NEW ADVANCEMENTS IN MODELING PUT UW ON THE MAP!

PROGRAMS ON THE WIND RIVER RESERVATION BRING STUDENTS TO THE WATER

WYCEHG WELCOMES NEW FACULTY
Year five of WyCEG's successful and innovative partnerships brings transition, from growth to sustainability. I am pleased to share several of WyCEHG’s success stories both in the science and education and will be following their trajectory as they take on new life outside of EPSCoR. The pages of this newsletter demonstrate how our work has transitioned into modeling the data we collect and how it applies to decisions being made across the west; how our education programs are preparing future academics and critical thinkers for life beyond the University; and how students are thinking differently about the ground, thus water, beneath their feet.

Here is a recent snapshot of the successes WyCEHG’s first four years has brought to the science field:

• As of this writing, WyCEHG data has generated over 90 publications, 3 new products, and $19 million in external funding.
• Four new faculty joined the University and will continue to grow WyCEHG’s legacy.
• Fostered new collaborations among faculty, those collaborations lead to innovative ideas and tools to address some of science’s big questions.
• Interstate partnerships have been initiated that will continue to thrive in years to come.

Education is also a critical component of the WyCEHG's success. The first four years of the project brought students from elementary through graduate school into contact with WyCEHG, many young people actively participate in projects throughout the state, their efforts and science.

Their work contributes to communicating science, especially about water in Wyoming, in small communities and large towns. We have:

• Provided hydrology education programs to over 400 students on the Wind River Indian Reservation.
• Welcomed nearly 100 high school students to the University for a six-week research experience through Student Research Apprenticeship Program (SRAP).
• Designed and delivered an Ecohydrogeophysics Summer Course in collaboration with Historically Black Colleges and Universities (HBCUs) for 30 students over the four years.
• And supported 418 University of Wyoming students through WyCEHG funds.

The last year of WyCEHG offers us a chance to celebrate how far we’ve come and a chance to build a legacy for Wyoming, our students, and the health of our waterways for years to come. We will take forward the interdisciplinary communication fostered through WyCEHG, the partnerships with industry and government, and unending support for students. Science will continue to flourish and we are looking forward to another productive year of innovation and education.

Dr. Brent Ewers

Project Director and
Track 1 Principle Investigator
Student Research Programs Coordinator, Lisa Abeyta, is in a unique position. She participated in the EPSCoR Summer Research Apprentice Program (SRAP), as an incoming freshman to the University of Wyoming. She now oversees SRAP, which brings over twenty students to campus from across the country, each summer. In addition to her full time job with Wyoming EPSCoR, Lisa is working on a graduate degree in Curriculum and Instruction using data gathered over SRAP’s thirty year history to evaluate its strengths and opportunities for continued growth. Lisa embodies SRAP and what it aspires to do for its alumni.

Facilitating educational journeys is a motivator for Lisa, which is how she sees her role as SRAP coordinator. It is also clear in how she views her own professional path. Recently, Lisa traveled to Finland to attend the European Science Educational Research Association meeting where she helped present research on UW ESPCoR Undergraduate Programs. The experience interacting with a global community of educators and researchers showed her how she could channel her interest in helping students succeed. “Where people came from and where they are now, gave me a glimpse of where I could be.” That motivation continues to drive Lisa to integrate stories, data, and collaborations sparked abroad into both her studies and SRAP summer programs.

Originally from Denver, CO, Lisa came to Laramie for college and never left. The mountains, lakes, and local outdoor adventures were a draw then and continue to be. When not at work she and her family enjoy getting out camping, fishing, and hiking in the near-by mountain ranges.
Year five of WyCEHG brings two new scientists to Laramie. Dr. Kevin Befus joined the Civil and Architectural Engineering Department in August following a U.S. Geological Survey Mendenhall Research Fellowship at Woods Hole Massachusetts and a PhD program at the University of Texas, Austin. He is a groundwater hydrologist specializing in the interaction of groundwater systems with changing hydrologic conditions at the Earth’s surface. Dr. Fabian Nippgen will join the department of Ecosystems Science and Management at the end of the Fall semester after completing a postdoc at Duke University. He studies how the combination of watershed structure and climactic variability influence the metrics of watershed hydrologic response.

