

## Episode 49: River Guides & River Science

[intro clip]

Hello, my name is Susan Washko, and welcome to Making Waves, brought you by the Society for Freshwater Science.

When people think of whitewater rafting, they think of a tourist activity or an outdoor sport. However, there is a surprising scientific application to rafting. Much like skiers can collect avalanche data, river guides can collect river-related scientific information. In addition to the public education that river guides do, they also contribute to ongoing studies and knowledge pools. To learn more about this, let's take a journey to the Grand Canyon, where we'll talk with river guides and river scientists, who might just be one and the same.

My first guest is Anya Metcalfe, an ecologist with the USGS Grand Canyon Monitoring and Research Center, who can tell us about ongoing science and collaborations with river guides. Then we'll speak with Nikki Cooley, a Diné woman who considers herself a recovering river guide and is currently the co-manager of the Tribes & Climate Change Program through the Institute for Tribal Environmental Professionals at Northern Arizona University. Nikki will tell us how river guiding connects to indigenous traditional knowledge.

**1.** Hi, Anya, welcome! Can you tell us about what kind of work you do in the Grand Canyon? (and if you were ever a river guide, let us know about if that influenced your career choice)

**Anya:** Hi Susan thanks for having me. I study the downstream effects of dams and dam management practices on aquatic insects. In Grand Canyon, that means looking at the effects of Glen Canyon Dam on about 300 miles of Colorado River all the way down to the top of Lake Mead, which is formed by Hoover Dam. I've never been a commercial river guide, but I am a river runner and my interest in descending technical whitewater has absolutely influenced my career choice. My first river trip in Grand Canyon was a course during my undergrad at Prescott College. It was a 25 day November rowing trip. For my class project I kicknetted the river for invertebrates at camp each night, as possible, and up in every perennial tributary we stopped at. That was about 10 years ago, I was hooked! I moved to Flagstaff after graduating and have been rowing rivers and chasing bugs since.

**2.** I've seen your publications about the Colorado River's aquatic insects, and a lot of data collection occurs through river guide-facilitated citizen science. Can you tell us how that works?

**Anya:** So... collecting bugs in Grand Canyon is hard. The river is – notoriously – very deep and cold and swift. So much so that it has its own whitewater classification that runs on a scale of 1 to 10 instead of 1 to 5. There are few places where you can safely sample the benthos for aquatic insects. We mostly drift sample off of motorboats. However, even a safe sampling method figured out, we've still got to access our study sites. Even with motors, sampling in Grand Canyon happens within the context of multiweek expeditions so the logistics and costs of putting

science trips on the water is limiting. In 2012, we started sending river guides out with light traps to sample emerging insects. Sampling adults is a bit unusual for a monitoring program, but we found it to be a safe and easy collection method where all the gear and samples for a 3 week trip can fit in a single ammo can. Now, during the peak of the commercial boating season, we get as many as 6 or 7 light traps deployed per night from campsites that are widely spread throughout the canyon. The spatial and temporal scale that we are able to sample on by working with river guides is something we simply could not achieve on our own.

**3.** What do you want people to know about river guides and science? (conservation applications, career advice, clearing a misconception, ...? up to you, feel free to change the question to suit your needs)

**Anya:** River guides are floating the same sections of river over and over again through different conditions and seasons. It is literally their job to pay very close attention to the river and their surroundings. This makes them incredible resources for scientists to learn from as they are constantly making observations in the field. While it is also our jobs, as stream ecologists, to pay attention to rivers, most of us simply don't get as much time on the water as guides do. If you want to know about flows, wildlife, vegetation, the best beaches, or the buggiest time of year on a river... ask a river guide.

**4.** OK, the last question is a fun question. In my opinion, the Colorado River is one of the most amazing rivers in the world, I find it really inspiring— what is your favorite thing about the river or the basin?

**Anya:** I totally agree! It's a one-of-a-kind river. The Colorado is like the giving tree for the entire western United States. It gives us water for our thirst and hunger, it gives us energy in the form of hydropower, and it gives us incredible recreational opportunities and mind-bending scenery – it carved the Grand Canyon after all! But also like the giving tree, it sometimes seems that all of our human demands are reducing the river to a stump of itself. My favorite thing about the river is when it reminds us that it is still wild. For example, in the summer of 1983 more than 120,000 CFS raged down Cataract Canyon, filled Lake Powell, and nearly took out Glen Canyon Dam. It was a little reminder from the river that we really can't control everything.

That's such a great reminder. I love thinking about that—how big of a hand humans have in the way the Colorado River is at present and how much conservation needs to go into protecting it further. On that note, we should talk about traditional knowledge and conservation and science. So, thanks so much, Anya, great speaking with you!

