2020

Adventuring in the Winds: An Exploration of Water Accessibility, Keystone Species, Environmental Justice, and Forest Fires in the Wind River Range

Rhianna Giron
University of Nebraska-Lincoln

Adventuring in the Winds: An Exploration of Water Accessibility, Keystone Species, Environmental Justice, and Forest Fires in the Wind River Range

Rhianna Giron

Environmental Studies Senior Thesis

University Honors Creative Project

Advised by Dr. Tom Lynch and Elyse Watson

Completed November 2020

Abstract

This thesis is a braided narrative that incorporates personal experience, ecological research, and poetry to explain some of the impacts of human interaction in wild spaces and of climate change. The specific areas of study in this essay are the Wind River Range, Wyoming and Nebraska. The purpose of this paper is to discuss topics related to water availability and quality, forest fires, keystone species, and social injustices related to people and environments in the Wind River Range. It is important to learn about other places than the ones we are already familiar with as it helps to instill a sense of stewardship in individuals. This is necessary as the climate continues to be negatively impacted by humas. Storytelling is an effective way to engage readers in conversations about climate change and human impact, so presenting statistics and research within a narrative is a good way to engage the audience and get them to care about the areas being discussed. In order to write this essay, I drew on my personal experience of backpacking in the Wind River Range and paired these experiences with historical and ecological research. One of the important key features and findings of this essay is that everything is connected to something else. Our actions affect other parts of our ecosphere and we are responsible for taking care of the environment, not just for ourselves, but for all other species that exist within it.

Introduction

This thesis is a braided essay that incorporates personal experience, literature review, art, poetry, ecology, soil science, water science, history, and theory in an extended narrative. I will use my personal experiences in the outdoors to discuss topics of importance related to the environment, policy, and forgotten histories. The "braided" aspect of the essay means that the different subjects will flow and move in and out of each other, seamlessly floating from one topic to the next, and connecting theories and experiences together. A few key concepts the text will explore are the relationships between people in the past, present, and future in relation to their environments and to each other, as well as the sense of stewardship and responsibility we have to each other and to the planet. In order to better understand my text, it will become necessary to understand that not all experiences and histories are the same, just as not all people are the same, but that we can still learn from one another and use other's perspectives and experiences to better understand the world and ourselves.

I believe there are strong connections to the environment that can be found when exploring and adventuring outside. I also strongly believe that words have weight and have the power to change people's perspectives and move them to action. There are books, movies, photographs, paintings, theoretical essays, speeches, etc. that have absolutely changed the world, that have sparked movements (I am not saying my story will do this, just simply that words and images are important in exposing the world for what it is, and drive generations towards change). Even if you can impact just how a single person views the world, then you have accomplished something. I am most interested in the power of words and exposing people to what already

exists as resources and as reflections of other people's personal experiences in the outdoors and with a deep/unique understanding of the environment.

Many people have explored the world, written about their experiences, informed others, and become experts in certain customs or traditions through assimilation and intent study. Most of these people have been wealthy white cis-gendered men, looking at the world and reporting on it from their limited and biased perspective. In more recent history, these viewpoints have been challenged, and individuals that do not fit into the above prescribed identity have been able to express their perspectives as well, demanding respect and recognition from the general public and academia. More work still needs to be done to diversify the information we intake, as well as diversify the voices we choose to elevate and pay attention to. We each have our own different bias and perspective as individuals that should be celebrated, but if we as a society decide that we prefer one viewpoint over another, then we cannot learn from those who are different than we are, or at the very least, cannot accept those differences and give them the recognition, respect, and honor that they deserve. Everyone should be able to have their story listened to, explored, and truly heard.

It has become increasingly obvious that huge portions of the American population still do not believe in climate change and the need to make sweeping and all-encompassing changes to the structure of our society in the next few years to stop the complete collapse of our global ecosystem. As one of the world's leading polluters, the United States cannot continue to contribute as much waste as it currently is without continuing to cause irreparable damage. As environmentalists, or really just as people, we cannot continue to tote the overused idea that "we must save the planet for our children and our grandchildren." We need to help save the planet for ourselves, for people today. If we focus on waiting to save it for our children, we will have

already lost. An aim of this essay is to use personal experience to discuss topics related to climate change and its effects on rural areas in Nebraska and the Midwest, as well as the far reaching expanses of the backcountry of the Wind River Range in Wyoming.

It has also been made very clear in recent American history that people are still not being treated equally and their stories are not being listened to, truly heard, or given the respect they deserve. These inequalities happen in the outdoors, as it remains very male centered and very white centered. Women, the LGBTQ+ community, BIPOC (Black, Indigenous, and People of Color), and people with physical or developmental disabilities are actively excluded from outdoor arenas and are not showcased as being welcome in outdoor recreation. Part of this essay's intention is to highlight areas where this exclusion occurs, as well as represent a female perspective in describing the outdoor recreation industry and its male-centeredness and the harm that it can cause and the dangerous viewpoints it perpetuates.

My research includes other essays or books that relate to the type of structure I am looking for in writing my paper (so, stories that take personal experience and relate them to environmental topics and discussions), as well as pieces of poetry, photographs, historical, ecological, geographical, and geological research, and other topics of importance related to describing the locations explored in this thesis.

This piece showcases the connections that we as humans have with our environment. Too often we separate ourselves from the system instead of viewing ourselves as part of it. This ideology has led to so many of the problems we are facing today with climate change, climate deniers, and polarized divides between individuals and countries. It is important to see ourselves as related to everything else so that we can further recognize our responsibility in fixing the harm

we have done. In this, we have to recognize and explore our histories to better understand our present, as well as to try and protect our future.

Chapter One: The Land Saw Me, Too

"All day cloud shadows have moved over the face of the mountain,
The shadow of a golden eagle weaving between them
Over the face of the glacier.
As sunset the half-moon rides on the bent back of the Scorpion,
The Great Bear kneels on the mountain
Ten degrees below the moon
Venus sets in the haze arising from the Great Valley."
-From "Toward an Organic Philosophy" by Kenneth Rexroth

Many people face new life chapters because they have to, some because they want to. I faced some of mine with fear and regret, others with optimism and naive expectation. The ways in which I faced new experiences completely affected the outcomes and lessons I was able to leave with. Because I went into my first year of university with little belief in myself and few close relationships, I was not able to face a new chapter with an open and optimistic mind. Instead, these feelings made up almost a yearlong chapter of sadness and longing. And then I found how to end that chapter and start a new one again. I found how to give myself a second chance, and this second chance was a love of the outdoors.

My new chapter started with rock climbing and a sudden desire to explore more of the world I had once thought so far away. I have climbed, backpacked, biked, canoed, and otherwise explored in many places, both close to home and abroad, and hope to explore much more in years to come. I have climbed in the same areas as some of the best climbers in the world, sharing a place with them. We've driven down the same roads, hiked down the same trails, and

touched the same rock. Their stories, and that of any other climber, is different than my own. We have different reasons for climbing and different strengths and weaknesses. The land has held each of us. It has seen us struggle, succeed, and fail. It has witnessed so many extraordinary things, but still keeps so many secrets from us. The chapters within the Earth's book are extensive, written in a language almost forgotten to us, but the closer we look, the longer we contemplate, the more connections we make to our planet, the more we can start to relearn the language we ran away from.

As I discovered climbing, I fell into a deep obsession with it and soon my dreams were riddled with rock formations, large and looming. Sometimes I would dream of becoming the greatest climber to touch rock, other times I was humbled by back-breaking falls and injuries, but most of the time I just woke up with sweaty palms, itchy with anticipation for the next adventure.

During the peak of my climbing fascination I was not only a highly regular student climber at our university climbing gym, but was hired on as a staff member there as well. All of my closest friends were in that community, all of the people I invested my time and energy were there, all of my personal aspirations seemed to be settled there, too. The Outdoor Adventures Center (OAC, or really just OA most of the time) and its adventure-desperate community became a second home very quickly: it was reliable, challenging, engaging, and personally fulfilling. Being active in the climbing community, and with OA, instigated a love of the outdoors I had never had before, and so started a new chapter in my very short life: one fueled by engagement in natural spaces, crisp mountain air, breakfasts accompanied by early morning sunrises, and completed by late night campfires.

Shortly into this new life chapter, and in my position at OA, another avenue for adventure became available. The trip program was one of the six main programs OA championed, along

with the climbing wall (where most of my time was spent, both personally and as a staff member), bike shop, equipment rental, challenge course, and academic classes. In order to teach academic classes and lead adventure trips in rock climbing, bike-packing, canoeing, kayaking, or backpacking, dedicated staff members had to complete an Outdoor Leadership Seminar, or OLS. The training is a two week backcountry backpacking trip in the Wind River Range in Wyoming where potential trip leaders test their skills in the outdoors and refine their leadership techniques and abilities. The goals of the program were essentially to educate students and other participants about important technical skills needed to be self-sufficient in a variety of outdoor recreation activities, but also to foster a relationship with natural spaces and landscapes that many may not have been exposed to.

Some of my co-workers and close friends had gone on the training a year earlier and I had heard stories about their experiences. For many of them, those two weeks seemed to start new chapters in their books as they found inspiration out there. Something had moved them, quite deeply, and instilled a new desperation in them to connect more with the wild. What had they experienced? Why were they all so inspired? In anticipation of my own discovery of sublimity, I reflected on the original touters of natural discovery and the romanticization of wild spaces, considering how their experiences could be connected with ours in a modern context. The Romantics seemed to believe you needed to experience wild spaces alone, and that only then could you discover some higher connection with nature and the world. I was about to begin my adventure with a group of thirteen other people, relying on them for everything: navigation, carrying equipment, emotional support, advice, and so much more. A week before we left OA for the Wind River Range, I still did not know who else would be coming on the training or if I could depend on them for the things I needed on the trip.