Dr. Befus is well acquainted with the region’s geography: as a Masters student at CU Boulder, he used geophysics to understand bedrock weathering in the Boulder Creek watershed CZO, and the mountainous field areas around Laramie “feel familiar.” The network of researchers and resources already in place through WyCEHG appeals to Befus. He looks forward to participating with WyCEHG in the cutting edge work that connects to Wyoming’s practical water needs. “I am fortunate to be walking into this playground of equipment. To have an array of the most advanced tools available overcomes many potential obstacles and lets us focus on quality science.” He plans to connect with ongoing research teams to help analyze WyCEHG’s extensive datasets and continue advancing the nascent scientific discoveries.

Befus is a self-proclaimed ‘water nerd’ who hopes his passion will encourage others to plug into their local, regional, and national water debates. He hopes to share his enthusiasm for water, both in the practical and scientific worlds through his teaching, research, and outreach. As the son of two elementary school teachers, he believes in the importance of education and is eager to teach Groundwater Hydrology this spring.

Dr. Nippgen is also returning to the intermountain west, where he completed his PhD at Montana State University. In the simplest of terms, he studies “how water flows downhill”. The details— influenced by both landscape structure and climate metrics— make this seemingly simple research more challenging. Nippgen describes himself as an experimentalist who uses hydrologic models to ask questions that cannot be answered by empirical analyses alone.

“An interesting thing about Wyoming is that the subsurface can be rather complicated.” For this reason, the symbiosis of hydrology and geophysics offered by WyCEHG is crucial to understand the movement of water moves through watersheds. “The infrastructure that is in place through WyCEHG is incredible,” Nippgen explains with enthusiasm. He is eager to contribute to a community that contains such great interdisciplinary expertise and infrastructure.

In addition to his work with natural hydrologic systems in Montana and North Carolina, Nippgen’s postdoc has taken him to some of the most disturbed territory in the United States: the coal country of West Virginia. This background in disturbed systems is a primary contribution that Nippgen brings to WyCEHG and Wyoming’s landscape. Applied research is important to Nippgen and he is looking forward to collaborations within WyCEHG to address questions/issues related to Wyoming’s water systems, both natural and disturbed. Outdoor activities keep Nippgen and his wife busy outside of the lab. He enjoys hiking, camping, and bow hunting. He is looking forward to wading Wyoming’s streams with a fly rod as well as trading in his skinny tires for knobby ones as he hits local mountain bike trails.

Both Befus and Nippgen bring an interest in mentoring and supporting students through the classroom and the lab. We look forward to their contributions and the broader impact their work makes on the University and local communities.

WELCOME TO “THE KEG” AND CHEERS.
SRAP CELEBRATES LARGEST IN-STATE CONTINGENT IN THIRTY YEARS

BY EMILY VERCOE

“Don’t be afraid to open up to new people. It’s very fun and adventurous and so worth it. At first I didn’t know how to approach a new group but with a constant reminder from the staff that it’s a judge free and comfortable community... I enjoyed this program so much. So much that I would love to come back.” SRAP 2016 summer alumni WolfStar Duran shares her advice for other Wyoming students considering research with EPSCoR’s Summer Research Apprentice Program. Duran is the first SRAP alumni to come from the Wind River Indian Reservation and among the largest cadre of in-state students to attend the summer campus-based program. Duran plans to do more than come back, she intends to recruit other native youth to join her next summer.

