TALKING THROUGH WATER: EXPERTS, ENVIRONMENTALISTS, AND THEIR PUBLICS, 1944 TO 1977

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Abstract

In response to the repeated droughts of the early twentieth century in northeastern North Dakota, the U.S. Bureau of Reclamation planned a large-scale diversion project called the Garrison Diversion Unit (GDU). The GDU, a multipurpose engineering project, received its first approval in 1944 promising to redirect water from the North Dakota segment of the Missouri River through a system of dams, reservoirs, and canals for the purpose of irrigation, hydroelectricity, industrial and municipal water supply, expansion of recreation areas, and enhancement of fish and wildlife areas. The engineers who planned the GDU failed to consider the environmental impacts or international political implications of the diversion of the project's irrigation return flows from one watershed to another and across the border into Canada. Although the project itself remains unfinished to this day, the GDU debates that raged between 1940 and 1977 provide invaluable insights into the professionalization of environmental experts, international water diplomacy, and the role of the public in the realization of mega water projects.

From the GDU's inception, various groups and individuals have contested this project. This dissertation examines how knowledge of water, technology, and public policy was mobilized in various sites of debate during a critical period in the development of environmental policy in America. I analyzed three sites of the debate: the promotion of the project by its leading engineering figurehead, the scientific and environmental organizations and committees that debated the environmental impacts of the project, and the international commission that engaged local users for the first time to determine the project's future. I found that economic, social, political, and cultural arguments and language, rather than scientific evidence, shaped the

dialogue, allowing both experts and non-experts to engage in the debate using various types of knowledge. This dissertation argues that the GDU, the reports it generated, and the talk surrounding it did not only describe the physical engineering edifices being proposed; they also and perhaps more importantly, revealed the GDU as an envirotechnical system that provided experts and non-experts alike with opportunities to communicate, translate, and challenge one another's ideas about technology and the environment.

Acknowledgements

There once was a young woman named Karen Dyck who was recruited by the University of Winnipeg in 1997 not for her academic skills, but for her athletic ability as a basketball player. By her second year Karen was facing the real risk of being placed on academic probation for failing to meet the minimum academic requirements for varsity student-athletes. However, at just the right moment, Karen's story was interrupted by a kind and generous professor by the name of Nolan Reilly. Recognizing Karen's buried academic potential, Nolan offered Karen a most precious gift that changed the trajectory of her life: one-on-one academic mentorship. Nolan began to coach Karen not on the court, but in the classroom. He taught her to be fascinated by the study of history, to be curious and to think like a researcher, and to write with accuracy and heart. From nearly missing the academic eligibility requirements in her first years as an undergraduate, to becoming an A-student at the PhD level, Karen did not look back. A history scholar was born!

My story of academic transformation was also marked by the timely investments of many other influential scholars along the way including Tamara Myers, Royden Loewen, James Hanley, Jacalyn Duffin, Karen Dubinsky, Marcel Martel, Sharon Reilly, and Christopher Kotecki. Despite my rough edges as a student, each of these men and women saw my potential before I did. I owe a large debt of gratitude to each of these men and women who enthusiastically engaged with me, an eager beaver, and a wannabe historian, during my frequent visits to their offices asking questions, hoping to discuss my ideas, and requesting feedback. Each provided me unique opportunities to apprentice under their watchful eyes, encouraging me to discover my unique interests, and inspiring me with their infectious passion for history.

I want to thank my supervisor, Kathryn McPherson for never giving up on me. You have stuck with me through thick and thin on this journey and you never lost hope that I would one day finish this work. Although I struggled severely with the symptoms associated with a head injury I incurred when I was struck by a car while riding my bike in 2014, Kate, you continued to set the bar extremely high. Your expectations of me as a scholar who was capable of excellence in research and writing did not change despite the health challenges that I faced. When I could no longer count my change after my accident or when I needed to record every conversation to compensate for my broken memory receptacle or when I would disappear for months at a time because of my health issues, you did not treat me as the incapable student I felt I had become. Instead, you continued to engage with me as a proficient scholar. Your belief in me kept me clinging to a vision that one day I would indeed produce a dissertation that would provide a fresh perspective on an old conflict and would make a substantial academic contribution. I could not have finished this work without your constant guidance and care over the last twenty years.

To my supervisory committee, Kate, Kathrine Anderson, and Sean Kheraj, you three have been such a bastion of support for me over these many years. You read every draft with a keen eye for the details while also focusing on the ideas and methodological approaches informing my work, pushing me to tighten and to sharpen my arguments and to own my contributions to the scholarship with confidence. Kate and Katey, I especially want to thank you for spending hours with me over the phone in the final stages of my writing to work through several significant sections of my work; those conversations were essential and really took my work to the next level! All three of you provided me with a safe space to test my ideas and to expand my thinking while also daring me to think about the GDU in new ways.

A huge thanks goes out to my committee and to the three other examiners who presided over my oral examination. I left my defense not feeling beat up but built up; your collective encouragement enabled me to stand two feet taller as a writer and a historian. To Daniel Macfarlane who acted as my external examiner, thank you for traveling to Toronto for my defense and for reading my work with such careful attention and interest. Your thoughtful feedback has served to sharpen my ideas and to strengthen my work. Thank you also to Matthew Tegelberg and Jennifer Stephen for taking time out of your busy schedules to read and to engage with my work. I really enjoyed the meaningful conversation we were able to have. Thank you to Karen Dancy and Lisa Hoffman who handled the administrative fallout of my many starts and stops over my twenty years in the history department at York University. Your care and administrative support played a key role in my ability to finish this degree.

My sister Andrea Klassen took time out of her schedule in 2009 to help me collect all of my primary source data. Not only was Andrea's company on the long road trip welcome and her attention to detail so perfect for the investigative work we needed to do, but her emotional support was so essential at a time when I was burned out and limping along. Andrea, your investment of time, your loving support, and your commitment to excellence provided a firm foundation for me to conduct my research and to propel me forward.

How can I thank the many friends who have stood closer to me than a brother over these twenty years? To the friends and to the strangers who became friends by providing me with a safe and quiet place to live and to write when I was in need, Ken and Linda, Randy and Natalie, Brodie and Rachel, Tim and Melissa, John and Donna, and Jen, my gratitude overflows. So many good ideas were born while I spent time in your homes and cottages. To the friends who supported me financially while I was too sick to work, but still needed to pay rent and buy food,

you know who you are; the Lord knows and has seen your open-handed gifts of love towards me, and He will reward you richly for this rare and uncommon sacrificial generosity.

Proverbs 29:9 says, "A sweet friendship refreshes the soul." My soul has been refreshed more times than I can count by more sweet friendships than I can list. “True friends are those rare people who come to find you in dark places and lead you back to the light.” (Unknown) The friends who have consistently found me in my dark places and have encouraged me to keep my eyes on the one true light are rare gems indeed: Amy, Becky, Carolina, Cindy, Daniella, Erin, Eunice, Gail, Janet, Johanne, Kathrin, Lorraine, Lorilee, Natalie, Marianne, Micha, Sarah, and Taya. You each are rare, beautiful, and gems of great price and I am honoured to know you and to be known by you. Rachelle, your fierce love, and our biweekly calls have anchored me when the swelling waves have threatened to capsize and overtake me; as my Jonathan, you have been my rock. Jen, your invitational love and friendship have blown me away. You have been the hands and feet of Christ to me by how you have given me a place to call home, a space to heal, and to become productive again. The love of a friend is rare and precious indeed.

To my parents, Ron, and Irene, you modeled discipline, resilience, and commitment to me from a young age and taught me how to grit my teeth when the going gets tough. Over these last ten years I have leaned heavily onto this heritage that you and the previous generation have set for me. The woman I have become and my ability to endure is a testament to your influence in my life. You made the two-day drive from Winnipeg to Toronto just to attend my defense. Knowing how proud you were of me blessed me more than you can know. Having you at my defense as my witness was an incredible honour.

I started this degree eager to pursue a career in history, but God, you had other plans. You upended my well-thought-out plans and invited me part way through my PhD to move to Africa

to serve and live amongst the poorest of the poor. While my life was deeply affected during this time of living and working overseas, I had no idea how much my life was about to change when I got sick in the field in 2013, which was then followed up by my bike accident and concussion in 2014. Since 2014, I have had to claw myself back from major injury and illness. I had every reason to quit pursuing writing this dissertation and though I argued, cried, pleaded, railed, and screamed for you to allow me to quit, but you just never let me give up on myself and on this work. This work has been a daily act of obedience and discipline as I have written through blistering migraines, relentless nausea, unending neck pain, deep mental fog, and physical fatigue, among so many other symptoms. Completing this PhD is therefore nothing short of a miracle! At most points along the way I thought I would just barely crawl across the finish line, but when my defense day came, I did not just make it across the line, I sprinted over it with form and with pace. I could not have been prouder of this accomplishment! Lord, you encouraged and strengthened me daily and I could not have done this without you. Jesus, my God, and my King, you have my whole heart. This dissertation has been my labour of love, my offering of worship, and my sacrifice of praise to you. I dedicate it all to you Jesus Christ, the brightest light in my life.

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List of Abbreviations

BWT – 1909 Boundary Waters Treaty

EIS – Environmental Impact Statement

GDU – Garrison Diversion Unit

IGDSB – International Garrison Diversion Study Board

IJC – International Joint Commission

NEPA – National Environmental Policy Act

NDSWC – North Dakota State Water Commission

TIE – The Institute of Ecology

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Introduction

Exhausted and tired, we had been bouncing in the truck along the dusty roads of rural Ethiopia for several hours. Rounding a sharp corner, our muddy truck lumbered down the steep hill towards a rickety bridge that spanned a fast-moving river below. When we had stopped along the river's edge, my Ethiopian friend proudly explained to me that the river before us was the Blue Nile and began to detail the historical significance of this river to Ethiopians. Taking in the vibrant scene before us, I spotted several women crouching in the shade of the river's stately trees to escape the midday sun and to enjoy a rest from the back-breaking labour of washing their family's laundry on the large slate rocks. The women were surrounded by the brightly coloured, handmade cotton scarves they had freshly washed and laid out on the rocks to dry in the hot sunshine. In the water were dozens of cattle cooling themselves alongside swarms of gleeful children splashing and jumping into the river; the water of this river was life to this community.