The Grand Canyon is sacred to many different indigenous groups in Arizona that have called the Grand Canyon home for thousands of years. Over those thousands of years, they have accumulated a lot of information about the Colorado River and the other streams in the area, continuously passing the information to the next generation. This type of knowledge is called traditional knowledge, and in addition to being a way of life, it's a type of science because it's based on observations. Nikki Cooley is part of the Diné Nation, known to many as the Navajo

Nation, and she can tell us more about how river guiding, traditional knowledge, and science intertwine.

5. Hi, Nikki, welcome to *Making Waves*. Can you tell us about how you became a river guide and scientist?

**Nikki:** Ahéhee', Susan. Thank you for that kind introduction and thank you to the Society for Freshwater Science for the invitation to be here on the Making Waves podcast. Before I move on, I'd like to introduce myself in the Navajo way:

*I am of the Towering House clan, I am born for the Reed People, my father's clan. My maternal grandfathers are from the Water That Flows Together clan, paternal grandfathers are from the Many Goats clan.*

I grew up in Shonto and Blue Gap, Arizona, on Diné Bikéyah (Navajo land). I currently reside in Flagstaff, Arizona. For almost 13 years, I was a commercial river guide working oar and motor trips on the Grand Canyon Colorado River, but also up in Utah on the San Juan River, where I really learned how to navigate a boat. I love to tell the story of how I became a river guide. I am lucky enough to be mentored by some amazing men and women, but notably here, my friend Kristen, who has since passed on, introduced me to these gatherings that invited San Juan and Grand Canyon guides at the end of the season, or towards the end of the season, where I met this wonderful woman, Laura, who was one of the first female river guides in the Grand Canyon. She asked me if I was ever interested in going on the Grand Canyon, and I said, yes, and she proceeded to ask me if I was interested in going on a Grand Canyon trip as an assistant. She explained to me that I would have to unload, pack, help cook, and then hike out at Bright Angel trail. When she told me that, I was excited instead of being daunted by what seemed like hard work as she explained it. I was never, and still am not, afraid of hard work. I then went on Grand Canyon, and I remember being at Lee's Ferry, where I stepped to the boat, and as we started floating down, I felt very much at home and very comfortable. But also, along the way, I realized that there was a great need for me to tell my stories of my people to the clients who were on the trip but also the river guides themselves. It was better to hear straight from a native person rather than maybe hearing it thirdhand from somebody who heard it from so on and so on. I wanted to make sure that the stories were accurately told, and that's where, as you said, Susan, traditional knowledge really became a big part of my life and my work. It has always been a big part of my life, but it's also kind of transferred into my work as an indigenous scientist. My grandmothers have always told me that we are the original scientists of the earth; us humans have been observing the environment, the skies, the animals, since time immemorial, since we were first created to be on Mother Earth. So that led me to Northern Arizona University where I received two degrees in Forestry, with my master's having an emphasis on traditional ecological knowledge. I was mentored by some amazing people, such as [Tom Elkos, Wally Covington, Ron Chosper?], but also mentored by Gifford Pinchot and Aldo Leopold through their many writings. So, in a sense, when you asked me how I became a scientist, I always have been one, and then I got trained in the Western way of being a scientist. So, that is, I guess, my answer to that, that we are all scientists because do trial and error throughout our lives, we do observations on what works best for us to live our best lives and whatnot. That is a great question.

6. How are river guiding and traditional knowledge connected?

**Nikki:** So as a guide, whether you're going down the river or down the trail, the whole premise of your job is to keep your clients safe and to give them an experience that they will never forget so they can return or recommend the same journey to their friends or family. In addition to that, you want to connect people to the area, the region that you are guiding them through. You want to connect them to the history, whether it's geologic or the botanic or the ancestral history. And when I say ancestral, I mean and I refer to the people who used to live there. They're referred to as the Anasazi, or ruins, you know, those are some of the terms that are used. But for us indigenous people, we feel that they still live there through their spirits, because they made a home there, someone was born there, someone died, someone cooked a meal, made a pot, or caught a fish there. We really try to convey that part of our history to the people and how important the area where they resided was to them and to the survival of their people, and how they would journey dependent on what season it was. So, a lot of that you learned through reading books or listening to a lecture from a university anthropologist, or perhaps a nonprofit that's hosting someone that has the knowledge about the region you are guiding in. Along with that comes the traditional knowledge, that's also referred to as indigenous knowledge or local knowledge. I like to say local knowledge because that's more inclusive of people beyond indigenous or native communities because there are a lot of our relatives who came from overseas, settled here, migrated to this area, and they may have German roots or African roots. They learned how to survive in the area in which they live, they have lived, and now us as their next generations, we're learning how much they survived through the hardships, whether it was through the lack of money, or the lack of jobs, the lack of food, or even major weather events. So, when you ask the question of how river guiding and traditional knowledge are connected, I believe it's the knowledge that's the key word there. Traditional knowledge is passed down through generations, and it used to be all done in the oral way of doing it, verbalizing it to the next generation. I mean, that's how I learned about the different plants that are used for medicine, for jewelry, for ceremonies, and you could say the same for river guiding. Some of that knowledge is passed down through river guides, and I learned how to row from these amazing women that had been doing it for a long time prior to my arrival. You know, the landscape changes and people change also; there's always a better way of doing things, and it's up to you to ask those questions but it's also up to you to ask, or should I say to hear what people are saying and how they're passing down that knowledge to you. So, it's intergenerational teachings that really make that connection between river guiding and traditional knowledge.