Begun in 1985, SRAP is the longest running Education, Outreach, and Diversity program under the purview of Wyoming EPSCoR, with updates and improvements occurring with each new round of NSF EPSCoR funding. It serves as a recruitment program heavily focused on first generation and underrepresented students considering college and aims to engage youth in STEM related activities. SRAP enjoys a strong history of college placement among its alumni. The program’s director, Lisa Abeyta, is a SRAP alumni herself and values the program’s impact on her career trajectory. SRAP is a six-week program for high school students who receive room and board, meals, coordinated activities, and are paid for their research work through EPSCoR.

SRAP provides a meaningful, hands-on experience in science, mathematics, statistics, and/or engineering research with the goal of stimulating interest in a future career in one of the fields. The general philosophy is to increase participation of first generation college students and underrepresented minorities in a research experience in order to develop student comfort in an academic and professional setting, as well as provide resources that can ensure higher education success. The program continues to bring in over 50% participation of racial and ethnic minority students. Students are provided with authentic research projects in labs across campus and in the field. Examples of student research topics include better understanding of tree die off due to bark beetle infestation and its impact on the ecosystem, exploration of biomaterials microfluidics for practical application, or environmental history through analysis of pre-fossil data to better understand impacts of climate change on ecosystems. High school programs such as SRAP are tools universities are investing in to encourage pursuit of college degrees and careers in STEM for students.

Along with Duran, Wyoming students that participate in SRAP enjoyed increased self-confidence and preparedness for life beyond high school and a smoother transition between. Students spent time in a lab learning about designing experiments and getting hands-on experience. In addition students had a taste of the professional world, they learned about troubleshooting and perseverance through data collection and analysis. They also built a network of learners and peers, all participating in a research experience together. Each of these benefits has led to higher rates of college retention and a greater interest in STEM courses.

Sophomores, current juniors, and current seniors in high school are eligible. Applications for summer 2017 SRAP programs will be available online (www.uwyo.edu/SRAP) in December 2016.
SUMMER MENTOR PROGRAM OFFERS EXPLORATORY STUDY FOR YOUTH

BY JENNIFER WELLMAN

During late July, several organizations on the Wind River Reservation collaborated to provide an interdisciplinary field camp, the Arapaho Ranch Safari, for students aged 14-23. The setting was Arapaho Ranch, a rural, historic ranch on the Wind River Indian Reservation, northwest of Thermopolis at the confluence of the Owl Creek Mountains, the Absaroka Range, and Hamilton Dome. Run by the Northern Arapaho Tribe, the ranch includes a cattle operation, historic homesteads, and vast tribal lands and waters for creative and scientific study.

The Northern Arapaho Workforce Investment Act (WIA) Summer Program employs reservation youth in various tribal departments and businesses. Clarinda Calling Thunder directs the WIA program and, with a grant from the US Department of Labor, developed the partnership to create the Ranch Safari with Maker Space 307, Poetics of Peace, Arapaho Tribal Health, Wyoming EPSCoR, Sky People Education, and numerous other artists and local experts. The Ranch Safari was the first, multi-faceted five-day field camp for WIA workers that offered an adventure in filmmaking, cultural awareness, scientific study, and creative environmental exploration.

Base camp was the historic old mansion and the Ranch’s yurt, established in 2012 by the Wyoming Conservation Corps. Water conservation was critical during the week as the house’s plumbing was not functional; students were able to use other local showers and bathrooms and had to haul water for drinking and cooking. Each day consisted of chores and activities including assisting with cooking and clean-up. Ranch Safari highlights included:

- Documentary film-making using iPad minis;
- Poetry reading and writing with Henry Real Bird (Crow Tribe), the 2009-2011 Montana poet laureate;
- Field trips to cultural and environmental sites: a buffalo jump, tipi rings, historic petroglyphs and the Thermopolis hot springs;
- Service learning projects at the mansion and the Ranch headquarters, clearing vegetation and debris from the grounds and updating paint on a roadside fence;
- Cultural horseback ride with Arapaho Tribal Health.