Before leaving Lincoln, we had each been assigned two lessons: one of the seven principles of Leave No Trace and some other lesson from the Backing Guide book. At some point during the trip we would be called on to teach one of the short lessons we had prepared. I was responsible for teaching Leave No Trace Principle 3: Dispose of Waste Properly and for a brief overview of the different types of water filtration that can be used while backpacking. It was a little unnerving knowing you could be called on to teach without more than a couple minutes short notice, so I took extra time to prepare my lessons, committing the material and activities to memory. Trying to keep the different kinds of water filtration in my mind was especially difficult, as I had never heard of some of them before. I also did not know what other people had been assigned to teach and felt like there was so much more I did not understand about being prepared for venturing into the backcountry.

My many curiosities and stresses were satiated soon enough as we loaded up the Suburbans with our gear and piled in for a fourteen hour trek. I knew some people better than others from working with them before, but not everyone seemed as willing to talk as I was. We sat in silence for most of the ride, each probably wondering what we had gotten ourselves into. I watched as we left the flat grasslands of Nebraska for the pined peaks of the Rockies. The silence soon turned into friendly conversation between neighbors and the butterflies in my stomach began to settle their fluttering wings.

To most people, the backcountry appears to be seemingly untouched, to be wild, natural, sublime. It maintains some of its original, unhindered, free form, even if only in illusion. The opportunity to experience this new and exciting world and escape from the societal restraints and hectic lifestyles in the “real world” helped impact my perception of nature and my interactions with it. I was familiar with the outdoors when embarking on my journey, but I was still

holistically unprepared for what I was going to experience. My questions about the trip (why I was there and how I would survive without the luxuries of my city life) continuously entered my mind as we drove towards the Winds. While I would end up being surprised by how easy it was to give up the "comforts" of city living, two very difficult weeks lay between that point of realization and where I was mentally at the beginning of that trip.

Chapter Two: Stolen Land

"In their dreams
the bullets shine red as roses
in their grandmothers' cheeks,
the horses
gallop again over the children,
the young men
can't kill fast enough.

In their dreams
they sleep with the moon.
But mostly they drag their heels in the dust,
they pour whisky down their throats,
they sharpen their knives on nothing
but stones.

They have raged drunk over their old grandmothers.

They have stumbled on the ghosts of the children.
After that, all their nerves click like frozen leaves.

They walk out under the branches of hopelessness.
They think of this world welcoming
the bodies of their sons."
-"Death at Wind River" by Mary Oliver

The group had become more familiar with one another along the drive and we were increasingly anxious to get to camp for the night. We wanted to get started. It was exciting and new. In the car, I talked mostly to one of my tent-mates Mary. At the time, she and I were both going into your third year at the university. We had been hired at the same time at OA so I had seen her around the building a lot, despite working mostly in different departments. Climbing was one of the things we related to, so we talked about the documentary "The Dawn Wall" that featured Tommy Caldwell's landmark climb up a new route on El Capitan in Yellowstone National Park.

"I absolutely loved that movie!" Mary had said as she excitedly explained to me how the film had inspired her to start climbing more regularly at the gym. "I really liked how they explained climbing and the whole sport to everyone, not just climbers. It's so nice to see climbing up on a giant screen like that. I saw it in the theatre."

"I also saw it in theatres! I had never gone to a documentary like that before. My palms sweat the entire time, honestly" I replied.

Hearing our conversation, others had joined in. “I saw it too! It was incredible.” John remarked.

“I cannot believe everything he went through while he was working on finishing that climb, so inspiring” said Adam.

It was nice to talk to other people about climbing outside of the group I normally hung out with. Seeing how passionate everyone was about climbing and the outdoors made me feel more connected to the group, less alone and ready for an adventure of my own. We sang the obligatory “Take Me Home, Country Roads” song by John Denver and laughed as everyone belted “TO THE PLACE, I BEEELOOOOOONNNNNNGGGGGG.” Our comfort levels around each other had expanded as we eased ourselves into tentative friendships. The drive was long, fourteen hours of farmland had rushed past us. Most of my time had been spent thinking, but I was grateful for the conversations and connections I made in that car, as it soothed many of my fears.

***

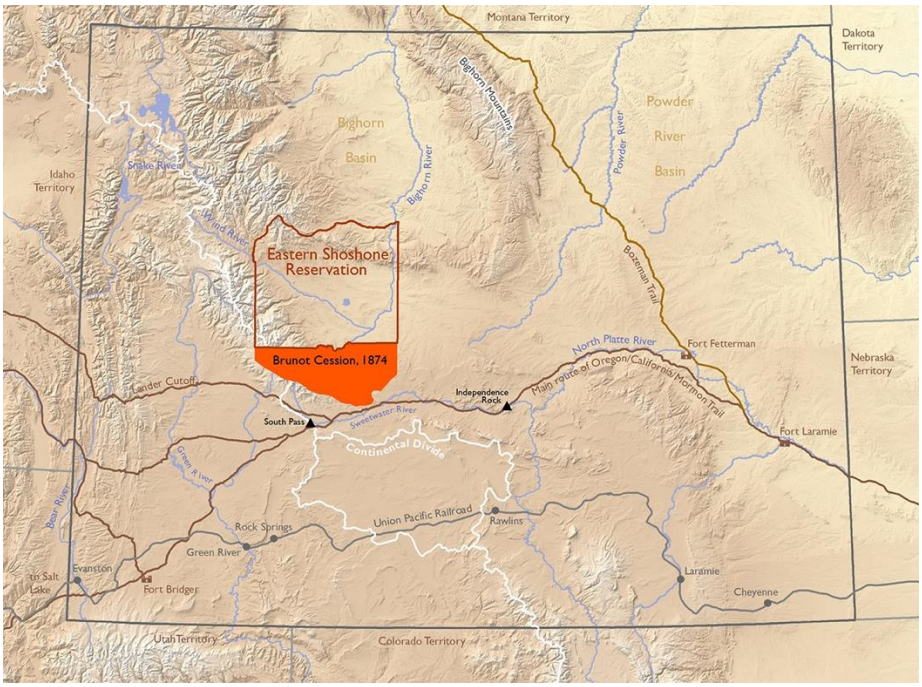
Not far from Lander, we stopped to fill up the cars for the remainder of the drive. There was a sign that read, “Wind River Reservation,” indicating the boundary not far outside of town. I came to learn that it is where many members of the Eastern Shoshone and Northern Arapaho Native American tribes live now. In the early1800s, the “ Eastern Shoshone band ranged along the eastern slope of the Rocky Mountains from southwestern Wyoming to southwestern Montana” (Eastern Shoshone Tribe). At about the same time, “white chroniclers recorded Arapaho people as far south as the Arkansas River in present southern Colorado; by the 18-teens, southern bands had congregated in that region, while northern Arapaho bands were ranging north from the mountain parks of Colorado, west of modern places like Fort Collins and Boulder”

(Wyoming State Historical Society). Both tribes once had territories far greater than the bounds of the reservation. Today, the Wind River Reservation is the eighth largest reservation in the United States, roughly covering 3,532 square miles (World Atlas), but it covers only a fraction of their traditional lands. The mountains we were about to be hiking through had been someone else's home once.

In the 1830s, as Fort Laramie and Bent's Fort were established, the Northern Arapaho and Southern Arapaho split, each preferring to trade with white settlers at the two forts. Both, however, were greatly impacted by the floods of emigrants from the east as they traveled along the "Oregon Trail up the Platte, North Platte and Sweetwater rivers to the Continental Divide passed through the middle of northern Arapaho ranges" (Wyoming State Historical Society). White miners began living on these lands as well, displacing many Shoshone and hunting bison out of the area creating food shortages for many. The lifestyle and traditions once followed were no longer possible in many instances as more resources were dwindling because of the white emigration.

By the 1860s, the Shoshone and Northern Arapaho were forced to negotiate with the US government. In 1863, they signed a treaty which defined "44 million acres on both sides of the Continental Divide" for the Shoshone. However, in 1868, a second treaty reduced this land area to 3.2 million acres. Today, it is only about 2.2 million acres after a large portion of the reservation was severed for white miners to live in the Brunot Cession of 1874. Recently, ancient cave dwellings nearly 12,000 years old have been discovered in the Wind River Mountains, credited to Eastern Shoshone builders. These dwellings exist outside the current land the Shoshone have access to, cutting them off from huge portions of their native lands and settlements. Despite warring over territory just a few years earlier, the Shoshone and Northern

Arapaho tribes were supposed to live together on this small land area. The US government did not honor the treaties it made with Indigenous people and continued to shrink the reservation land it set aside, regardless of where the people displaced there had originally been from.



The various landscapes and scenes I wandered through in this story were on lands that were stolen from the Shoshone people by white invaders in the early 1800s during the Westward Expansion where millions of Native Americans were systematically murdered and displaced. This destruction began much earlier, however. In 1492 when Columbus first arrived in North American, it is estimated that 5-15 million people were already living there. By "the late 19th century, fewer than 238,000 Indigenous people remained" (Fixico). These histories are not commonly taught in modern American education and the many atrocities endured by Indigenous people are not recognized or understood by most people today.

I learned about Native American History in 4th grade along with all other Nebraskan kids, but we were not taught about what actually happened. As an adult, I had to seek this information on my own. I did not know most of this history when I saw the sign next to the gas station in Lander, but I did understand that every experience I'd ever had took place on stolen land and at the cost of millions of lives. Our adventure into the mountains was no different, and I knew that. We loaded back into the vehicles for the last little bit of our drive just as darkness started to fall. The mountains disappeared into blackness as the twinkling lights above started to shine. The hazy band of the Milky Way was above us, splitting the sky. It was quiet. Conversations had stopped as the outside world shrunk from our view.