Unexpectedly, however, I noticed something quite out of the ordinary: the women were not filling their jerry cans with water from the river but were collecting their drinking water at a nearby man-made watering hole. Why would the women choose not to fetch their water from this free-flowing river? Was the river water not potable? The answer I received from my local Ethiopian friend sent chills through my body: the 1959 Nile Waters Agreement between Egypt and Sudan made the water in the Nile off-limits for consumption to anyone living along its banks and its tributaries in Burundi, Tanzania, Rwanda, the Democratic Republic of Congo, South Sudan, Kenya, Uganda, and Ethiopia. Although three of the four tributaries of the mighty Nile River originate in Ethiopia, providing upwards of eighty-five percent of the total water that flows into the Nile, the communities located along the river are forbidden to use its water to support

their daily needs. Sadly, similar inequities brought about by international treaties and policies exist across the African continent.

Standing along the banks of this river, questions about the politics of water swirled through my mind: Who or what entities held the economic, political, and engineering power to dictate the course and use of waterways that so deeply affected economies, communities, and environments across several countries? What impacts were considered in the development of these treaties? Were the conditions the same for dams and diversion projects? How did local men and women understand, interact with, and respond to international policies and local water management projects that were developed in distant, academic, and political settings? My interest in the history of water and public health in the nineteenth century was what originally propelled me to move to Africa in 2006 to work amongst some of the world's poorest communities to provide access to household water purification technology. Those historical concerns took on new, pressing weight as I boarded my long-haul flight back to Canada considering what I had seen on the banks of the Nile. I was not able to shake the gravity of these questions around international hydro politics and their impacts on local communities. My experiences overseas had fundamentally reshaped my interests in water, and I was returning to Canada with an urgency to investigate how historically the politics of cross border negotiations between Canada and the U.S. had impacted local communities. I did not have to look very far from my home province of Manitoba to find such a conflict.

In the 1970s a water dispute over the Garrison Diversion Unit (GDU) dominated local news coverage in Manitoba. The GDU was a multipurpose project in North Dakota that was meant to divert water from the Missouri River, via Lake Sakakawea, for the irrigation of millions of acres of farmland in east-central North Dakota, for municipal and industrial use, for the

expansion of fish and wildlife areas, and for the development of recreational areas. Dams, channels, reservoirs, irrigation, and hydroelectric systems were seen as technological objects that, according to the GDU's original founders, had the power to transform not only land, but also the socio-economic fabric of North Dakota. According to the project's designers these technological interventions had the power to overcome the region's economic and agricultural limitations, that of inconsistent rainfall levels. The project's designers had failed to consider the international impacts and implications of the GDU. The project's irrigation return flows would not flow back into the Missouri River Basin, but would discharge into the Souris and Red River Basins, both of which flowed north through Manitoba to Lake Winnipeg and on to Hudson's Bay. The international political dimensions of the large-scale, ecological inter-basin transfer of GDU water meant that this project became mired in an international conflict that has still to this day not been resolved.

Although the GDU was a project that was hastily conceived in the 1930s, was only partially constructed in the 1950s and 1960s, was hotly debated through the 1970s, and stalled out in the 1980s, I contend that this unfinished project did more than simply transform North Dakota's physical landscape. The GDU and debates over its viability also contributed to the growth of an environmental activist movement, it necessitated the invocation of international water diplomacy, and it demanded that proponents and opponents articulate their vision of what water could and should do and for whom. The debate over the GDU is a window on a particular moment in environmental history when those expectations of how water should be managed were revealed. The control of the Missouri River had created sharp divisions not only among North Dakotans and Manitobans but also amongst environmentalists, scientists, politicians, and the international community for over four decades. How did this relatively small and incomplete

water diversion project, in a state with limited political and economic influence, create so many ripples? What can we learn from the various actors involved in the project as well as from the scientific debates that surrounded this project?

I started this project on the GDU with an interest in the process of Canadian American boundary water conflict resolution and in the various types of scientific knowledge that were produced around the GDU. I thought that the discussion about the project would focus on engineering certainties such as the metric tons of cement needed to shore up an earth-rolled dam or of the cubic meter feet of hydropower one turbine could produce. What I found, however, was a wide range of 'data' being presented, some based on scientific claims, others on economic assertions, others on grounds of morality, modernity, necessity, and still others based on fears about the future. I also found that it was more than scientific experts and governmental agents who participated in the GDU debate. A diverse group of 'experts' contributed to the debate including lay people, academics, politicians, environmental activists representing their local communities, scientific organizations, or international committees.

This dissertation thus uses debates over the GDU -- from Congress' initial approval in 1944 to the publication of the International Joint Commission's (IJC) Final Report in 1977 -- to understand how 'experts' and 'users' talked about rivers and the environmental effects of a multipurpose irrigation project. It is a study about how knowledge of water, technology, and public policy was mobilized, translated, and contested at the local, regional, and national levels in America at a critical time in the development of environmental policy. In the pages that follow, I trace the story of a project that was promoted by some and opposed by others, and that benefited still others seeking professional status or organizational authority. I explore three sites of debate in the GDU story: an influential engineer's promotion of the GDU to a variety of

audiences across the country; the Bureau's publication of its Environmental Impact Assessment and the critiques it received from environmental scientists; and the enlistment of the International Joint Commission and its emphasis on public participation. Each of these sites or scales of talk, about the GDU, illuminates a unique narrative that I will explore in each chapter.

Three lines of inquiry shape this dissertation. The first is about the role of technology in the shaping of the nation's rivers. The GDU's proponents believed that taming the wild Missouri from a twisting and unpredictable river into a controlled system through the application of technology would transform their society. This dissertation contributes to our understanding of envirotech history by examining the cultural representations and meanings that were evident in the technocratic messages of the engineering experts promoting the GDU. I narrate the process whereby the technocratic vision for the GDU was imagined, challenged, and reimagined during decades in which North Americans were radically revising their understanding of the environment and in which a vibrant environmental activism movement was born. This dissertation shows that the GDU sought to remake the physical landscape of North Dakota and that over the same decades, debates over the GDU helped remake attitudes towards technological interventions on natural waterways.

The second argument focuses on the contested American water resource management sector in the postwar period, the determination of expertise, and the establishment of professional communities. Throughout the twentieth century, the engineering experts at the government agencies of the U.S. Army Corps and the U.S. Bureau of Reclamation had been guided by technology and scientific management in their approach to harnessing the nation's rivers. Where these engineering technocrats had historically been regarded as the premier authority within the federal water resource management sector in the early to mid-twentieth century, by the end of the

twentieth century the stage was set for the environmental scientists to lead that sector into the future. The introduction of the National Environmental Policy Act in 1970 fundamentally changed the way that federal agencies implemented water management projects. An ecological and environmental ethic quickly displaced a purely technocratic approach that historically had defined how federal agencies managed the nation's water resources. After 1970 federal agencies were required to evaluate the environmental costs and benefits associated with any planned projects and to produce an Environmental Impact Statement (EIS) documenting these impacts. This new law did not only apply to any new projects, but to ongoing projects, including the GDU. An analysis of the GDU's environmental statement therefore provides a window into how scientific knowledge about the project was produced, how definitions of environmental impact changed over time, and the ways in which society encountered scientific expertise. It also shows how different actors articulated the environmental and economic impacts of the megaproject and how a professional contestation of expertise was being developed. This dissertation examines how scientists competed to define the GDU as an envirotechnical system and how they each held divergent views about the purposes and objectives of dams, irrigation systems, and of the state's role in controlling the environment. I argue that at issue between the groups of experts were shifting understandings of the environment and of the role of the state and of technology in the management of nature.

The third argument is about the role of the IJC in the transboundary governance of Canadian and American waters. The Boundary Water's Treaty of 1909 established that both countries had equal rights to shared waters, thereby creating guidelines limiting the injurious pollution and contamination of water on either side of the border. It also established the IJC as a dispute resolution mechanism as well as a set of guidelines for how the two countries would

address conflicts and make decisions around its shared waters. As a bi-national institution, responsible for ensuring that the Boundary Waters Treaty (BWT) was upheld, both Canada and the U.S. expected the IJC to be an effective mediating institution. The BWT has not been revisited despite the many societal, economic, and political changes that marked the twentieth century, but the IJC has evolved in response to shifting pressures.[1] To understand the work of this international mechanism, we must not only consider its role in the politics of international water management, but its own vision and beliefs related to its role and its function as a non-judicial commission. I trace the IJC's pioneering model of public engagement through the GDU debates of the 1970s, paying close attention to what we can learn about the commission through an examination of its emphasis on public consultation in its investigative process. This dissertation argues that the IJC was an organization that adapted its practices and conclusions to meet the political and cultural expectations of the time.

The Story of the Garrison Diversion Unit

Before we go much further, however, we need to understand more of the history of the GDU. Non-Indigenous settlers had been drawn to the open plains of North Dakota in the late-nineteenth and early-twentieth centuries with the promise of free or inexpensive land and the dream of developing prosperous farms. For government officials and settlers alike, the arid west represented an obstacle to be ordered and overcome through the application of scientific expertise and engineering designs. Believing in the power of technology to transform the region's driest land, federal agencies including the Bureau of Reclamation and the Army Corps

[1] Noah D. Hall, Dan A. Tarlock, and Marcia Valiante, "The Boundary Waters Treaty, the International Joint Commission, and the Evolution of Transboundary Environmental Law and Governance," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen, Canadian History and Environment Series (Calgary, Alberta: University of Calgary Press, 2020), 470-71.

of Engineers were given free rein to transform, reclaim, and settle the "wild west" through the reshaping of the nation's river systems.[2] Rivers were seen not as natural, ecological systems surrounded by social systems, but were visualized as engines of economic potential with the ability to fuel the rapidly expanding American west.[3]

North Dakota's history is marked by its rugged and challenging landscape, its agricultural emphasis, extreme weather, economic dependence, and political distance. This state is a borderland that straddles the more humid East and the arid West. The western side of the state is an extension of the dry and arid Great Plains region, while the eastern side is part of the Central Lowlands semiarid cold and humid region. It is the northeastern area of North Dakota that is the focus of this dissertation. While a bird's eye description of the land provides accurate context for the GDU story, I would like to paint a picture of this region of this rugged, prairie state with feet planted firmly on the ground.

Having successfully adapted to the state's extreme climates, short and medium grasses mark the landscape as far as the eye can see. In the distance are a scattering of wooded bluffs that include bur oak, green ash, elm, cottonwood, and box elder. As an ecological transition zone from east to west, and north to south, the wildlife of the region includes species from all regions including owls, gulls, meadowlarks, warblers, ducks, wolves, coyotes, jack rabbits, and deer. While there are only a few larger rivers that flow through the region, there exists an abundance of lakes, ponds, streams, and sloughs that provide generous opportunities for recreational activities and for wildlife. The limited rains of the region have forced the farmers of the region to

[2] Marc Reisner, *Cadillac Desert: The American West and its Disappearing Water*, Rev. and updated. ed. (Vancouver: Douglas & McIntyre, 1993).
[3] Tina Loo and Meg Stanley, "An Environmental History of Progress: Damming the Peace and Columbia Rivers," *The Canadian Historical Review* 92, no. 3 (2011): 402.

consistently work against the forces of nature to cultivate sustainable crops beyond small grains and hard-spring-wheat.

