

# A Tale of Two Rivers



**UNIVERSITY OF  
GEORGIA**

**Jessica Chappell**

University of Georgia  
Odum School of Ecology

Integrative Conservation Program (ICON)



**Oregon State  
University**

**Erin Abernethy**

Oregon State University  
Integrative Biology Department





**R**obert Paine said that the most successful graduate students are the ones having the most fun. Having good friends who are fellow graduate students and maintaining those connections as folks enter the workforce helps make a successful career probable. While graduate students are encouraged to interact with established professionals, forming lasting connections with peers is also critical for creating an emotional support team and developing a network of young collaborators.

## Graduate School Initiating Connections

“Which way?” Jess yelled to Erin, who was paddling out front.

“No idea! Last time I was here was 10 years ago!” Erin grinned over her shoulder at Jess’s expression of excitement and anxiety.

Erin loved paddling into the unknown, confident that she was prepared. Having paddled dozens of whitewater rivers around the world, Erin expected a fun trip with Jess on the intermediate whitewater of the Chattooga River in North Georgia. But still, Erin didn’t know any of the routes through the upcoming rapids. She and Jess would have to trust themselves, rely on previous experience, and figure it out as they went. Paddling is a lot like graduate school in that way, which is fitting because that’s where Jess and Erin met.

Jess and Erin connected a couple of years before their Chattooga River paddling trip

at the University of Georgia, where Erin got her Masters and Jess is working on her PhD. Erin wanted to run her first 5k before moving across the country to start her Ph.D. at Oregon State University. Erin sent a graduate student-wide email asking if anyone wanted to run with her, and Jess responded.

During the race, Jess started talking about her Ph.D. research studying dam impacts in Puerto Rico. Erin hadn’t realized that Jess was doing her PhD research on dams, which was what Erin was moving to Oregon to study! Recognizing an opportunity to strengthen both their support and professional networks, Erin and Jess committed to growing their friendship and research collaborations while on opposite sides of the country

### Building a Network You Can Trust

After a stretch of slow-moving water, the Chattooga River started to roar. Erin and

Jess were being pulled towards a deafening waterfall. Erin paddled up to the edge, surveying the river for a path free of rocks. Jess followed close behind, trusting Erin’s expertise more than her own.

As Erin’s kayak began to go over the waterfall, she turned and yelled, “Don’t go this way!” before disappearing. Jess fought back a panic attack, waiting for Erin to pop up below the rapid. A few seconds later, relief flooded Jess when she saw a grinning Erin appear downriver. Erin pointed out a less rocky route, and Jess successfully flew off the 6-ft drop to the river below.

“Perfect!” Erin yelled, grinning as Jess gave an adrenaline fueled-cackle. Jess glanced at the jumbled pile of rocks Erin had paddled through and shuddered, glad she had an experienced kayaking partner she trusted.

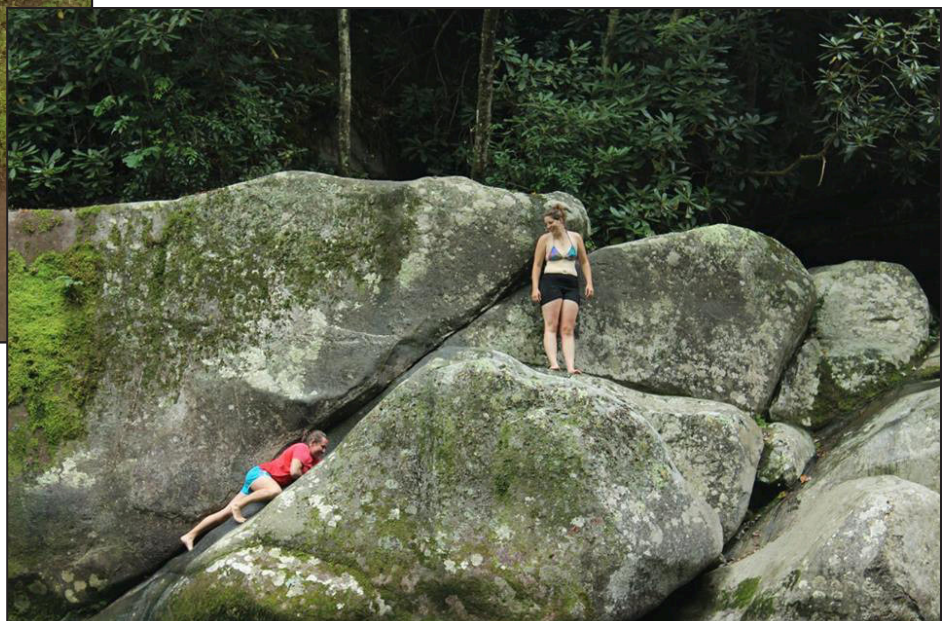
But keeping up with all your inspirational graduate friends, in addition to new research in your field, can be challenging.