***

Walking can sometimes feel like dreaming. Mountains surround you on every side, embracing you in their warm arms, hugging you, caressing your aching bones. They engulf your very being, urging you to push on with your walk. Your legs move you along, right then left then right again. The rhythm of this movement singing through your feet to vibrate the ground you trample. The open sky above you unmasked and bright, the sun's shine reaching into your soul. Walking can sometimes feel like floating, rising above the landscape, reaching out towards the seeming endlessness and vastness of the earth.

Walking can sometimes feel like drowning. Mountains surround you on every side, holding you firmly inside their gagged arms, suffocating the air from your lungs, setting a fire to your legs. The more you push on, the worse you feel, always waiting to reach the brink of your ability and your failure. Walking can make you feel hopeless, exhausted, yearning for relaxation, praying for water and an end to your pains. Sometimes you have to stop to catch the breath being

stolen from you. Even as you reach out to keep it from running out of you and into it in the stillness, the mountains steal each gasp anyway.

Some days backpacking in the Winds felt like dreaming, others, like drowning. A day would start with a beautiful dream just to fall into a nightmare. The first few days were more hellish than utopian. As we packed our bags at the trailhead, deciding which orientation to put our sleeping bags, tents, pots and pans, and extra socks, we all looked towards the beginning of the trail, the beginning of the next two weeks. Some glanced in earnestness, others seemingly in simple anticipation, and some with fear or nervousness. It quickly became obvious who among us had already experienced adventures like this one and I was not one of them. The more seasoned backpackers were quickly packing their bags, looking around at the rest of us still struggling to pack our bags. As I finally secured mine, we were ready to begin. One of my tent-mates, Mary, helped me get my pack on. It weighed almost half as much as I did and my shoulders sank under the weight. I could feel the bruises starting to form on my hip bones already.

We turned to the path ahead of us, into the backcountry, into an unknown part of world to most of us, and into an unforgettable adventure. Within thirty minutes we found ourselves balancing on fallen, dead trees, sandwiched between the new growth sprouting between the lifeless trunks. Sometimes our backpacks were too large to fit in between the trunks and branches. We had to force ourselves through hoping we wouldn't lose our balance and fall into the person in front of us. Our line of sight was so limited we had to walk directly behind one another and could stray little more than ten feet without losing sight of the group. My arms and legs were poked, punctured, and pricked. I was bleeding in at least four different places. All conversation ceased eventually, as the excitement and anticipation gave way to an uneasiness.

The only sound was of breaking branches, moans from the group at a misstep or scratch from a branch, and the screaming of the big blue sky above us.

The second day was much of the same: constantly performing balancing acts and playing the longest, most difficult game of "the floor is lava." All I could see for these first days was the sky above me, the two or three trees on either side, the trunks I balanced on below me, and the backpack directly in front of me. There was nothing else. It wasn't just the mountains strangling me, but the trees themselves, reaching out with their rough arms to poke at me, brush up against me, push me over. These first few days were rough for everyone; we had gained about twelve thousand feet of elevation within three days and were still just trying to breathe effectively. The Orangutan Forest, as we came to label this particular terrain, started to build comradery, not through our shared sense of despair, but through our shared knowledge of Disney movies. We could collectively recount the plots of any Disney cartoon movie from our childhoods and established that "...and they made sweet love under the moonlight. And that's Tarzan!" is an appropriate way to end the aforementioned movie.

With our love of Disney established, we began reaching towards others to pull us out of our own conciousness. I started to look outward, truly see the others I was with. I had at first judged them all based on their professional characteristics from what I had observed of them during regular OA shifts. Something about exploring brings out the questioning nature in people, makes them light up a little at the possibility of something new and beautiful. I wanted to know these people more. Truthfully, I also wanted to do something to take my mind off of how my body felt. I made it a personal goal to have a meaningful conversation with each person at least once on the trip. We talked about everything, from where we grew up, what we wanted to do after college, and why we wanted to be a trip leader, to what our biggest failure in life was and

the most challenging thing we had ever done. At first, the relationships we were forming were mostly a means of distraction, but slowly turned in to genuine affection and respect. I was learning more about a group of relative strangers than I had with some of my closest friends back home. Why was that happening? Were the close friendships I had crafted back home actually superficial?

Each day seemed to be a new kind of physical challenge. Some days we were faced with dangerous weather above tree line, some days with elevation increases and too many stream crossings, and others challenged with literal mountains to overcome. A two-person leadership team was appointed by the Bobs (the administrative staff consisting of Tim, an OA coordinator, Beth and Andi, the Graduate Assistants, and Morgan, an intern) every day to be the main leaders for the next day of travel, tasked with getting us from our current campsite to the next one. The two person teams had little time to prepare and were usually not ready to face what the next day would hold. Terrain looks different on maps than it does in real life. The numbers on the topographic map seem easily attainable but in actuality are much larger problems than they initially seem. Some leadership teams took the differences and changes in their plans in stride, whereas others struggled immensely. Having other people's lives in your hands, maybe for the first time, was uncomfortable and weighed on some of us. Making hard decisions for other people can cause you to question your own intuition and instinct.

The hardest part was the altitude. My lungs burned most of the time, despite beathing in clean air, unpolluted and crisp. I had never pushed my body like that before, not even close. Everyone else was tired as well, which made me feel less alone in my ache. The sweat soaked through our shirts in many places, especially along our backs where our backpacks rested. Our chests heaved as we tried to suck in as much air as we could. We would give ourselves time to

rest by filling our lunches with practice lessons. I was fascinated by some of the other topics my peers had been assigned, especially by the discussions we would have about Leave No Trace. During the debrief and critique of each lesson, we would seemingly always talk about how we all exist on a spectrum of what we believe to be true and how to act within the Leave No Trace principles. For example, Leave No Trace Principle 2 is Travel and Camp on Durable Surfaces. For some people, this means exclusively walking on trails that have already been marked and marred the land as it will reduce the impact on other unmarked lands that have not already been damaged. For others, traveling on unmarked land and off trails helps to reduce the amount of permanent wear trails get and also helps to spread out impact instead of concentrating it. I liked these type of discussions the most because I was able to understand more about the ethics of adventuring and got to challenge my own notions about what it meant to be an explorer.

Chapter Three: Bone Yard

"Thunder was the last good hunt.
Great bales of skins and meats in iron cauldrons
Boiling through the night. We made our feast
All night, but still we could not rest."
-From "The Red Sleep of Beasts" by Louise Erdrich

Our mornings would start early, just as the sun was beginning to bring out the blues in the sky. Waking up each day got easier the longer we traveled. Resetting our internal clocks only took a couple days. I would wake up each morning curled up in between Mary and Nora, my tent-mates, and feel fully awakened and prepared to start our camp chores. Back at home, I had a

tendency to snooze my alarm for almost an hour, not ready to leave my bed and face the day. I woke easily because I was actually invigorated by the possibilities of the day, and maybe also that sleeping on the ground just wasn't that cozy.

My friend John and I were selected to be leadership partners for one of days in the first week, and we were equally excited and nervous about having to make decisions for the group. The groups that had gone so far had done well in encouraging the group and take care in monitoring our pace so that it was attainable for everyone. John and I were excited to see that part of our route would put us along a trail, allowing the group to move faster towards our camp for the evening. We were not particularly thrilled by the thirteen river crossings expected along the route, however. River crossing can sometimes be dangerous depending on how deep the water is and how fast it is moving. You also have to stop each time, before and after, to change out of your hiking boots and into your river shoes and vice versa.

Despite getting to easily trek along a dirt path for our morning route, the river crossings ate up a lot of time and the crew was starting to get annoyed by the frequency with which they had to shove damp feet back into their hiking boots. By the time lunch rolled around, so too had rainclouds. Our mid-day meal was partnered with the River Wing (a big tarp the whole group had to huddle under to stay dry), heavy rain, and a lesson about bear safety Elsie was willing to teach for us while we waited out the worst of the weather. Hours passed with little mileage to show for it. I tried reasoning with myself; our pace was slow, but well within reason for the amount of crossings and weather we had to deal with. While I over-thought all of my decisions, the rest of the group seemed to be fine with how we were moving. No one was falling behind, everyone was hydrated, and we were nearing our camp.