Walking along the expansive prairie landscape an observer can quickly see that this is an unforgiving region whose most valuable resource is its land with its agricultural potential. Through repeated droughts and overwhelming floods, the farmers of this state have proven their resilience and have become the backbone of its economy.[4] The people of North Dakota experience bright sunshine, exhaustive heat, and long days in the summer followed by extreme cold, relentless wind, and short days in the winter months. North Dakotans share a "defensive loyalty" to their state and a fierce optimism despite the harsh weather and refer often to the "life-giving qualities" of this variable climate.[5] This cold climate infused the people of this state with a robust and energetic ambition that is marked by a willingness to work hard and to withstand the rigors of long, cold winter months. According to North Dakota historian Elwyn B. Robinson, the state's farming roots encouraged individualism and conservativism across the state; however, feelings of exploitation amongst farmers by the grain trade, banks, and the railroads, fostered a spirit of agrarian radicalism and stimulated the growth of agricultural cooperatives and local Farmer's Unions.[6] The insurance benefits, the social connection, and the economic security offered by these associations unified and strengthened these hard working and resilient farmers. The character of the people of North Dakota was dramatically described by Reverend Dr. Carroll E. Simcox in 1961:

> The children of these prairies do not grow up expecting that all the bonbons of this world are going to be fed them with runcible spoon by pampering destiny. Here you sweat by summer and shiver by winter and work and pay for everything

[4] Louis N. Hafermehl, "To Make the Desert Bloom: The Politics and Promotion of Early Irrigation Schemes in North Dakota," *North Dakota History: Journal of the Northern Plains* 59, no. 3 (1992): 14.
[5] Elwyn B. Robinson, *History of North Dakota* (Grand Forks, North Dakota: University of North Dakota, 2017), 14, https://commons.und.edu/oers/1.
[6] Ibid., 552.

> you get, so that by the time you are an adult you are spiritually prepared for more hard work . . . North Dakota life has been meant to make you a tough fighter, a hard worker.[7]

Once pioneering efforts in North Dakota had come to an end following World War One, settler farmers in the state faced repeated devastating droughts through the 1920s and 1930s. Farmers struggled under the weight of heavy debts, spiraling costs, and low agricultural prices when postwar deflation caused farm property values to fall by one third and crop values to drop from $153 million to $84 million destroying the hopes of many farmers across the nation.[8] By the mid-1920s the agricultural industry in North Dakota had collapsed, causing banks to close thereby expunging fifty million dollars in savings.[9] By 1931 another serious drought had hit North Dakota and farmers began to welcome federal financial investments but were wary of any 'outsiders' who were focused on aggressively espousing a national agenda over that of the local needs and interests. The land situated in the Red River Basin in North Dakota northeast of the Missouri River Basin had become even more difficult to cultivate (Map 1). Despite the reality that farmers were mired in debt and the land was not producing abundant crops, the farmers of northwest and southeast North Dakota were not pleading for government interventions in the form of new irrigation solutions.[10]

Even so, engineers and politicians alike began to envision what a large-scale multipurpose water management project could do for the state both economically and politically. Engineers at the Bureau and the Corps individually envisioned two technologically advanced projects. These projects would span the upper and lower basin states of the Missouri River to reclaim and to

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[7] Ibid., 553.
[8] Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West*, 1st ed. (New York: Pantheon Books, 1985), 178.
[9] Robinson, *History of North Dakota*.
[10] Adam R. Eastman, "Hit List: President Carter's Review of Reclamation Water Projects and His Impact on Federal Water Policy" (Doctor of Philosophy University of Oklahoma, 2013), 302.

tame nature to meet the varying needs in the north and the south at once. Colonel Lewis A. Pick at the Corps developed the Pick plan that was focused on developing the lower basin for flood control and hydro power while William G. Sloan at the Bureau had developed the Sloan Plan that sought to invest in irrigation systems and hydro power in the upper basin. When it became evident that congressional approval would only be given if the two agencies cooperated, the Bureau and the Corps reluctantly united in "a shameless, loveless shotgun wedding."[11] The result was an ambitious large-scale river basin project called the Pick-Sloan Missouri River Basin Project. The Pick-Sloan plan contained several upper and lower basin segments, one of which was the GDU, to address the repeated droughts in the upper basin states. Congress approved an ambitious GDU plan in 1944 to move hundreds of thousands of acre-feet of water from the Missouri River Basin, through a vast and complex network of open-air channels through the Garrison Dam, to irrigate 1,007,000 acres of land in central and eastern North Dakota, to supply forty-one cities in eastern ND with water, and to restore Devil's Lake.[12] Immediately upon receiving congressional approval, the U.S. Army Corps' brought thousands of workers to its newly built construction town near the small town of Garrison, North Dakota, eighty kilometers northwest of Bismarck, North Dakota. Construction crews were contracted immediately to begin the labour-intensive work of dam construction. Men worked furiously day and night (as figure 1 shows) building the dam's foundation, its supports, and intake structures. Excavators began carving up the valley floor, dump trucks transported thousands of tons of earth which the bulldozers spread, while mechanical rollers worked endlessly to compact the layers of material.

[11] James Nathan Miller, "Half a Billion Dollars Down the Drain," *Readers Digest* (November 1976). Roger S. Otstot, *An Overview of the Pick-Sloan Missouri Basin Program*, U.S. Department of the Interior (Great Plains Region, 2022), 10.
[12] Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*, U.S Government Printing Office (Washington, 1976).

The scope of this extensive work is reflected in figure 2. As reflected in figure 3, engineers and construction crews operating massive cranes, erected the skeleton structures for the intake works and transit mixers discharged the endless concrete needed to fill these structures. Figure 4 provides an aerial view of the dam's twenty-eight intake gates and its massive spillway during construction. Figures 5 and 6 show the scale of the project's hydroelectric components including the turbines, generators, transformers, and powerhouse. In 1953 the U.S. Army Corps completed its mission to dam the Missouri River. The Garrison Dam is over 3.2 kilometers in length, making it one of the largest earthen dams in the world.[13] As shown in map 2, the filling of the reservoir behind the Garrison Dam created what is now known as Lake Sakakawea. Lake Sakakawea is the third largest man-made lake in the United States spanning 290 kilometers in length and 382,000 surface acres.[14]

Despite the completion of the Garrison Dam, significant postwar economic restrictions led Congress to recall several federal water projects in 1964. The GDU was forced to undergo a financial review before a reauthorization of its plans would be considered. Between the GDU's initial approval in 1944 and its reauthorization in 1965, several geological studies had concluded that according to federal irrigation standards, the soil in this region of North Dakota was not suitable for irrigation, resulting in the significant reduction of the project's irrigation works and the reauthorization of the project. At a cost of $207 million dollars, the revised GDU was designed to irrigate 250,000 acres, to supply municipal and industrial water for fourteen cities across the state, to provide for the development and expansion of nine recreational areas, to

[13] State Historical Society of North Dakota, *U. S. Army Corps of Engineers Garrison Dam Construction Films*. https://www.history.nd.gov/archives/manuscripts/inventory/11084.html.
[14] U.S. Army Corps of Engineers, *Garrison Project Statistics* (2012). https://www.nwo.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487634/garrison-project-statistics/.

develop a variety of fish and wildlife areas, and to create permanent water supplies for new and existing wetland habitats.[15]

The GDU plans determined that from the Garrison dam, water would be pumped through the Snake Creek Pumping Plant into Audubon Lake and onto the extensive McClusky Canal system by gravity to the Lonetree Reservoir. From this reservoir the water was to be pumped along three separate canals to three irrigation areas named after the regions in which they were located: the northern Souris and Karlsruhe Section, the eastern Warwick and McEvilley Section, and the southern Oakes and LaMoure Section (see map 3). The GDU's project features included the construction of three large-scale mainstem dams, four regulating reservoirs spanning over sixty square miles, 141 water pumping plants, and seventy electric pumping stations. The construction of the Garrison Dam alone required the provision of 1,500,000 cubic yards of concrete and 66,500,000 cubic yards of fill, the equivalent of 20,337 Olympic sized swimming pools filled with earth.[16] The GDU was designed to move water by gravity along a series of canals spanning 2,900 kilometers (as figure 7 shows). The drains and laterals for this expansive canal system stretched 4,500 kilometers. In some areas the canals were dug deeper than a ten-story building with a right-of-way spanning the width of eight fifty-meter swimming pools side by side. The project was extraordinary not on account of the land that would be resuscitated through irrigation, but on account of the physical size and scope of the project infrastructure.

Construction of the GDU's principal supply features required the appropriation of vast amounts of land to make room for right-of-way passages. Whole communities and individuals including private landowners, farmers, and Indigenous communities that had farmed the rich and

[15] International Garrison Diversion Study Board and International Joint Commission, *International Garrison Diversion Study Board Appendix B: Water Quantity Committee Report-Information File to December 1976*, International Joint Commission (Ottawa, ON; Washington, D.C., 1976), 12.
[16] Engineers, *Garrison Project Statistics*.

fertile riparian lands were forced from this land and onto unfruitful top lands to make way for the GDU project features. The opening of the Garrison Dam in 1953 and the creation of Lake Sakakawea alone flooded at least one million acres of prime, river-valley farmland and Indigenous riparian Treaty lands. This appropriation of land also destroyed vast amounts of natural habitats and wetlands, inundated archeological sites, and displaced many families of the Three Affiliated Tribes.[17] Although many communities and Indigenous groups contested the sale of their rich, bottomland and opposed their relocation to the dry and unfamiliar prairie land above the valley, their cries went unheard and they were forcibly removed from their land.[18] Hazel Driver Blake, a high school student on the Fort Berthold Reservation during the relocations, recounted the painful process of being told her community would be required to move. In an oral interview in 1999 Driver Blake stated "I remember my elders got up and they said no we don't want this. We don't want this . . . no more taking our land. But that very same day they were already turning the earth."[19] Martin Cross, another community member, described the freedom of growing up in the Elbowwoods community prior to the relocations: "we swam and would run around with no clothes on, on the sandbars and in the warm water . . . the woods, the river, the hill were kind of like our playground . . . we raised beans, corn, squash."[20] Life in his relocated location at the top of the valley, however, was extremely difficult for Cross and his family: "there was no comparison, the ground was hard and when the potatoes would grow, there would be two or three little ones . . . everything was sparse and dry and nothing grew. The

