI and a number of other conservation groups have been saying for a long time: the Lake Powell Pipeline has always been a poorly planned scheme for Utah to stake a bigger claim of the Colorado. After years of what seems to be an endless saga, it seems the realities of water scarcity are finally catching up with the beleaguered Lake Powell Pipeline project.

Since 2006, UDWR, WCWCD, and the Kane County Water District have spent millions of Utah taxpayer dollars on studies and permitting for the project. When the National Environmental Policy Act (NEPA) process was initiated in 2018, Utah chose the Federal Energy Regulatory Commission (FERC) as the lead agency for its application, claiming that several small hydropower stations along the pipeline corridor merited the project's designation as an energy project. The actual reason for choosing FERC is likely that FERC Environmental Impact Statements (EIS's) tend to move quicker and with less public oversight than with other agencies – a fast track expected to be helped by a friendly Trump administration.

But the tactic backfired in 2019 when FERC withdrew itself, declaring it couldn't act as the lead agency for what was clearly a water project. The state had to restart an entirely new EIS

process, this time with the Bureau of Land Management, the National Park Service, and the Bureau of Reclamation managing NEPA permitting. Having already spent \$34 million dollars on the FERC EIS, restarting an entirely new EIS with different agencies reflected how haphazard Utah's approach truly was.

And then another hiccup emerged: Kane County, second of the original three counties involved with the pipeline, surprisingly dropped out of the project. Iron County was also originally part of the proposal and dropped out in 2012. After 14 years of telling the public that they absolutely needed additional water for future growth, Kane County water officials stated that new population projections show they didn't have a “foreseeable need” for a new water supply. It's worth noting that the Kane County arm of the pipeline was set to deliver 4,000 acre-feet of water to the Johnson Canyon area, only a mile from the extensive ranch properties owned by Mike Noel, Executive Director of the Kane County Water Conservancy District, former state legislator, and longtime champion of the pipeline.

With the Bureau of Reclamation acting as lead agency, a new EIS began in 2019, and a public comment period opened up over the summer. Along with our partner organizations fighting the project like Utah Rivers Council, Conserve Southwest Utah, Living Rivers, and Center for Biological Diversity, GCI and its members submitted extensive comments opposing the project. The EIS received a sizeable 14,000 comments in total.

The biggest blockbuster came in a comment letter not from a conservation group or concerned citizens, but from the six other Basin states asking the federal government to halt the pipeline EIS. In an unprecedented move, Wyoming, Colorado, New Mexico, Nevada, Arizona, and California submitted a joint letter asking that the project be put on hold until all the states can “identify consensus solutions to the interstate questions that the Lake Powell Pipeline raises for the entire basin. That work is undeniably best undertaken as part of a seven-state process rather than as an incident to the NEPA process or ensuing litigation with third parties conducted by courts.”

Aside from the fact that the pipeline throws a wrench in basin-wide drought planning currently underway, the pipeline would also violate a longstanding rule of the Law of the River preventing inter-basin transfers. While Washington County is in Utah, an Upper Basin state, it is in the Virgin River drainage, which feeds into the Lower Basin. Not an inconsequential detail, the inter-basin transfer was apparently something Utah hoped wouldn't raise any red flags. The letter stopped short of threatening litigation over the issue, but mentioned the possibility several times.

As Anne Castle, former Obama Assistant Interior Secretary

put it, “In the past - when that kind of transfer was occurring, specifically with the Navajo-Gallup Water Supply Project, congressional authorization was obtained. They’re suggesting that it may be necessary for the Lake Powell pipeline to have congressional authorization as well.” The Navajo-Gallup project transfers water from the San Juan River to the Navajo Nation and Jicarilla Apache Nation.

Nevada even issued its own letter against the pipeline, insisting Utah do more to increase its conservation efforts before tapping new water from the river. Nevada has implemented noteworthy municipal water conservation efforts over the past two decades - daily per capita use in Las Vegas is

203 gallons per day, compared to 302 gallons in St. George.

The Law of the river, the overriding policy of the river, is a complex framework of compacts, legal decisions, and interstate agreements that has historically operated with states cooperating with one another in a way that doesn’t interfere with each other’s use of their Colorado River allocation. To say this intervention is a big deal would be an understatement. It’s a clear sign that reality may finally be catching up to Utah’s water developers, and that “business as usual” no longer works in the Basin. Whatever lies ahead for the beleaguered Lake Powell Pipeline, GCI will continue fighting the wasteful project with our members and conservation partners.