Hands-on wildlife workshops were delivered by the Tribal Game Warden and a local US Fish and Wildlife Service biologist prior to the students’ field trip to observe local antelope, deer, and raptors in the Owl Creek Mountains. Students also heard a presentation and discussed the reservation’s history and culture of buffalo facilitated by the Wind River Native Advocacy Center. Wyoming EPSCoR conducted site visits to the Legend Rock petroglyphs and Anchor Reservoir, providing an opportunity to learn about geology, archaeology, and the impacts of irrigation diversions and oil development on stream ecology, providing direct connection to the water science of Wyoming EPSCoR. Students participated in field studies and cultivated an awareness of local watershed issues through experiential learning activities. The program was made possible with funds from the US Department of Labor, Wyoming EPSCoR, and the Wyoming Arts Council through the support of the Wind River Development fund.
PhD Student, Brady Flinchum finds creative ways to answer questions in the labs of WyCEHG

Brady is an enthusiastic doctoral student in his fourth year with Dr. Steven Holbrook’s lab. Originally from Reno, NV, where he earned a BS in Geophysics, he now uses near-surface geophysical methods as imaging tools to provide new and unique perspectives on the subsurface. These tools will improve understanding of hydrologic systems, ecosystems, weathering, and erosional processes in the top 10-100 meters of Earth’s subsurface. His work allows him to better understand how the landscape has evolved over time and how that landscape controls water flow.

The interdisciplinary nature of WyCEHG feeds Flinchum’s curiosity and using expertise from different schools of thought allow for new ways for problem solving. Throughout his time at the University he has learned how to communicate across disciplines, breaking down traditional scientific silos. “Once you speak the language of other disciplines, creative juices really begin to flow. Now instead of having just a hydrologist make measurements we also have a geophysicist, geochemist, or pedologist make measurements. We begin to link all of these independent measurements in new and exciting ways—which is how we push our understanding of the natural world further.”

In addition to researching the critical zone of the Earth’s crust, Brady stays busy as a photographer documenting people and their stories through the lens of a camera, as a Crossfit enthusiast, and as a new dad. Upon graduation, Brady wants to continue in research at a university with his own team of graduate students. “I think I have the best job in the world, I get paid to think about and try to solve important problems related to water. I would love to provide this opportunity to future students.”
Understanding the quantity and fluxes of water underlying an arid or semi-arid landscape will allow for thoughtful water resource management, both in Wyoming and downstream.

As a headwater state, Wyoming is the “Water Tower” of the west, feeding four major river basins in over a dozen downstream states and providing a supply of fresh water to residents, agriculture, and industry. Water flows across our borders and supports the livelihood of those downstream. Spring-time runoff from Wyoming’s high-country snowpack either flows into streams or seeps into the subsurface. WyCEHG’s central mission is to better understand and quantify water balances and pathways within Wyoming’s watersheds.

Through the use of integrated groundwater modeling by University of Wyoming and WyCEHG researchers, we are beginning to develop an improved understanding of this water balance and how it is partitioned between ground and surface water, as well as predict future water availability in the region. Borehole data collection is one tool that provides insight into this understanding and WyCEHG scientists have used a suite of boreholes atop the Laramie valley to provide a picture of the current hydrologic state of the ground below. When combined with additional information, like static models and assessments of fixed variables, the borehole data produces an integrated model, which is a more holistic approach to evaluating a system.

At the Blair Wallis experimental fractured rock hydrology site, twenty miles from Laramie and the University of Wyoming, Dr. Jianying Jiao, a postdoc with Professor Ye Zhang in the Department of Geology and Geophysics, is collecting hydrological, geological, and geophysical data to develop models that address the relationship between water systems. Water balance is collected through surface measurements such as LiDAR elevation, temperature, pressure, and local stream discharge is incorporated into the integrated model along with data collected below ground from boreholes and through
geophysical techniques like 3D seismic, GPR, EM, NMR, and resistivity surveys. This data is highly suitable for developing, testing, and verifying novel modeling techniques. Integrated modeling combined with the resources available at NCAR-Wyoming’s supercomputer facility allows us to make long-term predictions of the available water while taking into account various climate change scenarios.