[17] The Three Affiliated Tribes include the Mandan, Hidatsa, and Arikara Tribes. David C. Campbell, "The Pick-Sloan Program: A Case of Bureaucratic Economic Power," *Journal of Economic Issues* 18, no. 2 (1984): 451.; Angela W. Parker, "Taken Lands: Territory and Sovereignty on the Fort Berthold Indian Reservation, 1934-1960" (Doctor of Philosophy The University of Michigan, 2011).
[18] Parker, "Taken Lands: Territory and Sovereignty on the Fort Berthold Indian Reservation, 1934-1960," 4, 44.
[19] Hazel Driver Blake, "The Effects of Garrison Dam on the Peoples of the Fort Berthold Reservation," interview by Corene Geffre, *On the Road with North Dakota Studies*, June 23, 1999, 9.
[20] Martin Cross Jr., "The Effects of Garrison Dam on the Peoples of the Fort Berthold Reservation," interview by Mike Schatz, *On the Road with North Dakota Studies*, June 23, 1999.

ground was hard, it was prairie."[21] According to Sioux scholar Vine Deloria, the Pick-Sloan Plan was "without a doubt, the single most destructive act ever perpetrated on any tribe by the United States."[22]

By the late 1960s the project not only experienced resistance from those who were relocated to make way for the project, but also from growing local and national opposition. Downstream states claimed exclusive rights to the water of the Missouri River, Canadians expressed concerns over the impacts of irrigation return flows on Canadian waterways, environmental activists criticized the project's impacts on wildlife in the project areas, and federal politicians questioned the economic viability of the project. Despite this mounting opposition, in 1953 engineer Milo Hoisveen stepped into the role of North Dakota State Chief Engineer and quickly became the spokesman for the North Dakota State Water Commission and for its vision to implement the GDU to reshape the North Dakota landscape and the state's socioeconomic status. By 1958 Hoisveen had developed a marketing campaign to promote the GDU to a variety of stakeholders and was poised to travel extensively to deliver this message across the state and in Washington. In chapter one I trace Hoisveen's speechmaking efforts as he crisscrossed the country from 1958 to 1969.

Rising calls for environmental protection and conservation across the nation led to the introduction of the federal National Environmental Protection Act (NEPA) in 1970. In addition to "creating and maintaining conditions under which man and nature can exist in productive harmony," NEPA created new environmental assessment protocols for all existing and future

[21] Ibid.
[22] Michael L. Lawson, *Dammed Indians Revisited: The Continuing History of the Pick-Sloan Plan and the Missouri River Sioux* (Pierre, South Dakota: South Dakota State Historical Society Press, 2009), xv.

federal water management projects.[23] To comply with the new NEPA legislation, the Bureau published an EIS for the GDU in 1974. This report drew sharp and widespread criticism from a variety of ecological and environmental scientific and activist organizations in Canada and in the U.S. The scientific and environmental debates about the GDU raged from 1970 to 1976 without any resolution.

While the scientific debates failed to establish a clear course forward for politicians, international discussions about the impacts of the GDU on Canadian waters had also come to a standstill. In the late 1960s Canadian provincial and federal politicians had sent several diplomatic notes to federal politicians in the U.S. expressing their concerns about the GDU but had not received a reply. Evidently politicians on both sides of the debate and on both sides of the border were unyielding in their positions about the GDU. Officials in Canada and in the U.S. therefore jointly decided in 1976 to refer the issue to the International Joint Commission.

Governments from both Canada and the U.S. engaged the IJC to investigate the potential pollution of boundary waters and to advise on the transboundary implications of the GDU on Canadian waters and society. The IJC appointed the International Garrison Diversion Study Board (IGDSB) consisting of five technical committees to investigate the GDU's water quality, water quantity, biology, uses, and engineering impacts. The IJC's directive also called for a public participation component to its investigation. The commission held several public hearings in 1976 and 1977 to receive testimony relating to the reference. The IJC concluded in 1977 in its final report that the GDU as planned would have adverse impacts on water uses in Canada and its fifteen costly and multifaceted recommendations for the modification of the project

[23] U.S. Environmental Protection Agency, *What is the National Environmental Policy Act?* (U.S. Environmental Protection Agency, 2023). https://www.epa.gov/nepa/what-national-environmental-policy-act#:~:text=The%20National%20Environmental%20Policy%20Act%20(NEPA)%20was%20signed%20into%20law,actions%20prior%20to%20making%20decisions. .

represented the final nail in the coffin for the GDU. When the final report of the IJC's findings were published in 1977, the irrigation components of the original project were abandoned.[24] The GDU had become hopelessly mired in setbacks, lawsuits, and shutdowns that left the project only partially constructed. Although some of the completed components of the GDU remain operational to this day, they are the features related to the provision of hydropower, not to irrigation.

Few scholars have analyzed the development of the GDU and the debate surrounding this project from a historical perspective. The history of the GDU brings together several historiographical categories including envirotech studies, the history of water resource management in the U.S., the history of the Pick Sloan Missouri River Basin Project, the history of the Garrison Diversion project, American and Canadian political history and agricultural history, the history of the International Joint Commission, the history of Indigenous communities in North Dakota and Manitoba, the history of North Dakota and Manitoba. Although I have relied upon studies from each of these areas, my dissertation addresses three main historiographies: the history of water including environmental history, science and technology studies, and envirotechnical studies; the GDU and its place in the history of the American west; water governance and the International Joint Commission.

Water History: Environmental History, STS, and Envirotechnical Systems

Environmental historians have explored the connections between human and non-human

[24] In 2000, the Lonetree Reservoir was deauthorized and was developed into a wildlife conservation area. The McClusky canal continues to convey water to this conservation area and provides many recreational opportunities. John Welsted, "The Garrison Diversion Unit - An Update," *Canadian Water Resources Journal* 8, no. 1 (1983): 57. U.S. Army Corps of Engineers, *Garrison Dam/Lake Sakakawea* (2023). http://www.web.archive.org/web/20041024154045/https://www.nwo.usace.army.mil/html/Lake_Proj/garrison/dam.html.

nature.[25] William Cronon contended in *Uncommon Ground* that human and non-human nature are inextricably interconnected, and environmental history cannot be studied in isolation from people. According to Cronon, our perception of nature is socially and culturally constructed; there is therefore no singular truth about nature, but many perspectives informed by a variety of experiences and values.[26] In addition to a discursive interpretation of environmental history, several historians have explored the material environmental impacts of colonialism across the American west through the Bureau and the Corps.[27] Donald Worster's *Rivers of Empire* offered the most comprehensive study of the process of ecological intensification across the American west; he argued that this process occurred in three stages. Stage three of this process from the 1940s to the 1980s is particularly relevant to my work on the GDU. He demonstrated that during

[25] Douglas Cazaux Sackman, *A Companion to American Environmental History*, Blackwell Companions to American History, (Chichester, West Sussex; Malden, MA: Wiley-Blackwell, 2010); Paolo Squatriti, *Natures Past: The Environment and Human History*, The Comparative Studies in Society and History Book Series, (Ann Arbor: University of Michigan Press, 2007); Gregg Mitman, *The State of Nature: Ecology, Community, and American Social Thought, 1900-1950*, Science and its Conceptual Foundations, (Chicago: University of Chicago Press, 1992); Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1995); Linda J. Lear, *Rachel Carson: Witness for Nature*, 1st Mariner Books ed. (Boston: Mariner Books, 2009); Loo and Stanley, "An Environmental History of Progress: Damming the Peace and Columbia Rivers."; Andrew C. Isenberg, *The Oxford Handbook of Environmental History*, Oxford Handbooks, (Oxford; New York: Oxford University Press, 2014).

[26] William Cronon, *Uncommon Ground: Rethinking the Human Place in Nature* (New York: W.W. Norton & Co., 1996).

[27] Doug Goodman and Daniel McCool, *Contested Landscape: The Politics of Wilderness in Utah and the West* (Salt Lake City: University of Utah Press, 1999); Donald Worster, *Under Western Skies: Nature and History in the American West* (New York; Oxford: Oxford University Press, 1992); Donald Worster, *A River Running West: The Life of John Wesley Powell* (Oxford; New York: Oxford University Press, 2001); Reisner, *Cadillac Desert: The American West and its Disappearing Water*; William D. Rowley, *Reclaiming the Arid West: The Career of Francis G. Newlands* (Indiana: Indiana University Press, 1996); Norris Hundley Jr., *Water and the West: The Colorado River Compact and the Politics of Water in the American West*, 2nd ed. (Berkeley, California: University of California Press, 2009); U.S. Bureau of Reclamation, *Delivering Water and Power for the West* (Department of the Interior, Motion Picture Division, 2010). https://www.youtube.com/watch?v=lIYrQWFvdSo; Robert Kelley Schneiders, *Big Sky Rivers: The Yellowstone and Upper Missouri* (Lawrence, Kansas: University Press of Kansas, 2003); Donald J. Pisani, "Federal Reclamation and the American West in the Twentieth Century," *Agricultural History* 77, no. 3 (2003); David P. Billington, Donald C. Jackson, and Martin V. Melosi, *The History of Large Federal Dams Planning, Design, and Construction in the Era of Big Dams* (Denver, Colorado: U.S. Department of the Interior, Bureau of Reclamation, 2005), http://purl.access.gpo.gov/GPO/LPS102089; U.S. Army Corps of Engineers, *The U.S. Army Corps of Engineers: A History* (Washington: U.S. Department of the Interior, 2008); Richard L. Berkman, W. Kip Viscusi, and Ralph Nader, *Damming the West: The Nader Task Force Report on the Bureau of Reclamation* (Washington, D.C.: Center for Study of Responsive Law, 1971).

this stage the American government joined forces with private wealth to powerfully bring every major river in the west under its submission.[28] The more humans attempted to control nature, the more they relied upon the power of modernization, the big money of government, and the expertise of science and technology. Federalization efforts in this stage led to an increased reliance on technology and on the modernization of agriculture throughout the rural, agrarian west.[29]

Environmental historians have focused their attention on the biographies of specific rivers as a structure for their narratives. There is a rich literature documenting the history of specific waterways throughout the American west.[30] Historian Richard White studied the Columbia River in his book *Organic Machine* as an organic machine or an energy system that maintained its natural qualities despite the ways in which humans acted upon it. According to White, nature is both a cultural construction and a tangible object that cannot be confined to human construction.[31] Historian Robert Kelly Schneiders built upon this ideology as he reconstructed the historical bioregional landscape of two rivers the Upper Missouri and the Yellowstone rivers.