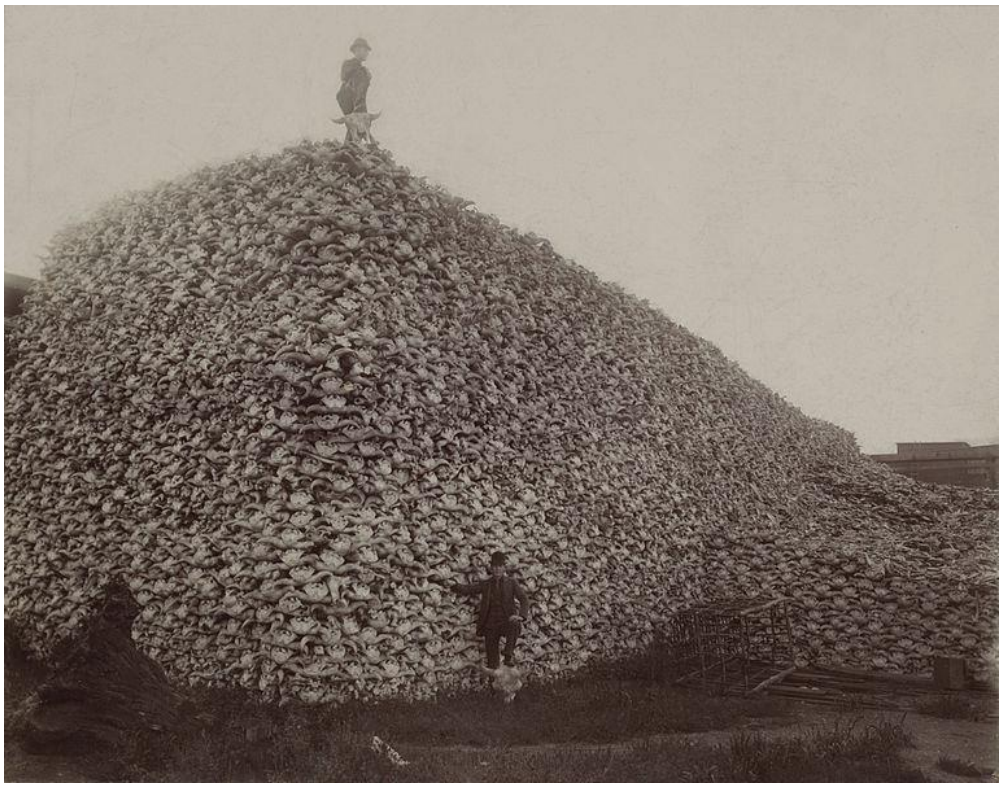
In the early afternoon we found ourselves in a wetland valley surrounded by mountains. It was beautiful, so picturesque and serene. The wind didn't blow, everything seemed to sit still, almost as if holding its breath. Stopping to look at the valley, we gazed at how simple it was, a stream running through a flat grassland with wildflowers growing on it. It was lush; green, gold, red, and blue booming in every direction. We fanned out so we would not create a defined path through the scenery. As we slowly walked through this landscape, taking in each step, looking around us at the expanse, I was the head of the group. After walking in silence for almost twenty minutes we were nearing the other side of the valley, ready to start climbing out of this little cove.

Suddenly, I heard a snap as my feet came down hard on an elk's rib. Looking down, both my feet were firmly planted almost in the center of a bone den. The flattened circle of ground around me was exposed with only the gleaming white remnants of a large animal or two, stark against the darkened soil. I was shocked, not entirely frozen, as a large yelp of surprise had loudly escaped my body. Others made their way over to me as I started to have trouble catching my breath. Just as Daniel, Adam and Elizabeth caught up with me, I was already scurrying off to the stream trying to get air into my lungs.

The bone den scared me for some reason. I knew it was probably where a wolf, bear, or scavengers had picked away at a dead deer or elk, and that it was natural for the bones to be left in groupings like that. I felt bad about the rib I had stepped on, as if I had caused the animal it once belonged to the equivalent amount of pain. Elizabeth followed me over to the stream as I was regaining my composure. Daniel and Adam had called over the rest of our team to show them my discovery and were picking up the jaw bone to examine it up against the light. It was completely white, no bits of flesh left. This den was not the only area we would find bones on

our trip, but it was where we saw the most of them in one place. It felt wrong to be picking through all that was left of something that once lived, probably not all that long ago. It was part of the landscape and the ecosystem before we had even arrived in the state, some of us for the first time.

Seeing the bones reminded me of all the creatures that called the Winds their home. Their whole lives, and eventually their deaths, were spent in a region I was just a visitor in. It was a place I had been in awe of as I stumbled around looking everywhere but at my own feet. Somewhere in the back of my mind was a photograph of bones; bison bones to be exact. In this photograph, a man is standing on top of a pile of bison skulls, his foot placed atop one of them, looking out across what can only be assumed to be more skeletons. Looking out, I presume, at a land almost wiped clean of a keystone species.



A keystone species is “a species whose presence and role within an ecosystem has a disproportionate effect on other organisms within the system” (Dictionary.com). In the central part of the United States, two keystone species were nearly hunted to extinction in the mid 1800s. The first, wolves, was seen mostly as a pest and a danger to human life. The other, bison, was hunted for sport, their hides, and their bones. Their absence changed the landscape for generations. More recent efforts have started to change the public perception of both animals, and begun a movement to reintroduce them back to their natural habitat so that they can restore some of the land to its original state.

Best estimates of the bison population in the Midwest in 1800 range anywhere from 30-60 million. The large animals were important to many Indigenous tribes. As settlers moved westward, the bison started to be considered prime prey for hunters and adventurers alike. In many areas in the mid-1800s, bison carcasses littered the Great Plains as hunters left trails of bodies in their wake, only taking their horns or tongues as trophies. Eventually their hides would be tanned and made into leather and their “bones were used in refining sugar, and in making fertilizer and fine bone china. Bison bones brought from $2.50 to $15.00 a ton. Based on an average price of $8 per ton they brought 2.5 million dollars into Kansas alone between 1868 and 1881. Assuming that about 100 skeletons were required to make one ton of bones, this represented the remains of more than 31 million bison (US Fish and Wildlife Service). By 1884, there were 325 wild bison left. In less than a century they had almost been hunted to extinction. Both the Shoshone and Arapaho relied on bison as a staple in their diet. As the bison’s numbers dwindled, the Indigenous populations and the natural landscape along the plains suffered.

While hunting bison was widely popular, people started to understand that the bison population would not survive as a species if they were targeted so heavily. Reserves started to take in bison and slowly grow their numbers. People were also very aware that there was a lot of money in rearing bison so ranchers began turning away from traditional cattle to cash in off the bison obsession. These private herds would one day help save the population from extinction. Throughout the 1900s, the number of small ranches with small herds grew. By the 1990s there were roughly 20,000 bison in public herds and 250,000 in privately owned herds (in both the US and Canada).

As the largest modern mammal on the Great Plains, bison helped to manage the ecology of the areas they roamed. As a migratory species, bison moved throughout the Midwest grazing as they went, never staying in one place for very long. As they walked, they trampled the earth, turning over new soil and aerating the grounds they wandered. They also consume "rougher, less digestible forage. This gives them a competitive advantage on native grasslands where forage quality varies seasonally. Plus, the ability to utilize lower quality forage results in better distribution of herbivory pressure on rangelands grazed by bison than under livestock usage" (Wuerthner). Their coats are much thicker than cattle, allowing them to stay more active in winter months as they migrate as best they can, giving them a much wider range than other animals. Bison also interact with other native species, as they "tended to graze areas around prairie dog towns, thus enjoying succulent new regrowth of plants previously cropped by prairie dogs while at the same time reducing the grass cover which benefited the rodents by making it easier to spot predators (Wuerthner). The effects of bison on grasslands is still being studied, but their impact is clear to see in many cases.

During the same time settlers were moving West and hunting bison, they were also establishing farms in the foothills around the Rockies, just as the miners were doing in their settlement in the Wind River Reservation. These farms were used mostly for personal use at the time, with each harvest really only supplying food for single households. As these farmers turned to ranching for sustainable income, large groups of grazers were suddenly stationary and confined in areas they had not been previously. Wolves and other carnivores such as mountain lions and coyotes would have no trouble picking off members of the herds on these newly established ranches. As ranchers lost more animals, they started to kill large portions of the wolves that were hunting on their farms. Because of this, the wolf population in the Rocky Mountains decreased substantially, including within Wyoming and the areas around Yellowstone National Park.

With the wolf population at almost zero in the Yellowstone area, despite a lone wolf spotting every now and then, other animals within the protected border of the park were able to thrive without the threat of a top predator. It is unclear exactly how much the wolves were responsible for, but their reintroduction changed the ecology of the landscape.

Wolf reintroduction in Yellowstone started in 1995 and 1996, and some of the effects were quite clear. Elk and deer populations had boomed without predation, causing strain to be put on many trees and other shrubs favored as a food source for them. They would feed out in the open and spread out over large land areas to graze instead of staying under tree cover as they normally would. After the wolves were reintroduced, “Significant evidence suggest[s] that the elk had changed their feeding habits in the presence of wolves, avoiding areas where they could readily be ambushed” (Dobson 1). As the wolves would feed off of the elk and deer, scavengers were able to boost their populations as well with access to a more consistent food source left

behind by the hungry wolves. The areas around rivers where the elk preferred to eat and drink had once been decimated under the many hooves, sinking water banks and adding sediment to the water. The dirty water became inhabitable for numerous fish species. With the wolves keeping elk from trampling banks, aquatic life was able to revive and the water became more clear as beaver started damming again.

The Great Plains and Rocky Mountains changed when settlers expanded west and started hunting keystone species. Their absence caused some species to flourish while others dwindled. The landscapes themselves changed without the great equalizers to balance the system. It took only a few decades for white settlers to cause these two species to near extinction, and over one hundred years to bring their numbers back up. Their reintroduction to native habitats has shown the impact keystone species have on their environment, and how detrimental their absence can be.

***

The last few river crossings were our largest and most difficult. We had to group together in a triangle formation to slowly sidestep ourselves through the fastest and deepest sections. It was one of the first real technical lessons we did along the trip, besides balancing on fallen tree trunks for two days. Tim helped to teach how to appropriately approach potentially hazardous river crossings, and made a lesson out of it so that we could all learn in case we ever had to lead a group of participants through something similar. John and I were thankful for the assistance. The other crossings had been much simpler compared to the last several and we did not know how to navigate the group through the obstacle. We reached a good site for camping that evening just after the last river. Everyone was tired and hungry after a long day despite the many trails we had been on throughout the day.

