



Exploring the Arizona Strip by Sabrina Carlson

The morning of April 28, 2016, the 23 students of Ms. Cole's 3rd and 4th grade class from Flagstaff Junior Academy gathered in their classroom to pack and organize their camping gear for an overnight trip to Lee's Ferry, part of the

Glen Canyon National Recreation Area on the Arizona Strip (the narrow strip of land between Grand Canyon and the Utah border). Each student was carefully checked in to ensure they had all of their camping gear, permission forms, and personal needs arranged. After each student was assigned to a parent vehicle and packed and ready to go, the long line of cars began their caravan to Lee's Ferry.



First peek at the Colorado River!

Our first group stop was at Navajo Bridge where the students peered over the newly converted pedestrian bridge to take in the bright green hues of the Colorado River. We contemplated the intense green color of a river once named for the "color red" and pointed out that the color and temperature of the river just below Glen Canyon Dam was quite different than in places where sediment has entered the river from tributaries. We discussed the benefits and downsides of damming a river and gave the students a chance to voice their opinions about it.

We also visited the historical signs around the visitor center and talked a bit about the history of the ferry, and later the construction of the bridge. It is hard for modern children and even adults to imagine a world without travel by automobile or airplane. But in the days before the ferry, connections between the Arizona Strip and the rest of the state to the south were long, arduous, and often times impractical.

After finishing our visit to the bridge, we continued on to the campground. Once settled and set up for the night, we all hiked to the beach for our first lesson. Having studied watersheds all year, the class was prepped for our practical experience.

We began by searching for macro invertebrates, the tiny creatures that form the foundation of the food chain in an aquatic ecosystem. Often referred to as "water canaries" or "benthic bugs," certain invertebrates tend to indicate the health of the water being studied. Many of the areas, like Marshall Lake near Flagstaff, are teeming with life and are abundant in a variety of species. But the Colorado River yielded very little. All we inspected was a few beetle type creatures and one worm. If we had been able to get further out into the middle of the channel, would we have found more? It's possible, but as it turns out, the Colorado River is considered one of the most endangered river ecosystems in the world. Yikes!

After our fruitless hunt for insects, we switched gears to play a very physical game to demonstrate our over consumption of water resources and the real struggle many families around the world face to obtain daily, clean water. We began by learning that the average American family of three uses about 200 gallons of water every single day, even in arid climates. Water comes very easily to us when it can pour right out of our shiny taps. Clean surface water in the Colorado River Watershed is an ever-dwindling resource with many competitive stakeholders drawing millions of gallons each year. But not everyone in the world comes by water so easily. In many parts of Africa and Asia families are lucky to have clean water within a two-mile walk from their home. This water must be collected and carried in buckets and containers and then walked back to their homes for use. Water is HEAVY, so this means that families must make multiple trips to water sources to collect enough every day, sometimes in unsafe conditions.



The long haul!

To illustrate this challenge we divided the students into three teams for a water hauling relay race. One at a time, teams would run to the river with a one gallon bucket, and return it to their “home,”



Try not to get sand in it!

to fill a 20-gallon tub that was roughly 30 yards away. The first team to fill their tub would win. At first the excitement and energy was running high! Students ran as fast as they could, laughing and splashing water all around. But as they began to fatigue and the water level of their tubs grew slowly, each team began to move a bit more deliberately. If they could help it, no one wanted to spill or waste any water. Filling these 20-gallon bins was tiring work, even with help. Let’s also keep in mind that this is TEN TIMES LESS than the average American family uses in a day.

When at long last the teams had filled their bins, we talked about the experience. They all agreed that gathering 20 gallons from a short distance away was incredibly hard work. We tried to picture what it would be like to have to carry water like this for miles, especially if you were the only one in your family who could do it. You would spend your day doing nothing but gathering water! It’s tough to leave time for school, games, sports, or fun with all that water hauling to do. We agreed that 200 gallons of water a day in an American household seemed quite excessive.

Our next lesson was led by a parent volunteer, who also happens to be a fish biologist working for the USGS right at Lee's Ferry! She taught the students about their efforts to study the populations of rainbow trout (a non-native species favored by anglers) and the humpback chub (an endangered native species that competes with the rainbow trout for food and habitat). She explained how they have learned that the chub prefer the confluence of the Paria River, which is farther downstream of Lee's Ferry. The trout actually prefer the colder and clearer water of the water from the dam to the ferry. But when trout populations get too high, there isn't enough food for them in their preferred area. This drives them into the chub's habitat where they dominate the chub's food sources. Over the course of a five-year study, she has seen the population boom to over a million from the dam to the ferry, and eventually drop back down to about 100,000 in the same area. With large numbers of trout, food can be scarce, and the chub population is threatened. But when numbers are low, everybody wins! There will be plenty of fat and happy fish for fishermen, and the chub can live unperturbed. She led the students in a fun game where they got to act out being trout in a confined space as the population grew and grew until they finally could no longer fit. It was a very illuminating lesson and a lot of fun, too.



Learning about trout!

The next morning, after a hearty breakfast and packing up our camping gear, we started the day with the usual class circle, some simple yoga and some centering exercises. Afterwards, one lucky student got to have her birthday circle at the campground! Ms. Cole has a special tradition for celebrating each student's birthday. While students sing Happy Birthday, she has them act out the number of years they have been on earth by walking around the "sun." What a special place to celebrate a birthday!



Artists at work

Ms. Cole then gave the students a watercolor art lesson on how to use the texture they see in nature to create a piece of art. Everyone got to work sketching their scenes and painting the colors they saw. It was fun to watch them each focus in a different way. Many painted the big picture of the canyon wall, and the river ribbon rippling through it. But some painted a yellow car that drove down the road, or the water tower in the distance. It was beautiful to see all the different perspectives.

Once everyone finished painting, we caravanned down to the boat ramp to watch some river trips prepare to launch, and to have one more watershed lesson. We built miniature watershed models with metal pans and sponges. We tested the rate and volume of flow through our little watersheds with and without sponges in the tray.

The sponges represent wetland areas within a watershed. With wetland, water loss was slowed and habitat created. Without wetlands, the water just ran through in seconds.



Observing the transition in the layers

Our very last activity before driving back to Flagstaff was a hike down into Cathedral Wash. This beautiful slot canyon demonstrates the carving power of water and shows the distinct layers that are revealed the deeper the canyon gets. Here the students took a quiet moment to create a sound map and write in their journal. Though we had hoped to hike further, storm clouds were gathering. Flash floods are nothing to mess with in canyon country, so out we hiked.

We all made it back to our cars just as the rain poured down. It was as if Mother Nature was affirming how beautiful our trip had been, and how impeccable our timing was.

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