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[28] Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West*, 64.
[29] Worster, *A River Running West: The Life of John Wesley Powell*.
[30] John E. Thorson, *River of Promise, River of Peril: the Politics of Managing the Missouri River*, Development of Western Resources, (Lawrence, Kansas: University Press of Kansas, 1994); White, *The Organic Machine: The Remaking of the Columbia River*; Thorson, *River of Promise, River of Peril: the Politics of Managing the Missouri River*; John H. Davidson and Tomas Earl Geu, "The Missouri River and Adaptive Management: Protecting Ecological Function and Legal Process," *Nebraska Law Review* 80, no. 4 (2001); Evan R. Ward, *Border Oasis: Water and the Political Ecology of the Colorado River Delta, 1940-1975*, Environmental History of the Borderlands, (Tucson: University of Arizona Press, 2003); Schneiders, *Big Sky Rivers: The Yellowstone and Upper Missouri*; Christof Mauch and Thomas Zeller, *Rivers in History: Perspectives on Waterways in Europe and North America*, History of the Urban Environment, (Pittsburgh, Pa.: University of Pittsburgh Press, 2008); Hundley Jr., *Water and the West: The Colorado River Compact and the Politics of Water in the American West*; Daniel McCool, *River Republic: The Fall and Rise of America's Rivers* (New York: Columbia University Press, 2012); Christopher Morris, "The Big Muddy: An Environmental History of the Mississippi and its Peoples from Hernando De Soto to Hurricane Katrina," (Oxford, U.K.: Oxford University Press, 2012); C. B. Bourne, *Development of the Columbia River: Its International Legal Aspects* ([s.i.]: International Law Committee, 1956); Leon J. Ladner and Canadian Bar Association., *International Legal Implications of the Columbia River Development* ([s.i.]: [s.n.], 1957); J. W. Wilson, *People in the Way: The Human Aspects of the Columbia River Project* (Toronto; Buffalo: University of Toronto Press, 1973); Bourne, *Development of the Columbia River: Its International Legal Aspects*.
[31] White, *The Organic Machine: The Remaking of the Columbia River*, ix.

A study of these two rivers demonstrated that the collective forces of animals, all humans, and nature permanently altered the landscape and the watershed of this bioregion.[32] Schneiders focused on the Pick-Sloan plan as an institutional dispute between the Corps and the Bureau to control the Upper Missouri River.

A further historiographical focus that is relevant to my work on the GDU is the intersection of environmental history and the politics of the Cold War. Gregg Mitman's *The State of Nature* offered the first substantive discussion of American science during the Cold War. Mitman explored how biologists enrolled nature during the Cold War to amplify their positions, even when scientific evidence itself did not support these claims.[33] Where postwar ecologists were seen as social healers in the 1950s, they became environmental engineers during the Cold War, reflecting the prevailing cultural competitions. Culture, politics, and scientific discovery were intricately connected, thereby discrediting the idea that science was fully objective and independent. Historians J.R. McNeill and Corinna Unger in their book *Environmental Histories of the Cold War* discuss how the Cold War was an ecologically destructive war where scientists and technology were elevated to an exalted status. Scientists became the experts who in the postwar political setting were seen to possess the solutions to the emerging environmental and public policy issues.[34] Unlike the scientists in McNeill and Unger's study, the scientific community in my research were not unified, but were divided by the science of the GDU. In the end science and scientists in the GDU debate were forced to give way to the decisions of politicians.

[32] Schneiders, *Big Sky Rivers: The Yellowstone and Upper Missouri*.
[33] Mitman, *The State of Nature: Ecology, Community, and American Social Thought, 1900-1950*.
[34] John Robert McNeill and Corinna R. Unger, eds., *Environmental Histories of the Cold War*, Publications of the German Historical Institute (Washington, D.C.: German Historical Institute, 2010).

Where environmental historians are interested primarily in the interactions between non-human and human nature, science and technology studies take a slightly different look at the development of technology and technical knowledge and analyzing technology within an historical sociopolitical context. These disciplinary approaches come together in the form of the interdisciplinary field of envirotech. Envirotech historian Sara Pritchard defined an envirotechnical analysis as the study of the material and discursive juncture of environmental history and the history of science and technology.[35] This cross-disciplinary approach combines concepts and approaches from both science and technology studies and environmental history and focuses on examining the relationships between human and non-human nature within the context of technological development. This methodological approach provides a rich foundation for this project.[36] Several envirotech studies have been written that explore the messy intersection of people, non-human nature, geography, and technology in the water management sector across space and time.[37] Two excellent examples of envirotech studies are Thomas Lekan and Thomas Zeller's *Germany's Nature* and David Blackbourn's *The Conquest of Nature.* Lekan and Zeller look at a variety of sites, including waterways, to investigate representations of nature, ecological change, and political and social development in Germany.[38] Specifically they chronicle how culture and politics influenced the reshaping of the country's natural landscape

[35] Sara B. Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône* (Cambridge, Massachusetts: Harvard University Press, 2011).
[36] Bruce Braun, "Producing Vertical Territory: Geology and Governmentality in Late Victorian Canada," *Ecumene* 7, no. 1 (2000); David E. Nye, *America as Second Creation: Technology and Narratives of New Beginnings* (Cambridge: MIT Press, 2003); Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*; Dolly Jørgensen, Finn Arne Jørgensen, and Sara B. Pritchard, *New Natures: Joining Environmental History with Science and Technology Studies* (Pittsburgh: University of Pittsburgh Press, 2013).
[37] Benjamin Forest and Patrick Forest, "Engineering the North American Waterscape: The High Modernist Mapping of Continental Water Transfer Projects," *Political Geography* 31, no. 3 (2012); Joy Parr, *Sensing Changes: Technologies, Environments, and the Everyday, 1953-2003* (Vancouver; Seattle, WA: UBC Press; University of Washington Press, 2010).
[38] Thomas Lekan and Thomas Zeller, eds., *Germany's Nature: Cultural Landscapes and Environmental History* (Ithaca, New York: Rutgers University Press, 2005).

including the nation's riverways. Blackbourn offered multiple, and at times conflicting, perspectives of how politicians, officials, and opinion-makers physically reshaped the German landscape and how this shaped modern-day Germany. Blackbourn argued that the study of how humans dominated over nature allows historians to gain insight into the nature of human domination and into the foundations of society itself.[39] Lekan, Zeller, and Blackbourn all linked nation-building and culture to a nation's understanding of the environment. Envirotech scholar Sara Pritchard argued that there had been historically two sets of envirotech studies: those that look at the historical production of organisms and landscapes and those that investigate the cultural meanings and representations of nature and technology. Pritchard sought to integrate the material and the discursive in her study of how technology remade the Rhône River in France since World War II and how the river mutually reshaped technology.[40] The management and reshaping of the Rhône, according to Pritchard, occurred because of the confluence of political ambitions, economic goals, cultural ideas, and social narratives.

Finally in their edited book titled *New Natures*, Dolly Jørgensen, Finn Arne Jørgensen, and Sara Pritchard sought to widen the conversation between science and technology studies and environmental history. The collection sought to examine the theoretical frameworks from both disciplines to expand our ways of knowing and the production of knowledge in a cross-disciplinary perspective. They argued that not only do we need to study the complex interactions of non-human and human nature with their environment and with the design and use of technology, but we also need to explore how the natural world shaped access to power, the

[39] David Blackbourn, *The Conquest of Nature: Water, Landscape, and the Making of Modern Germany*, 1st American ed. (New York: Norton, 2006), 5.
[40] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 13.

establishment of hierarchies, the development of expertise, and the production of policies.[41] Scientific matters, according to historian Naomi Oreskes are neither "wholly social nor wholly natural, but complex composites of the social and the natural."[42]

When I began my research, and indeed throughout the first iterations of my draft chapters, I envisioned the dissertation focusing on what science and scientists said they could do. As such I turned to a rich body of scholarship on the history of water and the use of technology to manage it – a scholarship commonly called envirotech. Scholars of envirotech are interested in analytical tools, the reshaping of rivers, and the cultural production of the meaning of rivers. Envirotech historian Sarah Pritchard's study *Confluence* provided me with a framework to interrogate the relationships in the GDU debates between nature, technology, and society. This scholarship has informed my thinking in important ways, but in truth, when I looked carefully at my evidence, there was a lot of talk about the environment and technology but the rivers themselves and even the technological tools to control the rivers faded from view. Instead, what I found was talk.

Although other historians have conducted material histories about the GDU, they have not specifically studied the GDU through an envirotech framework. The envirotech literature includes a range of methodological approaches from those highlighting technology and the environment to those that focus on discourse analysis. Pritchard analyzed both the application of technology on the river and how the river spoke back to those who tried to reshape it as well as the talk that surrounded these changes. It was the discursive aspect of Pritchard's work that I took up in this dissertation. Pritchard's study provided me with the methodological foundations

[41] Jørgensen, Jørgensen, and Pritchard, *New Natures: Joining Environmental History with Science and Technology Studies*.
[42] Naomi Oreskes, "How Earth Science Has Become a Social Science," *Historical Social Research/ Historische Sozialforschung* 40, 152, no. 2 (2015): 265.

and the framing questions to explore the rhetoric surrounding the GDU. Thus, while my dissertation does not evaluate in a new way the effect of the GDU on the Missouri, Souris, and Red Rivers or of these rivers on the technical engineering choices made, it does analyze the talk that surrounded this project. My work seeks to dissolve the divide between the engineering technology of the GDU and the talk about the environment.

In these ways, my study returns to the history of science scholar Christopher Hamlin whose work, *The Science of Impurity*, first inspired my interest in the history of water. Hamlin explored the rise of scientific expertise and the development of public policy in eighteenth century England. Hamlin argued that science was not simply a definitive body of knowledge with the power to definitively dictate appropriate guidelines and rules. Rather, science was a tool that experts strategically used to achieve specific social, political, and economic objectives. Although Hamlin's investigation of the growth of expertise and of professional experts in London, England in the eighteenth century was situated in a different time and place, his study of the development of scientific expertise and public decision making provided key conceptual tools for my analysis of the rise and professionalization of environmental scientists in the post NEPA period. Debates about scientific knowledge led to the creation of expert authority and in the case of the GDU, I explore how challenges to that authority also shaped the development of environmental policies.

This dissertation builds on environmental history and envirotech studies by focusing attention on the scientific debates that surrounded one water management project that traversed international political and geographic boundaries. How do the insights drawn from environmental history inform science and technology studies and vice versa instead of simply buying into the dichotomies of these two disciplinary approaches? These questions are relevant to my study as I explore the GDU as a technological artifact and as a site of scientific and

political debate that materially reshaped the Missouri River and the surrounding communities, though as we will see, not the way that its visionaries had originally intended.