The routine for every evening was roughly the same. As soon as a camp site was established, the four tent groups would split off to set up for the evening. First we all put up our tents, getting the bulkiest items out of our backpacks for the night right away and letting our sleeping bags fluff up before bed. Dinner was usually made right after; we wanted to make sure we were filling up our daylight hours with activities that were much better done with more light. After dinner, the team that had led for the day would meet with the Bobs and debrief how the day went from our perspectives, and then we would hear what they thought we did really well and what areas we could improve on. Our conversation after our leadership day went very well; they were complementary of how John and I worked together, making decisions as a team, but suggested that I do more to include other people in directing the group instead of always being the one to convey the plan. I could understand what they were saying and knew they were right about sharing the load of communication as it shows a united leadership team to the group. I felt guilty for taking up space and not providing opportunities for John to also direct and disseminate information.

After the private meeting with the Bobs, everyone would get together for the evening debrief. We would start with our Rose, Bud, and Thorn discussion where each person would say their highlight of the day, something they learned or thought was interesting, and their personal low point. Almost everyone's Thorn was the constantly having to take their shoes on and off throughout the day because of the amount of rivers, although I think everyone understood that it was an inevitable consequence of getting to travel mostly on trails. The overall Rose of the day was passing a group leading alpacas and the dog we met named Hugh Jackman. Listening to the other perspectives of the day, I was surprised by how everyone reacted to the trek. I had doubted myself and my leadership skills more than the group had.

Chapter Four: Fire

"And if the husk of the world is ripped away,

We will not have altered the consciousness of one leaf"

-From "Down from the Houses of Magic" by Cyrus Cassells

After the first week of our trip, an overall ease settled into us as our daily routines had been reestablished. We knew, roughly, what to expect out of every day. We would wake, do group yoga, make breakfast, pack up camp, put our packs on, and go. It was the going that was different every day, the unexpected bits where we faced new challenges. Some days we floated and dreamed while in others we were suffocated most of the way, grasping at the air. Not all of our days allowed our wanderings above tree line but some certainly did. These days also were seemly always accompanied by the threat of rain and lightning.

One of our first group lessons was lightning safety, as the weather forecast before our two weeks indicated multiple days of precipitation. The first storm we encountered along the trip was on a day when Mary and Collin were leading the group. We started the day with a massive upwards climb, moving constantly upwards to meet the heaven above. The morning was bright and crisp, the talus fields playground-like despite their pointed edges and uneasy footings. Dark clouds loomed in the distance moving away from us. Every now and then someone would look over their shoulder just to check on them, as if they were a member of our own group needing to be taken care of and watched.

As we climbed, up further still, sometimes on all fours, the sky grew darker as the clouds started moving towards us. At our peak we were able to look out over the valleys below us, finally seeing Needle Lake, our destination for the evening, thousands of feet down, surrounded

by plush pine trees fully shrouding the valley floor beneath. Although Mary and Collin had been leading us at a steady, albeit fairly rigorous, pace, Tim took over leadership and direction as he saw the darkness headed towards us. Looking out around us, only rocks looked back. We were by far the tallest thing nearby: not something you want to be when lightning is nearing. That, and wet rock tends to be slippery and human bodies are fairly fragile. The top of this peak was not broad as many of the others on our trip had been, with a large expanse between one side and the other to meander through. Just as we had reached our top, we started back down with little time to appreciate how far we had come. The valley where we had spent our previous night was so small and far away.

Our descent was managed carefully but with a sense of brisk urgency. Through a particularly technical downclimb, rock climbers partnered with non-climbers, responsible for helping one another down the steep, rocky terrain. Tim had sped ahead of us, dropping his pack and giving group directions from a little platform off to the side of the gully we were making our way down. As he viewed us from his perch, peering at the clouds beyond us, we heard our first rumblings, hungry and demanding. We all paused momentarily, looked at first around us and then back to one another, making eye contact and sharing knowing glances. Our pace quickened.

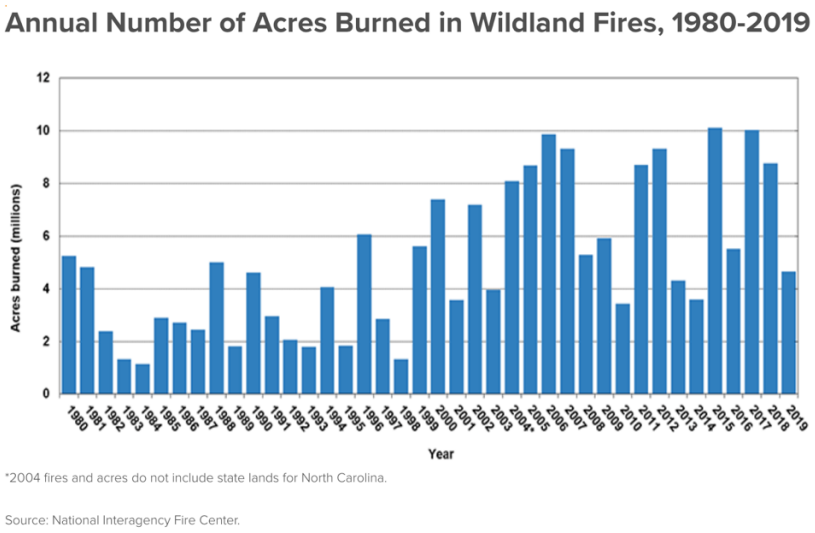
Reaching the bottom of our gully, the mountain sloped steadily down to our lake, really only a short jaunt away. I think we all started racing then, sprinkles touching our cheeks as we almost ran. We were running for the trees, desperate for their protection, their height. Breaking through the first few trunks was relieving. The booming continued around us, the cracking whips were striking somewhere close by. We threw off our backpacks, rolled out our sleeping mats, we crouched with bent knees, bodies resting on only our heels. A rule to follow when figuring out how many miles the lightning strikes is to count the time between a flash and an explosion. For

every five seconds, a mile separated your body and the jittering electricity. When we were at the top of our daily peak the seconds seem to reach into minutes, the risk so far away. Now, at the bottom, our counting did not reach the first count of five.

Mary and I were positioned nearby one another, with Tim off to our left. From our vantage point no one else in the world existed, our group members too spread out among the thick trees. When there is no time for counting, there is just a single explosion accompanied by a vibration felt within your bones, a sinking your stomach, and the smell of burning wood; the storm and you are no longer separate. The rain never seemed to pour over us the way I would have expected with the persistent clambering of the thunder and lightning. It would have been welcome almost, to make the storm at least seem as terrifying as it made me feel. It had been a fairly dry year in Wyoming, evidenced by the various expanses of dead or dying grasses and flowers for days.

The rain and water supposedly have a way of washing away our sins, but nothing seems to be more final than fire. It wipes the slate clean, disappearing vast landscapes that once were. Ancient woods, modest in appearance and powerful in memory, erased. It also provides opportunity for new growth and resets the landscape. I did not want to become part of the erased landscape. We could not have outrun a forest fire, not where we were. In those moments, as I was crouched over my sleeping mat over a patch of dry pine needles, I thought about where we would go should the smell in my nose not just be of the scorched tree on the edge of the tree line. I reached down to pick up a few pine needles. They pricked me, warning me at their potential danger and laughing at their power over me. They we not even damp, the lack of rain with the storm made it even more horrifying.

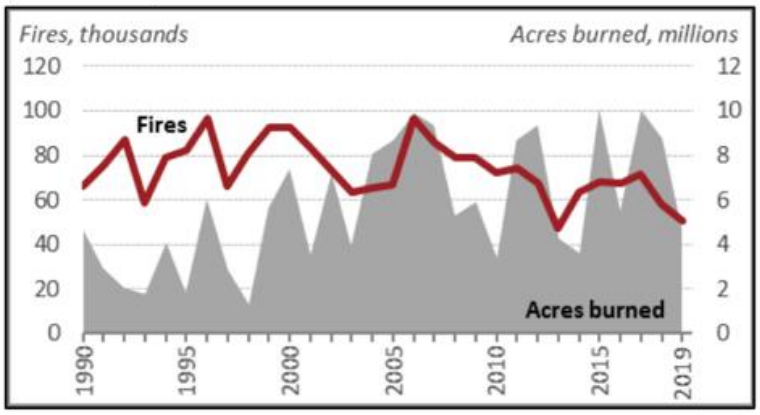
Most wildfires in the United States are directly caused by humans, with only about 10 percent caused by either lightning or lava catching dry brush on fire. According to the National Interagency Fire Center, from January 1 to October 16, 2020 there were 45,939 wildfires compared with 43,509 wildfires in the same time period in 2019. About 8.3 million acres were burned in the 2020 period (4.1 million acres in California alone), compared with 4.4 million acres in 2019 (2.5 million acres in Alaska). The highest reported acres burned was in 2015 with roughly 9.3 million acres burned. While the number of fires per year changes dramatically, overall, there is an upward trend since the 1980s, as showcased in the graph below.



I did not know at that time that humans were by the far the greatest contributor to wildfires across the nation. I also did not know that Wyoming is not one of the top ten states that have had the most wildfires, neither overall or on a yearly average. It is, however, one of the western states most at risk of having small fires turn into larger ones because of the heat and weather conditions (Congressional Regional Service). As climate change continues to impact extreme weather, drier climates will get drier and wetter climates will get even wetter. Already in

2020 we have almost surpassed the previous year's number of fires and almost doubled the amount of acreage burned and on our way to setting a record, overtaking the total area burned in 2015. The number of wildfires per year has been following a fairly regular trend and sloping slightly down, but the amount of acres burned has been increasing as shown in the below figure.

Figure 1. Annual Wildfires and Acres Burned (1990-2019)



Source: National Interagency Fire Center (NIFC).
Note: Data reflect wildland fires and acres burned nationwide, including wildland fires on federal and nonfederal lands.