As a headwater state, Wyoming is the “Water Tower” of the west, feeding four major river basins in over a dozen downstream states and providing a supply of fresh water to residents, agriculture, and industry.

Integrated modeling provides a unique opportunity to explain and quantify the interaction between surface water and groundwater through the interpretation and prediction of data. However, results of integrated models can be sensitive to the ‘starting point’ describing the hydrological condition of a site at the beginning of the simulation period. Information such as current subsurface water table position and stream flow gauge must be accurate in order to make a reasonable forecast of the future hydrological state. Such information, in particular the water table position, is difficult to obtain even with the collection of large quantities of borehole data, which measures hydrologic properties of the granitic rock. This is because water table position is often not coincident with the water levels observed in boreholes if there are significant vertical flows, such as those occurring in recharge/discharge areas where surface water and groundwater actively interact. This poses a real dilemma for modeling. Traditional techniques thus invoke a ‘spin up’ period where models are simulated, driven by climate data such as precipitation and the water table position. However, the spin up simulation approach ignores the available water level data from the boreholes that contain subsurface information such as hydraulic gradients that drive groundwater flow. To address this necessary omission, Dr. Jiao developed a novel approach to analyze the WyCEHG water level data using inversion, resulting in an improved estimation of the water table position. This improves the hydrologic “starting point” and thus enhances the ability to predict future water table positions by the integrated model. The subsequent model predictions have been confirmed by monitoring data collected at the Blair Wallis well field. By eliminating assumptions used by the ‘spin up’ approach and by incorporating subsurface water level data via inversion, the new approach has led to significantly improved accuracy in predicting groundwater flow, and consequently the interaction of surface water with groundwater.

The initial data collected at Blair Wallis and their interpretation using integrated modeling represents an opportunity for Laramie and other communities in Wyoming to begin planning for future growth, potential droughts, and water usage. In a state where water is a precious commodity these kinds of tools will enable smarter growth while ensuring sustainable development of our surface and subsurface water resources.

As a headwater state, Wyoming is the “Water Tower” of the west, feeding four major river basins in over a dozen downstream states and providing a supply of fresh water to residents, agriculture, and industry.
As an adolescent, I appreciated the wild, fleeting nature of Wyoming water. My teen days were spent hiking, sometimes 20+ miles through the Bighorn Mountains. Days spent working as an adult at power plants made for a more sobering realization: water in this state isn’t simple. No matter what we do, our lives in the west dictate maximizing a rare but necessary resource – water – at whatever the ecologic or financial cost. For over a hundred years, we have wrestled rivers and water basins into ponds, ditches, dams and lakes. Desperate to outrun and outwit naturally dry and fickle high desert and high plains climates, we attempt to ranch, farm and ultimately thrive in an ecosystem that doesn’t necessarily welcome our thirsty habits.

Coal-fired power plants are heavy water users; Jim Bridger alone churns through 20,000 gallons of water per minute – the equivalent of processing a large swimming pool every sixty seconds. Naughton, its older neighbor in Kemmerer sucks up 7,900 gallons of the Ham’s Fork River per minute. Coal-fired power does not have the majestic glamor of wind power, but without it, this state would lack the easy and cheap ability to turn on lights, watch TV shows and enjoy other luxuries deemed necessary to American life.

What I learned about water in Wyoming is that usage is complicated, even as efforts are made to reduce the human footprint. A USGS study released in 2014 stated that, despite the western U.S.’s rapidly growing population, water usage in this country is at a 40 year low. Contrary to popular belief, newer technologies, better environmental awareness and legislation have greatly helped lower water waste in this country. An example of this innovation is the Wyodak power plant in Gillette. This plant uses sewage water – not river water – to power its turbines and employs one of the largest air-cooled systems in the world. As a result, its average water usage is 300 gallons per minute – exponentially lower than Jim Bridger, or the other power behemoths in the state.