To strengthen their connection after Erin moved, Jess and



Left: Jess (left) and Erin (right) at the Chattooga River. They'll have to rely on their previous experience and each other to navigate down the river, much like navigating graduate school. Below: Jess and Erin at the 2017 Ecological Society of America meeting in Portland, Oregon. Professional meetings are where young researchers make new connections and strengthen existing collaborations.

Below: Jess (left) and Erin (right) at the end of their Twilight 5k run in Athens, GA. It was pouring down rain for most of the run, but they did it! Erin waits while Jess climbs up the rock face. Successful graduate students network with each other and make sure to have lots of fun.



Erin started a cross-continental book club, focused on something they were both researching and passionate about: dams.

The first book they selected was *Silenced Rivers: The Ecology and Politics of Large Dams* by Patrick McCully [2]. Since their projects both deal with the ecological impacts of dams, Erin and Jess were aware of the consequences for stream animals when a river system is dammed. But they didn't realize how global these issues are, or how severe the social consequences can be.

McCully details dozens of instances in which entire human communities were forcibly removed with inadequate or no compensation so that a dam could be constructed. Millions of people have died because of improper dam management, which includes everything from poor placement to failed dams. Shockingly, these issues are on-

going today. This past summer, an unfinished dam collapsed in Laos, killing over 30 people and displacing thousands.

Discussing the book and their projects, Erin and Jess began to see how their ecological research fit into the larger conservation conversation surrounding dam construction, management, and removal. Additionally, over these weekly phone chats, Jess and Erin covered more than just dams. They talked through dissertation ideas, advisor relationships, and learned from each other's experiences.

Communicating thoughts about McCully's book and each other's dissertations while also self-reflecting, Jess and Erin practiced valuable communication skills that have helped them grow their professional network at conferences and home universities, critical for success in graduate school and conservation careers.

## Get to the Dam Research

Erin's dissertation research examines the effects of large dams on aquatic invertebrates in the Colorado River Basin. The Colorado River Basin stretches over seven states, and its dams supply drinking water to 30 million people, irrigate 4 million acres of cropland, and generate >10 billion kilowatt-hours annually (enough to power a million homes) [3]. While clearly important for humans, the dams on the Colorado

River do have unintended consequences for animals. Erin's research characterizes how the aquatic invertebrate communities immediately downstream of large dams on the Colorado River are dominated by just a few species. Additionally downstream of one dam, Erin will model how insect population sizes respond to certain river flows (like a flood), and she will compare the relatedness of insect populations living in small side



streams of the Colorado River. This research will detail dam flows that benefit insects, which are the base of the aquatic food web and critical to many of the world-class fisheries in the Western USA.

Jess' research is focused on the effects of small dams in Puerto Rico, specifically El Yunque National Forest. You probably wouldn't think of a national forest having dams, but these small dams (less than



5-ft tall) provide drinking water to thousands of people on the island. Unfortunately, this drinking water comes at a large ecological price. These dams can completely block water moving from the river down to the ocean. Without this water, animals that complete their life cycle by moving from the river to the ocean can't make this journey. Eventually these migratory animals won't be found in rivers where water doesn't flow to the



ocean. This is a big problem for freshwater shrimp, the most abundant animal in Puerto Rican streams. Shrimp are very hardworking, filtering river water and scraping algae off rocks in the river bed. If these animals are lost, the river becomes overrun by green algae. Since the main ways people rely on the forest is for drinking water and swimming, losing animals like shrimp harms humans as well.