Crouching under those trees, I did not know the statistics, but doubt now that they would have made me feel any better. I was afraid of the fire, definitely, but I was also scared about getting struck directly by a bolt. According to the National Weather Service, "Lightning kills an average of 49 people each year in the United States and hundreds more are injured." Once again, I didn't know that at the time, and honestly, I do not think it would have helped put my mind at ease. I have decidedly bad luck.

As the storm moved past us and the intervals of counting got longer, my heartbeat started to slow. My fear settled and my mind stopped pondering what our escape route would be if a fire

broke out. I was able to focus again on my breathing and the metaphorical fire lighting up my calves from staying crouched for so long. Mary and I could tell Tim was coming out of his own tiny hell of worry. His forehead was beaded with sweat and his face was wrinkled with worry. Once he concluded his own, and our, safety, he had started making coffee as it was "good for the nerves," he said. Slowly, we started to hear voices echoing through the trees as the rest of our group erupted from underneath trees and around bushes. It had been almost an hour since we had run down the mountain, so focused on reaching our sanctuary and perceived safety. Nervous laughter rippled its way around our gathered group as we tried to settle in for the evening, knowing we might have to return to our crouches later on since the clouds remained dark above us.

Sitting down for our nightly debrief, the Thorn for pretty much everyone was the shockingly terrifying nature of the day, even the seasoned backpackers and adventurers. Everyone agreed that Mary and Collin had been wonderful as the morning's leaders. They had led the group with enthusiasm, payed attention to everyone's physical needs, and encouraged the group enough to push us forwards up the massive elevation gain. We got through our Rose, Buds, and Thorns quickly, everyone still fairly exhausted from the physical and mental challenge of the day. Liam taught his practice lesson on fire safety, building our first fire of the trip on a patch of sand. It was small, really just a little flicker of light to break through the darkness that night. Looking at the flames, I thought about my fears from earlier in the afternoon and the escape route I had planned in my mind. In Liam's lesson he had a section about how to build a small fire as well as one about the multiple, and dueling, perspectives on fire in the backcountry.

Concentrated campfires can permanently scar and sterilize the earth below the heart of the flames. They can, as already discussed, lead to the worst wildfires in history, catching some

stray dry brush ablaze and desecrating millions of acres. Even looking at our small fire on the sand, we all knew why it was dangerous. In our discussion about fire's place in the backcountry, and camping in general, we decided that it was not right for us, that we did not need it in order to get the "full experience," and that the risk, specifically in the backcountry, was just too great. During our chat around our tiny light, Andi told us some good news: tomorrow would be a zero day, meaning we would not be putting in miles and instead would get to stay at that camp for two nights. And we did not have our morning wake up until 10:00am, almost five hours more sleep than we had been getting in a single night. I almost cried.

Chapter Five: Only A Year, What About Fifty?

"I've known rivers:
I've known rivers ancient as the world and older than the
flow of human blood in human veins."
-From "The Negro Speaks of Rivers" by Langston Hughes

After taking a much needed and highly regarded rest day, we were ready to get moving again, anxious to start making our loop back towards the cars: we were at our farthest point out, it was time to head back home. Nora and Liam were the day's leaders, and in their morning briefing they told us to expect to reach our next camp around noon, hours before when we would normally expect to pitch our tents for the evening. We were all happily shocked by our route and were willing to put in the work to make such a day happen. That morning we all prepared for the day in high spirits, excited to get through the morning and make it to lunch at our next stop.

It quickly became obvious that we would not be reaching our destination at the highly anticipated time. We had been climbing up hills just to go back down them, had many breaks where Liam would leave to scout, leaving the rest of us to sit and take a break after only walking for a short time. We gained little ground and ate up a lot of time. Noon came and went and we were still miles away from where we were supposed to be. We did not stop for lunch but continued on for hours instead. Eventually, people, myself included, began to feel sick and weak from not eating and needed to stop, rest, and snack. Everyone was frustrated. People were angry, hungry, dehydrated, and disheartened with the day. We had not been frustrated like that since the beginning of the trip, balancing on those fallen trees and having our bodies pushed and abused by sharp branches.

I have come to understand my body pretty well, after all, I've lived in it for a while now. One of my understood faults is that I get grumpy when I have not eaten or had enough water. Most people get this way, I think, and we can tell when we simply need to stop and rest to recuperate. Taking care of your body, especially when you are pushing it harder physically than you do on a regular basis, is necessary. Stopping for a short time, Nora and Liam met with the Bobs and discussed which way we were headed. There was some nervousness about our maps being potentially inaccurate. While others debated, I drank water, ate some almonds, and lay on a rock, staring up the mountain we had been headed up all morning. We were near the top already, nearing the tree line, laying around in the shadow of the mountain towering above us. Regaining a sense of where we were, the leadership team told us we were only a short distance off from where we were supposed to be.

Beth had been sitting next to me, looking up at the defined line between white and black on the side of the mountain. Even in the heat of the summer, mountain glaciers can stay in their

positions atop peaks, glistening as warmer days melt little chunks away. “Hey Tim,” Beth called, “Haven’t we been here before?”

“Yeah, this is the same leg of the trip we went on last year with the other group,” Tim replied, not looking up from the map he was looking at intently.

“Wasn’t there a larger glacier here? I remember it almost reaching the base of the ridge.”

Tim looked up at Beth and followed her gaze up the shadow of blackened talus and up to where the white snow began. I could see the features of his face change as he tried to place the specific area around us in reference to last year’s OLS crew. He got up and walked towards the white. After looking after him, the rest of us slowly followed, leaving our packs where we had been enjoying our food before. Beth told us to bring our trekking poles along. When we reached the line of snow, Tim told us about how the last crew had learned to walk on snow on this same glacier last year. He turned and pointed down the mountain towards the ridge Beth had pointed out earlier, “That’s where it used to end,” he said, “and this is where it is now. Crazy how much can change in a year.”

The glacier had melted about three hundred feet, roughly the length of a football field. Who knows how deep it used to be and how many layers had been exposed newly to the sun. There were no trees in the glacier’s path, only rocks of varying size and shape, pushed and pulled by the forceful currents within the glacier as it expanded and retracted every year. Tim and Beth had been there the previous year at about the same time, and yet the difference within that time was drastic. I could tell by looking at the two of them that they were upset. This place had held meaning to them, to last year’s group, and would to ours as well. We learned how to walk on snow in the backcountry, an important skill for adventurers. We also learned about how much

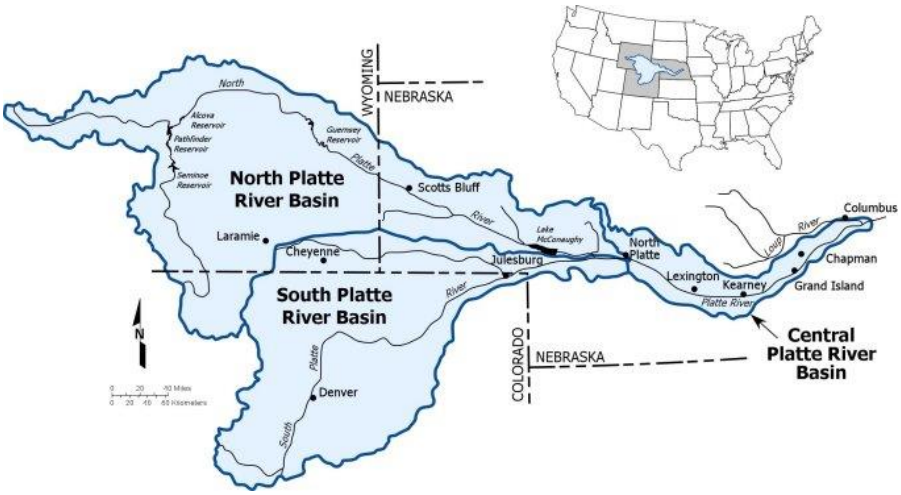
the global temperature change had affected our Wyoming glacier, the whole landscape there really.

Walking back towards our backpacks later on, we started packing our belongings, ready to hike on to our new camp now that we had a better idea of where we were. A little stream was running next to us, racing off down the slopes into the valley. We filled our water bottles up for the rest of our walk that day, reaching our bottles into the icy water. The water that was melting off the glacier we had just been walking on was feeding this little stream, willing it into existence. This little stream wandered off down the landscape to meet with other streams coming off their own mountains and their own glaciers. They grouped together, finding a wholeness in their company with others, the little droplets finding a home with one another, a safety. These mountain streams would grow and grow until they raged through landscapes far away.

***

The waters that melt out of the mountain glaciers in Wyoming and Colorado feed the Platte River Basin, a system that runs through all of Nebraska, with nearly 80,000 miles of rivers and streams running through it (Nebraska Department of Agriculture). Growing up in Omaha, Nebraska, the Missouri River ran along the border of our state and the border of our city. The headwaters of this river are much farther north, in Montana, flowing down through the Dakotas before finally reaching the banks of Omaha. If your gaze turns from looking East and instead turns to face the West, the whole Nebraska states turns to look back at you. Some days it feels like you can see from one side of the expanse to the other, over the flat corn and soy fields that lay in between, the sparse townships and even sparser cities. Growing up in Nebraska, everyone seemed to know how important water was, even if it was not a large part of our existence in the city. My dad grew up in New Orleans and moved to Colorado for graduate school. I remember

him telling me the two most shocking things about his movement there: all of a sudden there were mountains towering above you and no water, anywhere. Nebraska can feel much the same, not a whole lot of water on the surface.