Water is not a simple black-and-white issue. Even while we may demonize the existence of heavy industry as an environmental blight, work is being done to increase water-efficiency in pioneering ways. And though I do not particularly wish my ‘chocolate milk’ experience on most people, I am grateful for the opportunity to recognize the gross complexity of Wyoming’s water.

WE’LL CALL IT CHOCOLATE MILK-GROSS COMPLEXITY OF WATER IN WYOMING

MEGAN RICHTER

My adult education in Wyoming’s water occurred last summer, as I sloppily attempted to pour ‘chocolate milk’ into a jar. The ‘chocolate milk’ was not, in fact milk. It was human waste streaming from the Jim Bridger Coal Plant near Rock Springs, and we were testing water at the plant’s sewage treatment facility. I was wearing gloves and trying not to spill raw sewage on myself. ‘Chocolate milk’ worked as a catchphrase that allowed me to pretend I was not handling liquefied excrement.

My internship brought me into close quarters with the water used in heavy industry. Our work objective was to adjust the chemicals used in the millions of gallons of water plants to ensure water cleanliness and usefulness as long as possible. This allows plants longer periods of water use before pumping the fluid to evaporative ponds. From its initial plunge into feed-water tanks through its expulsion in ponds after becoming too dirty for boilers to continue cycling, my life orbited around the water that powers our landscape. I began to understand, very uncomfortably, that the human relationship with water is – at the least – painfully complicated.
My dad was a river man, and when the thrills in the Midwest had flushed through, he moved to Colorado, and then Wyoming, to play in the mountains and to run the rivers that flow from their highest peaks. I was—for all intents and purposes—born into biting cold mountain water, and spent whole summers swimming in the warm, slow meander of the Bighorn River. Currents have shaped everything. They carried me from a boy cascading into momentary pools, to a deep river—thoughtful and productive. And so when I met that first cutthroat trout I connected. It was my rivers flowing into one at the exact right moment, peacefully agreeing, “The greatest good is like water.” Something immediately changed, and I watched as 20 years of perceptions floated downstream in the current. All at once, I felt together with my surroundings, and realized the importance of the wild places I’d half-heartedly called home.

What’s funny about life—changing moments is that at the time they never seem so huge. Looking back, that one fish seems much bigger than it really was, and my father’s words reverberate monolithically. After that moment I grew from a boy spending the occasional weekend on the upper North Platte, to a man with one foot always in a wading boot. It’s been years since that first cutthroat. I still fish all the time though, if for no other reason than to revisit what it means to catch a fish, to feel the perfection of it all. It is a perfection achieved in a near mathematical process. A fly—fisherman follows a truly unique equation balancing humility and commitment and factoring in sensitivity. It’s this mathematical construction of a fly fisherman, his calculated path to manhood, that reveals in him a sincere conservationist.

I’ve got this friend—a real arrogant know-it-all type—who I love to fish with. Fishing for him has always been what I’m assuming to be a humbling experience. He is quickly changed from the fly shop employee quoting specifics on your new waders, to a guy yelling every few minutes about the fish he just missed, without landing any all day. The blunt point of it is, fly fishing rewards humility. I’ve learned that a person able to own their shortcomings and learn to play with their strengths catches the fish. In fly—fishing there is no way to fake this, only those willing to learn from the river will be rewarded with its lessons. It’s taken only the realization that I have no idea what I’m doing to cocoon my metamorphosis into a fly fisherman.

The image of the fly fisherman begins to take its form when a humble individual strikes a balance with commitment. The concept of fly fishing is misleadingly simple: to trick a fish into thinking feathers are food. All new fishermen stop at this realization and take stock. They must decide how deep their river is going to be. The commitment is simple, but not like many others you make in life. To commit to fly—fishing is to commit to a lifestyle, a personality—a state of being. It builds a work ethic and a dedication to effort. It is the commitment to stand in the snow, fingers numbed, smiling as you’ve missed just another fish. It is the sort of commitment that breeds conservationists.