2020 Outreach and Education

—JS

In February, GCI’s outreach season began with a panel discussion at the Future of Lake Powell forum in Moab, hosted by Utah State University’s Center for Colorado River studies. The event showcased a number of scientific studies on the river and a policy panel discussion about the future of the reservoir. Joined by Eric Kuhn, former general manager of the Colorado River District, and Matt Rice of American Rivers, GCI made the case for Glen Canyon’s full restoration in front of the audience at Star Hall Theater.

Then as March rolled around, COVID-19 was declared a pandemic and went from a far-off news story to an uncertain reality that we would be living with for the foreseeable future. Here in Salt Lake, ski areas, bars, restaurants, and schools all closed. People stayed at home. Stores implemented mandatory rules to help limit the spread of the virus. At GCI, all of our normal tabling and outreach events were immediately canceled. We made the difficult decision to cancel our annual member river trip—breaking an almost decade-long streak of member trips. For much of the spring and summer, our outreach and education was put on hold.

But, like with many things in this trying time, there are some silver linings. With extra time on our computers, we were able to refocus on our digital presence. We created an updated Lake Powell Pipeline information page which we have been adding to and updating as that fight evolves. Through this page, we rallied a large number of our members to submit comments against the project.

We also took advantage of digital tools to adapt our Colorado River Roadshow. We joined the 2020 Colorado River Days, where we screened *Glen Canyon Rediscovered* and spoke to many people from across the Basin that joined the Zoom presentation. We have also used Zoom to talk to students from Utah and Colorado working on projects around Glen Canyon, informing a new generation of advocates for the region.

As summer ended and temperatures in the desert became more inviting, we got better clarity about how COVID spreads and how we could safely conduct field trips while protecting ourselves and others around us. By wearing masks while inside

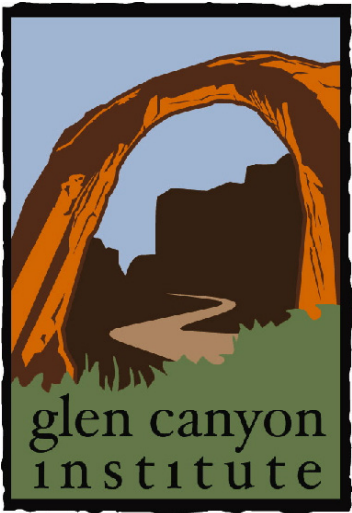
or near others, making sure to wash hands regularly, and maintain physical distance from people outside our group, we were able to safely take several trips into Glen Canyon.

Two of the trips were with the Adventures Cross Country (ARCC) gap year program, which brings post high school students from around the country out on a 70-day adventure. They learn about different cultures, landscapes, and a variety of issues. They also get to see some of the most amazing places on the planet. Usually, they travel internationally but because of Covid they created a “southwest” trip wherein they could do all of their exploring in the U.S.. The group conducts routine Covid testing and travels as a pod, creating a safe and educational experience for the students.

We were lucky enough to make two trips down to Escalante to meet and hike with the students, teaching them about the amazing restoration happening in Glen Canyon’s side canyons. We hiked through the twisting red rock, way off the beaten path following seep spring flows, cobbled canyon bottoms, and the Coyote willow and cottonwood trees. We saw Ancestral Puebloan rock art in arching grottoes. Beavers had retaken a huge section of what was once reservoir. We discussed the history and future of Glen Canyon and the canyon country. Both the students and our staff were very appreciative of the time spent out in the desert surveying the restoration of Glen Canyon.

Here in Salt Lake, outdoors physically-spaced events have begun to incrementally return. We presented and tabled at a benefit for a multi-group event focused on inclusion and diversity in the outdoors community. We were proud to be a part of the effort to help people from all backgrounds feel more welcome in the places we love.

Until a vaccine or effective therapeutics for COVID-19 are widely available, GCI will continue to adapt our outreach efforts with public health and safety in mind. Like everyone else, we are making the most of uncertain times and remaining grateful for the outreach and fieldwork we have been able to do. Our main hope is that all of our members and partners stay safe while we ride out the pandemic.



3090 East 3300 South
Suite 400
Salt Lake City, UT 84109

ADDRESS SERVICE REQUESTED

"As long as people start to broaden their minds and sometimes take a step back and let Mother Nature take her course in healing herself, just like the body heals itself from an addiction or anything like that, our bodies start to heal themselves. That's the way people should view the Grand Canyon and Glen Canyon."

—Charley Bullets

A pictograph panel once submerged below Lake Powell now sees the light of day in lower Cataract Canyon. Photo by Eric Balken.