In 2019, the population of Nebraska was estimated to be just north of 1.9 million, according to estimates put forth by the Census Bureau. Wyoming is the least populated state, with only about 572,000 residents. The waters coming from a state with almost a quarter of the population supplies huge portions of the water used for agriculture in Nebraska. Most people in both states live in smaller, rural towns scattered across vast landscapes, with 92% of the total land area in Nebraska being utilized by farmers and ranchers (Nebraska Department of Agriculture). Nebraska is nationally ranked in producing some of the country's most important commodities, including cattle, corn, various beans, ethanol, animal products, hay, and many others as outlined and ranked in the image below. In order to ensure the health of both the plants and animals widely raised and exported in the state, large amounts of water are required to yield healthy and productive harvest and raise healthy animals.

Nebraska's Top National Rankings

1st Beef and veal exports, 2018 – $1,318,500,000
Commercial cattle slaughter, 2019 – 7,666,300 head
Great Northern bean production, 2019 – 749,000 cwt. (38,049,200 kg)
Popcorn production, 2017 – 368,620,976 lbs. (165,879,439 kg)

2nd All cattle and calves, Jan. 1, 2020 – 6,800,000 head
All cattle on feed, Jan. 1, 2020 – 2,600,000 head
Commercial red meat production, 2019 - 8,289,800,000 lbs. (3,769,190,029 kg)
Ethanol production, Jan. 2019 – 2,186,000,000 gallons
Pinto bean production, 2019 – 845,000 cwt. (42,926,000 kg)
Proso millet production, 2019 – 3,286,000 bushels (74,526,480 kg)
Light red kidney bean production, 2019 – 145,000 cwt. (7,366,000 kg)
Bison, 2017 – 28,047 head

3rd Corn for grain production, 2019 – 1,785,420,000 bushels (45,349,668,000 kg)
Corn exports, 2018 – $1,476,600,000
Cash receipts from all livestock and products, 2018 – $11,914,468,000

4th Beef cows, Jan. 1, 2020 – 1,922,000 head
Total animal products exports, 2018 – $1,848,400,000
Soybean production, 2019 – 283,140,000 bushels (7,701,408,000 kg)
All dry edible bean production, 2019 – 1,883,000 cwt. (95,656,400 kg)
Cash receipts from all farm commodities, 2018 – $21,117,971,000
Land in farms and ranches, 2018 – 45,000,000 acres (18,210,854 ha)

5th Soybean exports, 2018 – $1,218,700,000
Alfalfa hay production, 2019 – 3,610,000 tons (3,274,992,000 kg)
Harvested acres of principal crops, 2019 – 18,777,000 acres (7,510,800 ha)
Cash receipts from all crops, 2018 – $9,203,503,000

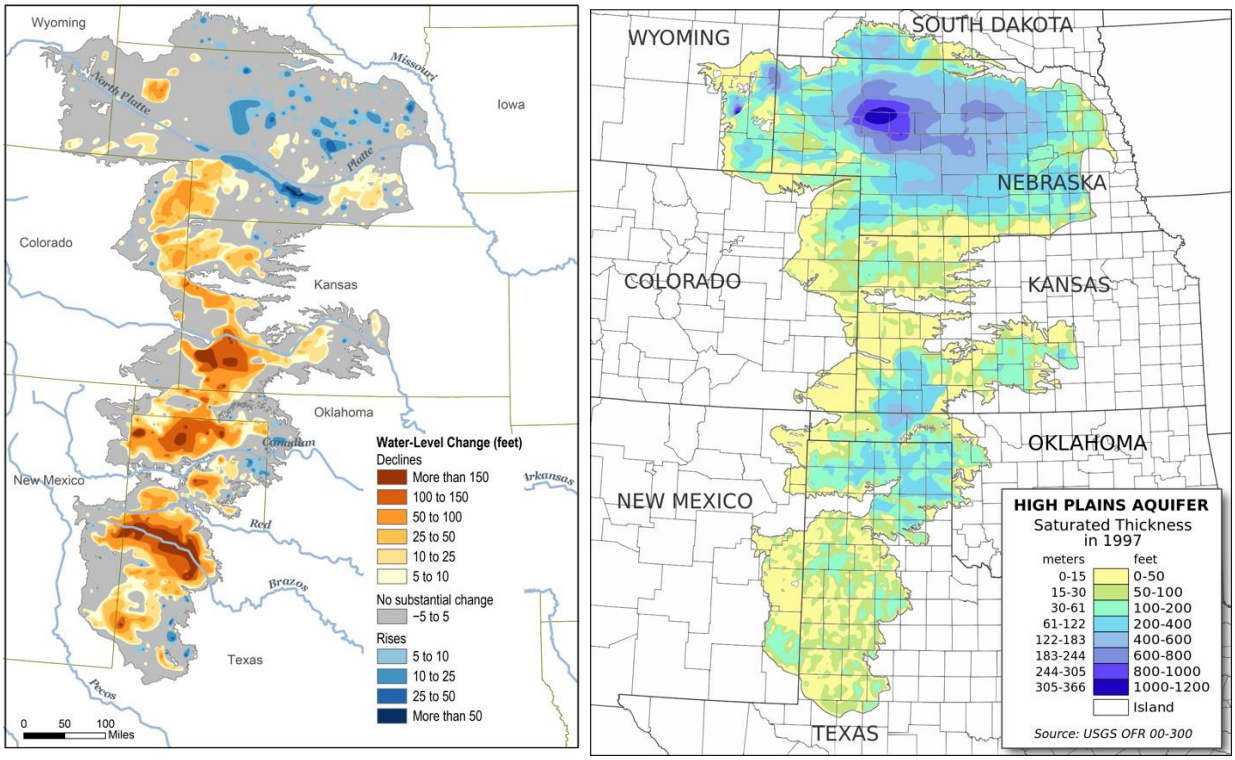
6th Agricultural exports, 2018 – $6,802,300,000
All hogs and pigs on farms, Dec. 1, 2019 – 3,750,000 head
Commercial hog slaughter, 2019 – 8,013,200 head
All hay production, 2019 – 6,085,000 tons (5,520,312,000 kg)
Grain sorghum production, 2019 – 12,090,000 bushels (307,086,000 kg)

7th Sugar beet production, 2019 – 1,069,000 tons (9,796,800 kg)
Sunflower production, 2019 – 44,850,000 lbs. (20,182,500 kg)
Pork exports, 2018 – $246,800,000

8th Winter wheat production, 2019 – 55,290,000 bushels (1,503,888,000 kg)

The largest underground freshwater aquifer in the world is in the United States, underneath parts of Wyoming, South Dakota, Colorado, Kansas, Oklahoma, New Mexico Texas, and with the deepest parts of the aquifer lying beneath almost the entire Nebraskan state. According to the Nebraska Department of Agriculture, “If poured over the surface of the state, the water in those aquifers would have a depth of 37.9 feet.” Water from the Platte River Basin, as well as rainfall, help to replenish the waters deep below us. Most portions of the Ogallala are losing water every year, some with losses over one hundred feet (shown in the left side figure below). In many areas, the water from the aquifer are used for similar reasons as in Nebraska: for agriculture and municipalities. About 51% of the drinking water in the United States is supplied by groundwater, with 99% in rural communities. Crop irrigation draws most of its water (64%)

from groundwater as well, making the Ogallala a huge contributor to the water accessibility within the state (Nebraska Groundwater Foundation). As these reserves continue to deplete over time, there will be strains on other sources, possibly resulting in shortages for both people and within agriculture. If snow can no longer accumulate over winters and help supply water to the Platte Basin in summers, the aquifer will not have additional water fed into it every year. As droughts become more common in parts of Nebraska (the Sandhills), they will need to draw on more water, as will the rest of the state. Our seemingly endless resource has been proven to not be infinite. There are limits to our consumption, and with growing population sizes, communities will require greater quantities for their members and even more water will be needed to grow more crops to feed these new people.



The deepest part of the aquifer is in Western Nebraska, almost in the pan-handle. The saturated thickness there is over one thousand feet. This section is referred to as “the eye.” It peers back out at you from its spot almost directly in the center of the country, the heart of it. As it moves farther south, the less water it has, as if the tears from the eye dry as they run down the cheeks of the Midwest. Ancient waters are housed within the eye, though it is replenished yearly from new waters, recycled from other parts of the system, from the coasts and into the rain, from the snow, into the glaciers, into the streams and rivers in the Platte Basin.

In his book The Immense Journey, Loren Eiseley has a chapter devoted just to water. It begins with a simple enough line: “If there is magic on this planet, it is contained in water” (15). In this section, he discusses the life and path of a single drop of water. How simple and insignificant we believe a single drop of water to be, but as it passes through our planet’s systems, it comes to live a life of wandering and adventure, exiting and full. Water can become anything, “Its substance reaches everywhere; it touches the past and prepares the future; it moves under the poles and wanders thinly in the heights of the air. It can assume forms of exquisite perfection in a snowflake, or strip the living to a single shine bone cast up by the sea” (Eiseley 16). The drops of water that filled my water bottle on that trip would eventually travel all the way to the ocean, would be touched by some creature I did not know, pass through some other being’s body.

These same drops would one day find themselves in the Platte River, passing through near Kearney, a small Nebraska town, home to one of the stop-over points along the greatest animal migration in the world. Every year, about 600,000 Sandhill Cranes stop in the Platte to eat and regain their strength before heading on the next lengths of their migration. Early morning bird watches in the late fall and early spring are deafening as the birds screams fill the air.

Without the water in that area, these birds, and many others on their annual migrations would not have a place to stop. Not as many of them would survive the trip.