The balancing of humility and commitment create the shell of the fly fisherman, evolving and ready to learn. But, without guidance he is simply just a man standing in a river truly believing he is smarter than a fish. The hard part about fly—fishing is there is rarely someone who can really teach you how to fish. It becomes a game of the self, teaching yourself your limitations. Fly—fishing offers you the unadulterated truth about who you are, and when I became willing to listen I grew nearly as sensitive as the trout I chased.

It’s still the compounding sum total of those things that has taught me who I am. It is always feeling the water against my waders, and the tug of too many 6-inch trout on my line that keep me buoyant and humble. When people ask, “Why do I fish?” It’s hard for me to respond any differently than the river would, uncertain and open—ended. Fly fishing is nothing and it is everything. It is still just trying to convince fish feathers are food, but in a calculated way it’s taught me everything I think I really may know about myself.

And so I still stand, my entire world between the rocks on either bank of the river, contained by laws of physics more complicated than I can understand. With every minute I go without a fish, my perspective grows wider and wider, until my world exists between two horizons at the jagged edge of the canyon’s wall. Because some days I have no idea what’s going on, on the river, these intermissions last all day, allowing my mind to wander farther. It is in those moments that I can finally situate myself in the grandeur of the place I am in. As current pushes past past and contemplative synapses fire I learn to interpret the world around me. It may start as the realization that I haven’t fished a hole better than the one just below the parking lot all day, or that maybe the #14 yellow humpy that’s seen more fish mouths than I can count needs to be retired to the brim of my hat.

But the more time I spend waiting on fish, the more my perspective can expand. The next fleeting thought, how thankful I am that Trout Unlimited battled to protect the headwaters of the river I stand in. And, my thoughts snowball into climate change, water quality or, biodiversity loss... It is these mental processes; these pathways of thought that make the fly fisherman so unique. Cleverly coaxing broad meaning from individual occurrences.

Fly—fishermen are often called haunted. They seem possessed by something more uncertain than themselves. Their flies ride high in the upper reaches of an environment totally other, and the creatures they chase, as John Gierach wrote, “exist like UFO’s, zipping off at a 90 degree angle before disappearing into its backdrop all—together.” Fly—fishermen stand—cold—into night waiting for a faint tug on their line, absolutely committed to something they can’t fully understand. They watch the river run in cycles, dredging up memories while the river’s current carries others away. When I look back on the course I’ve taken, floating through the slow agricultural valleys of the Big Horn River, to tackling the headwaters of America’s greatest rivers the fall lines become clear, and the courses I choose flow in time with the river.

The river has taught me to respect the places I walk, and flyfishing has taught me to take these steps often. It has taught me the importance of clean water and a clean mind. It has taught me the power of technology, and the perfection of tradition. It’s taught me that there are no set paths, nothing and it is everything. It is still just trying to convince fish feathers are food, but in a calculated way it’s taught me everything I think I really may know about myself.

Just like the river we create our own course. Choosing to cut soil from one spot and leave it somewhere else, collectively leaving our mark on our world. We can choose to be sensitive and humble and leave our marks artistically, or we can choose to push through life like a flash flood, leaving deep scars in the banks of our world. We can choose to push against the current, or we can be confident in it.

Essays were modified for length and clarity.
WYOMING EPSCoR
CONNECTIONS

UPCOMING DEADLINES

December 2016: SRAP Applications Available
Online (uwyo.edu/epscor)

Feb 17, 2017: Deadline for WWISE grants

March 2017: Deadline for SRAP Applications

April 2017: Deadline for CAW Writing Contest

April 29, 2017: Undergraduate Research Day

More at www.uwyo.edu/epscor