7. What role does traditional knowledge or local knowledge play in the conservation of the waters of the Colorado River basin? (Perhaps in terms of climate change as well? Can the scientific community or the public do more to support those conservation efforts?)

**Nikki:** The role of traditional knowledge, and as I said before, also known as indigenous knowledge or local knowledge, in conservation and climate change adaptation and mitigation is steeped in the tribal indigenous history of the Colorado River Basin, where there are currently 24 tribal nations, and more that are unrecognized by the federal government and Western society. Before the onset of settlers, tribes were maintaining the balance of subsistence food gathering, growing, and harvesting, including hunting, while ensuring that the waters and the lands were not polluted or overused. They maintained that respectful balance between give and take. As I mentioned before, traditional knowledge is an intergenerational method of maintaining the foundational knowledge of conservation, of caring for the land. This was done as a community,

with other tribes. But, after the tribes were forced of their lands and forced to sign treaties, downgrading them to smaller tracts of lands called reservations, where the ecocultural resources were unavailable. They were foreign, unrecognizable, and in some cases, overused. The act of forcing tribes to the confines of reservations essentially created a domino effect of the lands, waters, and animals being managed instead of being respectfully cared for. There came the centralized framework of land management, which created an oppressive set of regulations, created/developed by people who were not from the area. Consequently, traditional knowledge of the tribes, of the local communities, was seen as hearsay and anecdotal. But, through the persistence of tribal indigenous peoples, this is finally being seen as the true science that it's always been. Susan, I strongly believe that the scientific community, notably the Western scientists, and the public, can always do more by supporting the role and the use of traditional, indigenous, local knowledge in conservation, adaptation, and mitigation efforts by the tribal indigenous, and local communities. It's absolutely imperative that we have the support of the scientific community because it builds that bridge between Western scientists and the indigenous scientist traditional knowledge-holders. You all here listening today, you have the platform to support and advocate for those of us who are trying to care for our mother, the Earth, Father Sky, and all of the animals. Your voice and support can elevate our efforts, and in doing so, we are working as a community to care for the land.

**8.** As I said to Anya, I think the Colorado River is so inspiring. What's your favorite thing about the river or the watershed?

**Nikki:** Thank you, Susan. I think that's a great question that we should all ask ourselves: what do we find inspiring about water, and in this particular conversation, the Colorado River watershed. The Navajo term *tó éí ííná*, water is life, speaks volume to how much our lives depend on water. Not just our lives, but also Mother Earth and all of her children and all of our relatives, meaning the animals and the plants, depend on water. We all know that around 60% of our bodies are water; we cannot survive without it. The Colorado River watershed sustains millions of plants and animals, but also communities across seven states. That is amazing. Because of that, we should do better to try and preserve what we have now and what we could have by respecting water so our future generations can have what we are enjoying today, and also for the survival of all the plants and animals. The biodiversity of our environment is really important to the survival of our planet. But also, the Colorado River watershed is full of history, whether you enjoy John Wesley Powell's stories, or the stories of my people, the Hopi, the Paiute, Havasupai, Hualapai, and all of the other tribes who hold the Colorado River Basin a very culturally significant place. We all can do better so we can have what we have now but better in the future.

**Susan:** Thank you so much, Nikki, it's been a joy to speak with you and learn from you today.

**Nikki:** Yes, Susan, I would like to thank you for the invitation to speak on Making Waves. I've really enjoyed our time. And thank you for the questions, because I feel like these questions inform the larger community of the different perspectives that are out there, and this is often a perspective that is not always included in conversations. So, I really appreciate you and the Society for Freshwater Science using the platform to include our voices. So, thank you all for listening, and I hope to catch you downriver someday. Thank you.

**Susan:** Today's guests gave me so much to think about. The hardworking scientists involved in understanding the Colorado River include not only the kind of scientists that we know from the Society for Freshwater Science, but also river guides and everyone else, particularly the indigenous peoples of this area who have such a long history with the watershed. Bringing all these groups together is the best way to protect our precious water resources, such as the Colorado River and tributaries in Grand Canyon.

I'm Susan Washko; thanks for joining us for this episode of *Making Waves*.

[outro clip]