Sea levels are rising at an increasing rate as glaciers and ice sheets melt and do not re-freeze and expand in winters. According to NOAA, "Between 1980 and 2018, glaciers tracked by the World Glacier Monitoring Service have lost ice equivalent to 21.7 meters of liquid water—the equivalent of cutting a 24-meter (79-foot) thick slice off the top of each glacier." With so much ice disappearing from areas all over the world, not just our coastal regions will be affected, but everywhere else as well. About 40% of the world's population lives within 60 miles of the coast, meaning nearly 2.4 billion people will become displaced and need to find permanent residence somewhere else (United Nations). The melting of the glacier we saw in the Winds directly impacts sea level rise in the Gulf Coast and the rest of the world. It was shocking for us to visually see the change a year had made and how rising regional temperatures had greatly affected a single place.

Looking around us at the white tipped peaks against the bright blues of the sky, they seemed stable, as if they had been painted on top of the rocky layers below them. Maybe at that same time in twenty years there would no longer be any white. Maybe it would only take ten. It was hard to imagine the landscape looking too much different than it did right then, it was too perfect in the way it exposed itself to the heavens, saying almost, "Look at me. Can't you see all I have to offer?" If you were to look at it from above, you would not be able to see down into the valleys below the thick pine branches, protecting the floor from spying eyes. If you were to look at it from above you would be able to see small veins cut through the land and grow in size, making their way across diverse landscapes. If you stopped in some areas, these lifelines would be large, others only a trickle, some accompanied by the sound of hundreds of thousands of

migratory birds, and some barely a whisper. The water, barely audible, next to my feet was doing its best to scream out, call out into the world, excited for its new adventure, hoping to go meet with the other drops that had left long ago.

Chapter Six: Go Light

"To climb these coming crests
one word to you, to
you and your children:

stay together
learn the flowers
go light"
-From "For the Children" by Gary Snyder

I am not ready to start a new chapter just yet, but I am ready to continue on the same path I have been on for some time now. The world seems smaller to me now somehow. I am not sure when that happened either. When I was a child, I dreamed of the vastness and the endless expanses, but somewhere I also began to shrink this enormity down. I learned about the connections between things, how the system depended on many different cycles to function properly. An event that affects one part of the world is not isolated there, and results in consequences elsewhere. Whenever I think of these connections, I am forced to think of Aldo Leopold's "The Land Ethic" section of A Sand County Almanac. He writes, "When a change occurs in one part of the circuit, many other parts must adjust themselves to it. Change does not

necessarily obstruct or divert the flow of energy; evolution is a long series of self-induced changes, the net result of which has been to elaborate the flow mechanism and to lengthen the circuit. Evolutionary changes, however, are usually slow and local. Man's invention of tools has enables him to make changes of unprecedented violence, rapidity, and scope." Most importantly here, besides noting the connection parts of the system have to one another, there is an emphasis on man's influence on the environment, and overall how destructive it is.

I like the idea that one person can change the world, and I do truly believe this to be true. While we may not be one of the few with this ability, there is still much that we can do. Every trip I lead for my job I try to show people how beautiful the outdoors can be, how much we must rely on it, and how fragile it is. By instilling in people some sense of responsibility, stewardship, and respect, hopefully these people will be somewhat changed in their attitudes and their actions towards our Earth. I am not expecting to change every person's perspective, nor am I expecting them to become environmental activists, but I am trying to do my part in showing others how much we have to lose if we do nothing.

***

Looking out to the stars on a clear night never ceases to amaze pretty much anyone. In Colorado, if you are up high enough above the cloud cover and light pollution, you can see the line of the Milky Way cut across the sky. The twinkling lights represent worlds far away, and the empty spaces show lands even farther away, possibly with their own life forms. Do these planets have the same issues we do? Do they abuse their lands for profit? Do they care who gets hurt in the process? What are they doing to combat these issues? What can we do?

If a single person can change the world, I am certain that a large group of us can as well. There are too many brilliant minds and kind hearted people for me to believe that all hope is lost.

We can do our part in any way we can. I will continue to lead trips, stick with my vegetarian diet, and ride my bike. There is more I do to help, and still more that I can do. I have hope because I have to. I am not sure we can make it through this struggle without this hope, without this dream. The monsters of my nightmares are no longer werewolves, vampires, and witches, but are fossil fuels, melting glaciers, extreme weather, and greenhouse gases. My superheroes are no longer the knights saving the princesses but people like Greta Thunberg, Michelle Obama, Malala Yousafzai, Ruth Bader Ginsberg, and Wangari Maathai. The places I longed to see have changed, but I still dream of seeing more of the world. I now see myself as a protector and lover of the Earth. I have opened and closed many of my own chapters, and will continue to do so. Our planet has many more chapters than I, but I am lucky enough to be in the same chapter as the people I just mentioned, and the many more that will become more prevalent in the near future. These activists, these heroes, will be in our story, and we will all be in the Earth's. How we want this chapter to end is entirely up to us. There are many possible endings. The next chapter may have humans in it, it may not, but there will be another chapter nonetheless, and I am sure it will be beautiful either way.

Works Cited

Bair, Julene. The Ogallala Road: A Story of Love, Family, and the Fight to Keep the Great Plains from Running Dry. Penguin Books, 2014.

Dobson, Andy P. "Yellowstone Wolves and the Forces That Structure Natural Systems." PLoS Biology, vol. 12, no. 12, Dec. 2014, pp. 1–4. EBSCOhost, doi:10.1371/journal.pbio.1002025.

Climate.gov. "Climate Change: Glacier Mass Balance." National Oceanic and Atmospheric Administration https://www.climate.gov/news-features/understanding-climate/climate-change-glacier-mass-balance. Accessed 9, Nov. 2020.

Dictionary.com. https://www.dictionary.com/browse/keystone-species. Accessed 9, Nov. 2020.

Eastern Shoshone Tribe. "About The Shoshone Tribe." http://www.easternshoshone.org/about.html. Accessed 12, Nov. 2020.

Eiseley, Loren. The Immense Journey. New York, Random House Inc., 1957.

Fixico, Donald L. "When Native Americans Were Slaughtered in the Name of 'Civilization.'" History.com. 26, Oct. 2020. https://www.history.com/news/native-americans-genocide-united-states. Accessed 12, Nov. 2020.

Hanson, Laura A.; Hoover, Katie. "Wildfire Statistics." Congressional Research Service. https://fas.org/sgp/crs/misc/IF10244.pdf. Accessed 9, Nov. 2020.

Institute of Agriculture and Natural Resources. "Cropwatch: Ag Water Resources." University of Nebraska-Lincoln. https://cropwatch.unl.edu/cropwatch-youth/agwaterresources. Accessed 9, Nov. 2020.

Insurance Information Institute. “Facts + Statistics: Wildfires.” https://www.iii.org/factstatistic/facts-statistics wildfires#:~:text=2019%3A%20In%202019%20there%20were,million%20acres%20burned%20in%202018. Accessed 9, Nov. 2020.

Jones, Stephen R. The Last Prairie: A Sandhills Journal. University of Nebraska Press, Bison Books, 2000.

Leopold, Aldo. The Sand County Almanac: And Sketches Here and There.

Moran, Greta. “High Plains Farmers Race to Save the Ogallala Aquifer.” Civil Eats. 2019. https://civileats.com/2019/11/18/high-plains-farmers-race-to-save-the-ogallala-aquifer/. Accessed 9, Nov. 2020.

National Interagency Fire Center. 2020. https://www.nifc.gov/fireInfo/nfn.htm. Accessed 9, Nov. 2020.

National Science Foundation National Research Traineeship (NRT) Program. “The Platte River Basin.” University of Nebraska-Lincoln. https://nrt.unl.edu/platte-river-basin. Accessed 9, Nov. 2020

National Weather Service. “Lightning Victims.” National Oceanic and Atmospheric Administration. https://www.weather.gov/safety/lightning-victims. Accessed 9, Nov. 2020.

Nebraska Department of Agriculture; USDA. “Nebraska Agriculture Fact Card.” 2020. https://nda.nebraska.gov/facts.pdf. Accessed 9, Nov. 2020.

O’Brien, Dan. Buffalo for the Broken Heart: Restoring Life to a Black Hills Ranch. New York, Random House Trade Paperbacks, 2001.

Pariona, Amber. “Biggest Indian Reservations in the United States.” World Atlas. 5, June 2018.

https://www.worldatlas.com/articles/biggest-indian-reservations-in-the-united-states.html. Accessed 12, Nov. 2020.

Pfost, Doreen. This River Beneath the Sky: A Year on the Platte. University of Nebraska Press, Bison Books, 2016.

The Ocean Conference. "Factsheet: People and Oceans" United Nations. https://www.un.org/sustainabledevelopment/wp-content/uploads/2017/05/Ocean-fact-sheet-package.pdf. Accessed 9, Nov. 2020.

The United States Census Bureau. "QuickFacts: Nebraska" https://www.census.gov/quickfacts/NE . Accessed 9, Nov. 2020.

Wind River Visitors Council. "The Wind River Range." https://windriver.org/experience/wind- river-range/. Accessed 9, Nov. 2020.

World Population Review. https://worldpopulationreview.com/states. Accessed 9, Nov. 2020.

Wuerthner, George. "Bison ecology, ecological influence, behavior, and decline." Wildlife News. 2, Sept. 2020. http://www.thewildlifenews.com/2020/09/02/bison-ecology-ecological-influence-behavior-and-decline/. Accessed 12, Nov. 2020.

Wyoming State Historical Society. "The Arapaho Arrive: Two Nations on One Reservation" WyoHistory.com. 23, June, 2018. https://www.wyohistory.org/encyclopedia/arapaho-arrive-two-nations-one-reservation. Accessed 12, Nov. 2020.