This GDU in the History of the American West

The considerable grandeur of the GDU project has drawn several scholars to study the project's development, planning, and implementation since the project's inception.[43] The majority of the research has evaluated the project's viability and its social, environmental, and political impacts.[44] In 1980, public policy scholar Nancy Doemel published one of the first comprehensive studies that examined the scientific and technological perspectives of the various stakeholders involved in the GDU debate. Doemel's study revealed an intricate web of passionate proponents and opponents of the GDU, charting a list of the key players and their positions. While Doemel's study effectively identified the voices and the issues involved in the debate, her study examined the scientific and policy debates rather than the dialogue between the

[43] Janice Benson Johnson, "Time and a River Diverted: A Planning Evaluation of the Garrison Diversion Project" (M.C.R.P., North Dakota State University, 1977); Paul Edward Kelly, "Under the Ditch: Irrigation and the Garrison Diversion Controversy" (M.S., North Dakota State University, 1989); John E. Carroll and Roderick M. Logan, *The Garrison Diversion Unit*, vol. 7, Canada-U.S. Prospects, (Montreal, QC; Washington, D.C.: C.D. Howe Research Institute, National Planning Association, 1980); John B. Owen et al., *Distribution of Fishes in North and South Dakota Basins Affected by the Garrison Diversion Unit* (Grand Forks: Fisheries Research Unit [Distributed by] Dept. of Biology, University of North Dakota, 1981); Priya A. Kurian and Robert V. Bartlett, "The Garrison Diversion Dream and the Politics of Landscape Engineering," *North Dakota History* 59, no. 2 (1992); Sheila C. Robinson, *Taming the Big Muddy: The Story of the Garrison Dam* (Garrison, North Dakota: BHG Inc., 1997).
[44] Kim Richard Nossal, "The Unmaking of Garrison: United States Politics and the Management of Canadian-American Boundary Waters," *Behind the Headlines* 37, no. 1 (1978); Jay A. Leitch and Donald E. Anderson, *Impact of Inundation and Changes in Garrison Diversion Project Plans on the North Dakota Economy*, vol. 127, Agricultural Economics, (Fargo: Department of Agricultural Economics, North Dakota Agricultural Experiment Station, North Dakota State University, 1978); Lynton K. Caldwell, "Garrison Diversion: Constraints on Conflict Resolution," *Natural Resources Journal* 24, no. 4 (1984); Charles M. Carvell, "The North Dakota Garrison Diversion Project and International Environmental Law," *North Dakota Law Review* 60, no. 4 (1984); David Lee Keys, "North Dakota's Garrison Diversion Unit: A Case Study of Domestic and International Environmental Values Conflict" (PhD, Indiana University, 1984); Brian K. Russel, "Flooded Lifeways: A Study of the Garrison Dam and its Environmental Impact upon the Three Affiliated Tribes of the Fort Berthold Indian Reservation" (Master of Arts University of North Dakota, 2000); Eastman, "Hit List: President Carter's Review of Reclamation Water Projects and His Impact on Federal Water Policy."

various actors.[45] Likewise, environmental historian Robert V. Bartlett and water policy scholar David Feldman questioned the environmental politics that encircled the construction of the GDU. Bartlett demonstrated that the decision to build the GDU was not strictly an environmental decision but a political one. Bartlett was highly critical of the governmental institutions in North Dakota that promoted and perpetuated the myth that technological interventions had the power to transform the state.[46] Feldman argued that the GDU debate illustrated the absence of a coherent American environmental ethic to guide the creation of a national water policy. The complex consequences associated with developing the nation's river basins therefore remained unexplored.[47]

Unlike many of the other studies focused on the GDU project, Helen Hoehn Correll's study *Until the Old Men Die* did not attempt to resolve any questions pertaining to the appropriateness of the project, but rather used discourse analysis to examine new iterations of the project in the late 1990s. Once the GDU had been halted in the late 1970s, the project was revised once again and was poised to be reintroduced in the United States House and Senate in 1997 as the Dakota Water Resources Act. Hoehn Correll analyzed the public hearings that were held in 1997 to acquire insights from the various stakeholders who would be affected by the project if it were reapproved. She argued that the narratives at the public hearings revealed the public's eco-visions and ideas about environmental issues and public policy.[48] Hoehn Correll's study focused on the community narratives and policy debates in the late 1990s, where this dissertation looks at

[45] Nancy J. Doemel, *The Garrison Diversion Unit: Science, Technology, Politics, and Values* (Bloomington: Advanced Studies in Science, Technology and Public Policy, Indiana University, 1980).
[46] Robert V. Bartlett, "Adapt or Get Out: The Garrison Diversion Project and Controversy," *Environmental Review* 12, no. 3 (1988).
[47] David L. Feldman, "The Great Plains Garrison Diversion Unit and the Search for an Environmental Ethic," *Policy Sciences* 24, no. 1 (1991).
[48] Helen Hoehn Correll, "Until the Old Men Die: A Case Study of the Garrison Diversion Project in North Dakota" (Doctor of Philosophy, Michigan Technological University, 2000).

various narratives that informed the original GDU debate that occurred twenty-one years earlier.

International Water Governance: The History of the IJC

A study of the GDU needs to consider the international nature of the project. Several historical accounts have examined specific boundary water disputes between Canada and the U.S.[49] Historian Daniel Macfarlane's *Negotiating a River* for example, sought to explore the international negotiations between Canada and the U.S that surrounded the creation of the megaproject, the St. Lawrence Seaway. Macfarlane demonstrated that although the Seaway was initially envisioned as a unilateral Canadian waterway, diplomacy led to cooperation that was "comparable to a gigantic 'zipper'" that integrated the two countries politically, environmentally, and economically.[50] In contrast to Macfarlane's findings of the IJC's involvement in the St. Lawrence Seaway, this dissertation contends that the IJC's involvement in the GDU debate divided rather than unified the governments of Canada and the U.S. during the same period. The GDU demonstrated that Canada and US did not always have aligned environmental and economic interests concerning boundary waters. In the case of the GDU, Canada mobilized the BWT and the IJC to pursue its national interests, despite the economic power imbalance between

[49] L.M. Bloomfield and Gerald F. Fitzgerald, *Boundary Water Problems of Canada and the United States: The International Joint Commission, 1912-1958* (Toronto: Carswell, 1958); Chirakaikaran Joseph Chacko, *The International Joint Commission Between the United States of America and the Dominion of Canada* (New York: AMS Press, 1968); John J. Bukowczyk et al., *Permeable Border: The Great Lakes Basin as Transnational Region, 1650-1990* (Pittsburgh: University of Pittsburgh Press, 2005); Karen J. Bakker, *Eau Canada: The Future of Canada's Water* (Vancouver: UBC Press, 2007); Alice Cohen and Seanna Davidson, "An Examination of the Watershed Approach: Challenges, Antecedents, and the Transition from Technical Tool to Governance Unit," *Water Alternatives* 4, no. 1 (2011); Paul R. Sando, "Water and Political Relations Between the Upper Plains States and the Prairie Provinces: What Works, What Doesn't, and What's All Wet," in *Beyond the Border: Tensions Across the Forty-Ninth Parallel in the Great Plains and Prairies*, ed. Timothy Pasch and Kyle Conway (Montreal: McGill-Queen's University Press, 2013); Lynne Heasley, Daniel Macfarlane, and Noah D. Hall, *Border Flows: A Century of the Canadian-American Water Relationship* (Calgary, Alberta: University of Calgary Press, 2016); Jamie Benidickson, *Levelling the Lake: Transboundary Resource Management in the Lake of the Woods Watershed* (Vancouver: University of British Columbia Press, 2019).

[50] Daniel Macfarlane, *Negotiating a River: Canada, the U.S., and the Creation of the St. Lawrence Seaway* (Vancouver, British Columbia: University of British Columbia Press, 2014), 8.

the two countries.

Several recent works have also begun to explore the involvement of the IJC as the institutional mechanism that the two governments of Canada and the U.S. established to provide guidance on boundary water disputes. Much of the scholarship on the IJC has been written from the perspectives of political scientists, geographers, legal and water resource scholars.[51] Legal scholars have studied the legal precedents connected to IJC recommendations. Scholars of the environment have examined the IJC's effectiveness in managing cross border environmental concerns.[52] Political scientists and international relations scholars have focused on the policy implications of IJC conclusions.[53] Very few of these studies speak to each other in an interdisciplinary fashion. Perhaps the most comprehensive and prominent historical study of the IJC is Daniel Macfarlane and Murry Clamen's recent edited book *The First Century of the International Joint Commission.* Macfarlane and Clamen examined the complex history of this 'gate keeping' organization through its first 100 years. They contend that the IJC evolved and transformed its behaviour, role, and function in the second half of the twentieth century and that

[51] Robert Spencer, Johan Kirton, and Kim Richard Nossal, eds., *The International Joint Commission Seventy Years On* (Toronto, Canada: The Centre for International Studies, University of Toronto, 1981); Emma S. Norman, Alice Cohen, and Karen J. Bakker, *Water Without Borders?: Canada, the United States and Shared Waters* (Toronto: University of Toronto Press, 2013); Murray Clamen, "The IJC and Transboundary Water Disputes: Past, Present, and Future," in *Water Without Borders?: Canada, the United States and Shared Waters*, ed. Emma S. Norman, Alice Cohen, and Karen J. Bakker (Toronto, ON: University of Toronto Press, 2013); Alan M. Schwartz, "The Management of Shared Waters: Watershed Boards Past and Future," in *Bilateral Ecopolitics: Continuity and Change in Canadian-American Environmental Relations*, ed. Philippe Le Prestre and Peter Stoett (New York: Routledge, 2016); Norman Brandson and Allen Olsen, "The International Joint Commission and Mid-Continent Water Issues: The Garrison Diversion, Red River, Devils Lake, and the Northwest Area Water Supply Project," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen, Canadian History and Evnironment Series (Calgary, Alberta: University of Calgary Press, 2020); For an extensive literature review on publications of the IJC see Murray Clamen and Daniel Macfarlane, "Introduction," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen, Canadian History and Environment Series (Calgary, Alberta: University of Calgary Press, 2020), 11-13; Garth O. Makepeace, "The International Joint Commission: Determinants of Success" (Masters of Arts University of British Columbia, 1980).

[52] Schwartz, "The Management of Shared Waters: Watershed Boards Past and Future."

[53] Makepeace, "The International Joint Commission: Determinants of Success."; Elizabeth Mayhall Sherr, "Understanding the International Joint Commission: A Comparative Case Study Approach" (Doctor of Philosophy Colorado State University, 2005); Philippe Le Prestre and Peter Stoett, eds., *Bilateral Ecopolitics: Continuity and Change in Canadian-American Environmental Relations* (New York: Routledge, 2016).

although the IJC was intended to be apolitical, especially during the Cold War era, several issues became politicized within the organization. Several of the authors briefly remark on the public hearings in the IJC's process, but none focus on analyzing the transcript hearings of the commission's public hearings. What can we learn about the organization through a comparison of its published vision for the public hearings and the reality of those hearings? As a site of international dialogue between Canada and the U.S. throughout the twentieth century, the IJC's public hearings are an excellent source for historians to gain insight into the commission's implicit purposes, vision, and goals as a quasi-judicial organization.