Humans are now aware of the ecological consequences of dams, even small dams. Weighing dam costs and benefits, the question arises: are the trade-offs balanced? In addition to ecological and social costs, dam maintenance comes at a significant economic cost. Sediment builds up behind dams and needs to be dredged regularly for intakes to function. The actual structure of dams needs to be inspected and reinforced to prevent failure. All this combined with ecological and social impacts has people questioning world-wide if dams are worth the continued investment. While Erin and Jess both agree dams provide valuable services, they also believe there are dams that should be reevaluated. If these dams aren't worth continued investment due to ecological, social, and economic costs, then it may be time to consider removal.



Left: Juvenile freshwater shrimp, climbing along the river shore, returning from the ocean. Shrimp do not migrate upwards if there is no water in the channel, and populations will eventually die out (credit: Luquillo Long Term Ecological Research Project). Top: Erin participated as a scientist on two raft trips down the Colorado River with Grand Canyon Youth and the US Geological Survey. She taught high school students the importance of sampling aquatic insects. Above: Erin poses in her inflatable kayak on the Chattooga River. Erin led Jess down a 10 mile stretch of Class II and III intermediate whitewater. Right: Jess and Erin celebrate a colleague's wedding in September 2018. Who knows what's next for them after they finish their PhDs.



# Create a Career From PhD

Jess and Erin plan to pursue leadership positions in conservation to directly affect how freshwater is conserved and managed in the United States. Though they recognize that career plans change, they see importance in developing their plans for the future. Writing a career plan helped them determine which connections and skills they should focus on developing in graduate school to be most effective and competitive in their chosen careers, whether it's in academia, agency, non-profit, etc.

If it seems like Erin and Jess have it all figured out, it's only because they've been thinking about these issues for a while. Over the last several years, they've learned the importance of a support network, but also the necessity of relying on yourself. Although PIs and advisors can encourage graduate students to explore various career paths, students must often seek advice independently. Academics may only know academia, so it has been helpful for Erin and Jess to talk with conservation researchers working for agencies and non-profits. Erin and Jess have learned to maneuver within their contact networks, pushing for introductions to researchers working on projects they aspire to be a part of.

Additionally, they've pushed for and attended department-sponsored events in which graduate students talk with professionals involved in con-

servation. Oregon State University's Integrative Biology Department has brought in individuals from Microsoft, ESRI, the Environmental Protection Agency, and the Bureau of Land Management. Meanwhile, the University of Georgia's Odum School of Ecology has invited researchers from the Nature Conservancy, US Fish and Wildlife, Army Corps of Engineers, and SESYNC to discuss their work. Erin and Jess continue to take advantage of opportunities like these to develop their career plans, both on campus and at professional meetings. Of course, they also make time to create lasting friendships with colleagues and maintain them. Although they still get anxious about chapter deadlines, grading papers, and comments from reviewer #3, having friends to lean on/ paddle with and a plan in hand keeps them energized and focused.

"I think this is Bull Sluice! Let's pull over and check it out," Erin shouted as she calmly started paddling away from the roar of another waterfall. Jess shot Erin a look of pure terror and made a bee-line for the shore. Erin and Jess had decided earlier that they would portage around Bull Sluice, a Class IV rapid with a two-tiered 15ft waterfall. But unfortunately, they had pulled over on the side of the river that was across from the portage path. They were just 20-ft upstream of the waterfall and would now have to paddle

across the swift current.

"Once you hit the current, paddle hard," Erin said. Jess watched as Erin ferried herself easily across the river, telling herself that she could also do this. Erin parked her boat and waved Jess over. Digging in hard with each stroke, Jess quickly reached the other side.

"I knew you had that," Erin said with a smile. On solid ground, the two women sat and watched the water thunder through Bull Sluice, appreciating the power of the untamed river. The take out was just around the bend, but neither Erin nor Jess was quite ready for the trip to end.

They recognized that although challenging, this adventure had been one of their best. Going outside their comfort zone, trusting themselves and each other, had been rewarding and served to strengthen their friendship, much like their experiences in graduate school. Exploring this free flowing river in the southeastern US, a rarity, had reminded them of the broader purpose of their research and why they had originally picked their PhD projects.

Before climbing back into their kayaks to float to the car, Erin and Jess took one last look at Bull Sluice and shared a smile, proud of what they had achieved. They will have to continue to rely on each other so that they can reflect on their graduate careers with the same fondness.