A small number of studies have examined the role of the IJC's public consultation process. C.B. Griffin's article explored the IJC's creation of grassroots watershed councils in the 1990s and early 2000s. Looking at the political debates around resource management, Griffin argued that the reorganization of political control over natural resource management from the federal to the local created significant challenges for the agencies and organizations tasked with managing the nation's resources.[54] Murray Clamen also explored the IJC's public engagement mechanism in the late 1990s in his article "The IJC and Transboundary Water Disputes." He argued that the IJC's public participation mechanism in the 1990s were illustrations of the organization's flexibility and adaptability, contributing to its success as a commission.[55] While it is certainly true that the IJC's inclusion of public participation in its process demonstrated its ability to adapt to the ever-changing social and political climates, this dissertation found that the IJC's inclusion of the public was not always on account of the commission's openness, but with an eye to moving its own organizational agenda forward. Since, according to Macfarlane, the building of

C.B. Griffin, "Watershed Councils: An Emerging Form of Public Participation in Natural Resource Management," *Journal of the American Water Resources Association* 35, no. 3 (1999): 516.
[55] Clamen, "The IJC and Transboundary Water Disputes: Past, Present, and Future."

trust amongst the public was crucial to the Commission's effective operation, my study interrogates the IJC's purpose, vision, and goals underpinning its public-input mechanism.[56]

This dissertation has evolved and grown drastically from my original research questions and inquiries. Not knowing what documents were available in the historical record pertaining to the GDU, I began my research broadly by focusing on the various organizations that had been involved in the GDU dispute, on the international politics of the project, and on the reasons behind the project's failure. Having only a vague idea of the questions I hoped to explore, I set out in the summer of 2009, together with my younger sister who had completed her master's degree in history and was willing to gain experience in historical research, to scour the archives and libraries in North Dakota for information relating to the GDU. Since I was doing this research prior to the introduction of online library catalogues, I only had a limited idea of the resources that were available at the libraries and archives in Grand Forks, Fargo, and Bismarck, North Dakota. I had a deep conviction that I needed to go to the various sites and collect my data so that I could analyze it at home rather than spending months at the archives considering the material I found.

With my dad's Dodge Ram packed with our camping equipment, a cooler topped up with sandwiches and hard-boiled eggs, suitcases filled with multiple professional outfits, and an atlas of rural North Dakota, my sister and I drove off for my first adventure to gather data. Armed with two digital cameras and multiple memory cards, we moved systematically from one library

[56] Daniel Macfarlane and Murray Clamen, eds., *The First Century of the International Joint Commission* (Calgary, Alberta: University of Calgary Press, 2020).

and archive to the next, snapping pictures of every document that we could locate. After ten days of camping at several KOA campgrounds by night and researching by day, we had visited the State Historical Society of North Dakota, the Elwyn B. Robinson Department of Special Collections at the University of North Dakota, the North Dakota State University Archives, and the Garrison Diversion Conservancy. Several weeks later I made one more trip to rural North Dakota to fill in any gaps I had identified in my research.

As we drove out of Bismarck, I decided it might be worthwhile to add a few more hours to our drive back to Winnipeg so that I could visit the Garrison Dam and see for myself what this project entailed. The incredible spectacle of this dam and the work that went into the construction of the dam and the spillway left an indelible impression on me. Figure eight is a picture of the spillway during construction around 1950 and figure 9 is a picture of the finished spillway in operation in 2011. My sister and I were left speechless at the vastness of Lake Sakakawea, the immense amount of concrete that made up the Garrison Dam and its spillway, the endless kilometers of canals, and the powerful surge of water flowing through the enormous hydroelectric turbines. The grandeur of these features was punctuated by the reality that the project remained stagnant and incomplete. Standing aghast at the edge of Lake Sakakawea, I recalled my experience along the shores of the Blue Nile one year earlier. Questions began to fill my mind: How could a project of this size have been authorized several times yet remain only partially constructed and not be fully operational? How was this water project allowed to remain incomplete despite all that its construction had cost the surrounding communities, the individuals who had been forced off their land, and the environment that was indelibly altered to make way for project features? Who successfully thwarted the Bureau's efforts to complete this flagship project? Driving away from this imposing project, I wondered what dynamic narrative lay

beneath the seemingly obvious storyline of this sleeping giant. Having found many documents relating to the GDU in North Dakota, I also spent time scouring the various archives and libraries in Winnipeg, Manitoba. To round out my research on the GDU, I also discovered several valuable resources at the University of Winnipeg Rare Book Collection, the Archives of Manitoba, the Conservation Library, and the Province of Manitoba Legislative Library.

I returned to Toronto with over 20,000 JPEG files in hand, each picture representing one document pertaining to the GDU. I would not have been able to complete this dissertation if I had not made the pivotal decision in 2009 to collect all my data using digital cameras during those two field visits. What I did not know at the time was that starting in 2013 I would face major health challenges that would make future research trips impossible. Having battled several tropical bacterial infections and severe post-concussion syndrome I returned to my dissertation in 2018. Given the state of my health in 2018 I spent the next year working on printing and organizing the 20,000 pictures I had to more effectively be able to analyze them. Although having a physical copy of these thousands of pieces of paper made my multiple moves between homes and even provinces since 2018 extremely cumbersome, having access to these files all these years later enabled me to restart my dissertation and ultimately to complete it.

As I began to explore the data I had collected, I noticed the presence of a variety of voices beyond simply the large organizations that had dominated the historical conversation around the GDU. Buried in the historical record of the GDU were the voices of those who were directly involved in or impacted by the GDU including men and women, environmental scientists, engineers, farmers, interested citizens, and indigenous communities that had been or were slated to be affected by the GDU. Many other commentators expressed their views on the GDU, including the local press and North Dakota's politicians. Their interests in the GDU, though,

were often animated by their own professional investments and concerns or their talk was not focused on the environmental components of the GDU. The size and scope of the collections of these secondary actors who spoke about the GDU in the media and in the political arena were too large for this study; these could provide the basis for a subsequent study about the talk of the GDU in the media and by politicians. Rather, this dissertation focuses on the significant body of archival material generated by key actors who advocated for and debated the GDU: the Hoisveen archive, the many reports produced around the Bureau's environmental assessment, and the substantial material related to the IJC's report.

The first unexplored resource that revealed the narratives of individuals was the Milo Hoisveen Papers at the State Historical Society of North Dakota. Upon the retrieval of two large boxes that made up the Milo Hoisveen Papers, the archivist made sure to let me know that she was happy to see someone accessing these records. Recognizing that Hoisveen was a significant figure in the GDU debate, but knowing little to nothing about him, I immersed myself in the contents of these records. As I flipped through the pages of the two boxes that Hoisveen himself had curated, a sense of Hoisveen's dynamic personality began to emerge. These records included a collection of Hoisveen's speeches, correspondence, editorials, newspaper clippings, hearing material, newsletters, and memoranda from 1930s to 1984. In addition to his personal papers, I relied upon newspaper articles and obituaries written about his life. I quickly learned that Hoisveen was a proficient and hardworking man as evidenced by the number of tasks he carried out daily, by the many ways he served on various water management boards and committees, and by the number of accomplishments he achieved over his career. Following his decision to retire in 1973, Hoisveen took time, over several years, to reflect on his lengthy career as an engineer. Twelve years later Hoisveen had curated a collection of select documents from his

thirty-three-year career that he donated in 1985 to the archives in North Dakota. The documents that Hoisveen deposited at the archives were likely only a limited cross-section of the total records that he possessed, making them noteworthy. Hoisveen's meticulous approach to the maintenance and organization of his records also provided useful insights into this leader's proficiencies and his character.

This curated collection was also representative of what Hoisveen hoped would be used in the future to define his legacy. From this perspective, the largest and most comprehensive cluster of documents that Hoisveen preserved and included in his record was a collection of speeches that Hoisveen had written and delivered across the country between 1958 and 1969 promoting the GDU. Hoisveen's intentional memorialization of these speeches highlighted his pride in the marketing campaign he delivered to promote the GDU and in his belief that his efforts had been successful. One of the greatest pleasures of this research project has therefore been my exploration and analysis of Hoisveen's relentless and remarkable speechmaking efforts to promote this controversial project. How do we measure the success of Hoisveen's campaign? What can we learn about the translation of scientific knowledge to a variety of audiences in the postwar period through an analysis of the efforts of one influential technocratic engineer?

Another set of undiscovered, hidden gems were the transcripts of the IJC public hearings in 1975 and 1976. These transcripts revealed the experiences of the individuals whose livelihoods would be impacted by the GDU, whose land was divided by the extensive canal system, or who was relocated to accommodate the construction of project features. Although I was unable to locate the transcripts of the 1977 hearings for this dissertation, future studies may locate these records to add to our understanding of public consultations and the creation of public policy as

well as how the IJC integrated the information it received at public hearings into its final decisions and recommendations.

This dissertation is divided into three chapters. Each chapter evaluates a different type or group of experts, each of which were working at different and expanded scales of knowledge production, and the ways in which that knowledge was contested. I begin in chapter one with the knowledge that one man promoted, moving in chapter two to assess the larger scope of the engagement of the Bureau and of a new group of scientific actors into the debates, and moving in chapter three to the multi-dimensional character of how the IJC and locals mobilized expertise.

Chapter one examines the role and expertise of engineering technocrat Milo Hoisveen. A technocrat was a member of the technically skilled elite who held positions in government or industry, who was characterized by a belief in the supremacy of scientific solutions to the issues facing society. Hoisveen, an ardent technocrat, believed in the power of technology to overcome the environment, but saw the value of targeted marketing to disseminate his vision to various audiences across the U.S. I analyze his career as an engineer, his speaking campaign, and the rhetorical strategies he used to promote this project. Hoisveen left an archive that revealed a constantly changing narrative that he creatively adapted to meet his audiences. A limitation of this particular archive is that we do not have records of the ways in which Hoisveen's audiences contested or responded to his messaging. We can, however, indirectly track the ways Hoisveen's knowledge was challenged by evaluating his shifting narrative that changed according to what he thought each of his audiences wanted to hear.

I expand my analysis in chapter two from one man's mobilization of knowledge to the wider scientific debates about the definition of environmental impacts between the Bureau of Reclamation and the emergence of a new group of experts, environmental scientists. The

Bureau's repeated attempts to write its EIS for the GDU and the responses that other scientists produced, generated an archival trail of the dialogue that occurred between the experts. Chapter two explores the impacts of the installation of the National Environmental Policy Act in 1970 on the construction of the GDU and on the evolution of expertise in the water resource management sector. Where engineers had retained their position as the ultimate authority in the water resource management sector prior to 1970, the introduction of NEPA opened the door to a new group of experts and their ecological understandings of water. The scientific reports that were published provided the crucial evidence for the second chapter of this dissertation including those of the Institute of Ecology, the Manitoba Environmental Council, the Harza Engineering Company, the Mines, Resources and Environmental Management, and the U.S. Fish and Wildlife Services that are being held at the Manitoba Provincial Legislative Library and at the University of Winnipeg Library. I was able to access the Bureau of Reclamation reports relating to the GDU at the University of Winnipeg Library and the Manitoba Legislative Library. I analyzed the Bureau's 1974 EIS and various draft statements and supplemental reports that the Bureau published in the 1970s and early 1980s. In addition to the published reports, I relied upon the unpublished reports of several organizations including the Manitoba Environmental Council, the Grand Forks Chapter of the Audubon Society, the Farmer's Canal Protestors Association, and the North Dakota Water Users Association. These sources included correspondence, annual reports, meeting minutes, draft presentations, and information kits about the GDU.

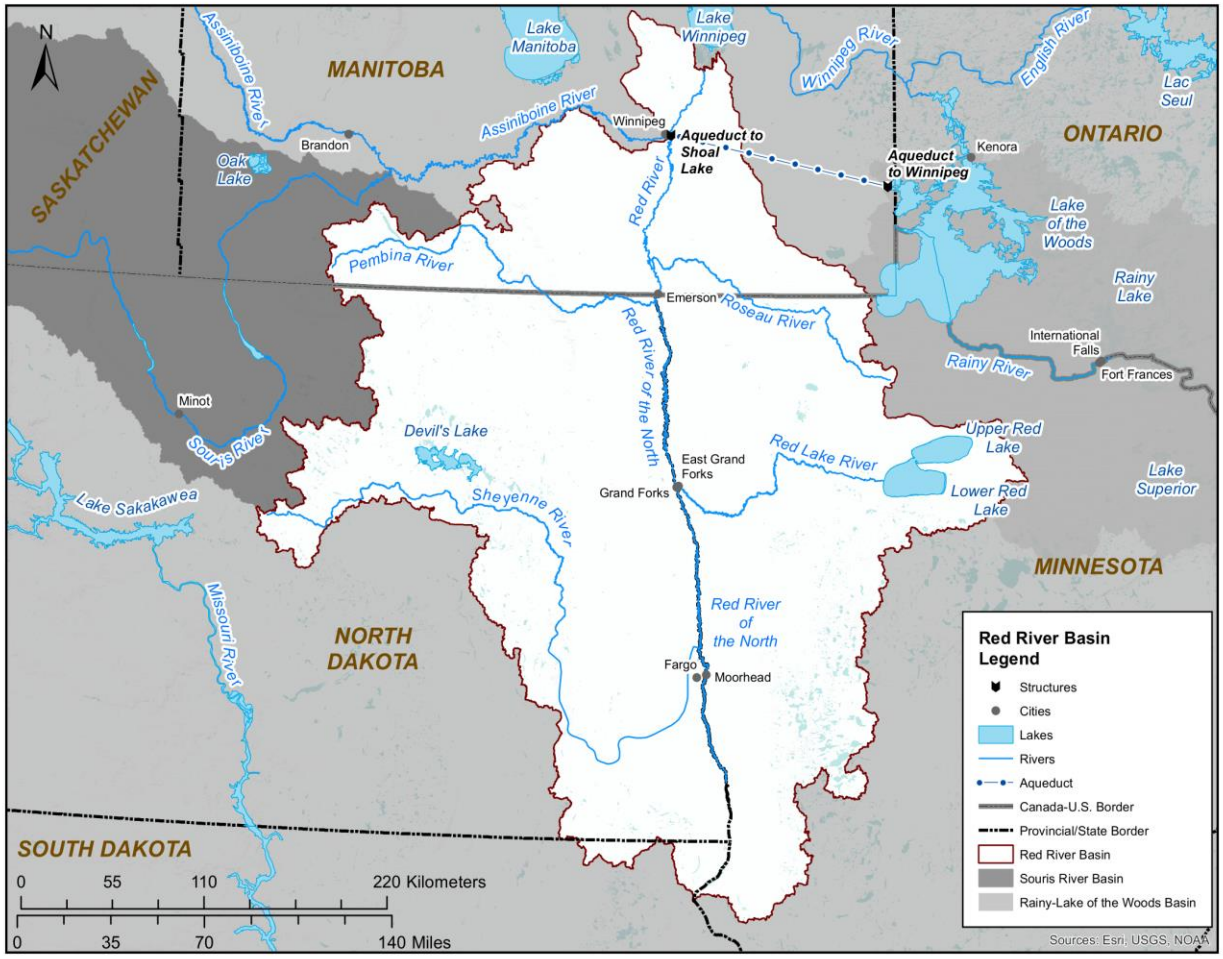
The final chapter provides the widest scope of my analysis. I examine the IJC, and the multiple kinds and sites of expertise expressed within its investigative process. When politicians and scientists had each attempted, but failed, to resolve the conflicts surrounding the GDU, the IJC was called upon in 1976 as a neutral body to chart a course forward. As an organization

without jurisdictional power, the IJC was increasingly dependent upon public approval and support. Where the post NEPA era created opportunities for environmental scientists, it created new challenges for the IJC. The IJC sought not only the knowledge of scientists but appeared to solicit for the first time in the GDU debate the expertise and knowledge of the public. By this point in the story, all sorts of people were talking and were challenging the GDU narrative, creating a rich archive of the various divergent voices.

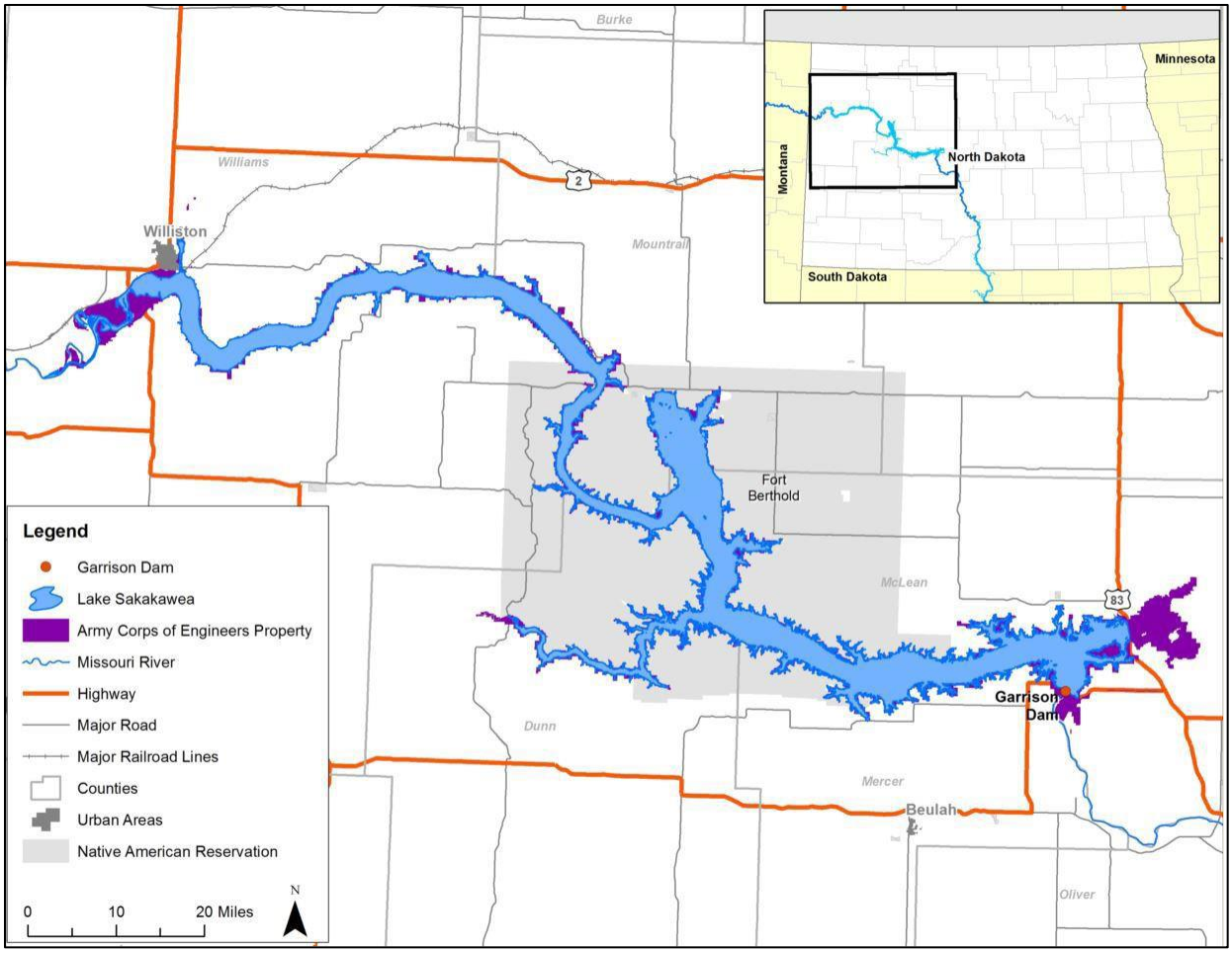
The IJC's public hearings provide insights into not only the narratives of the various actors who spoke at the hearings, but also into the IJC and its processes as a rapidly changing organization during a volatile time. The IJC's records, including the verbatim transcripts of the 1975 public hearings, the data files of the International Garrison Diversion Study Board, and the Commission's reports formed the basis for my analysis in this chapter. I also used the collected transcripts of oral interviews that historian Corene Geffre conducted in 1999 with several members of the Three Affiliated Tribes at the Fort Berthold Indian Reservation and of the Manitoba Indian Brotherhood of the impacts of the GDU on their communities. In addition to the documents of official organizations, I relied upon the popular publications including a variety of newspaper clippings found in the Milo Hoisveen Papers, the IGDSB data files, the Grand Forks Chapter of Audubon Society, and in the Garrison Project Vertical File at the Manitoba Legislative Library.

By analyzing arguments made at each of these three scales – an individual, an organization (and its critics) and an international joint commission – this dissertation seeks to understand what kinds of environmental knowledge and expertise was mobilized and validated. Debates over the GDU provide a lens on a key era in the history of environmental manipulation and activism, an era when new kinds of experts challenged engineers over what kind of environmental

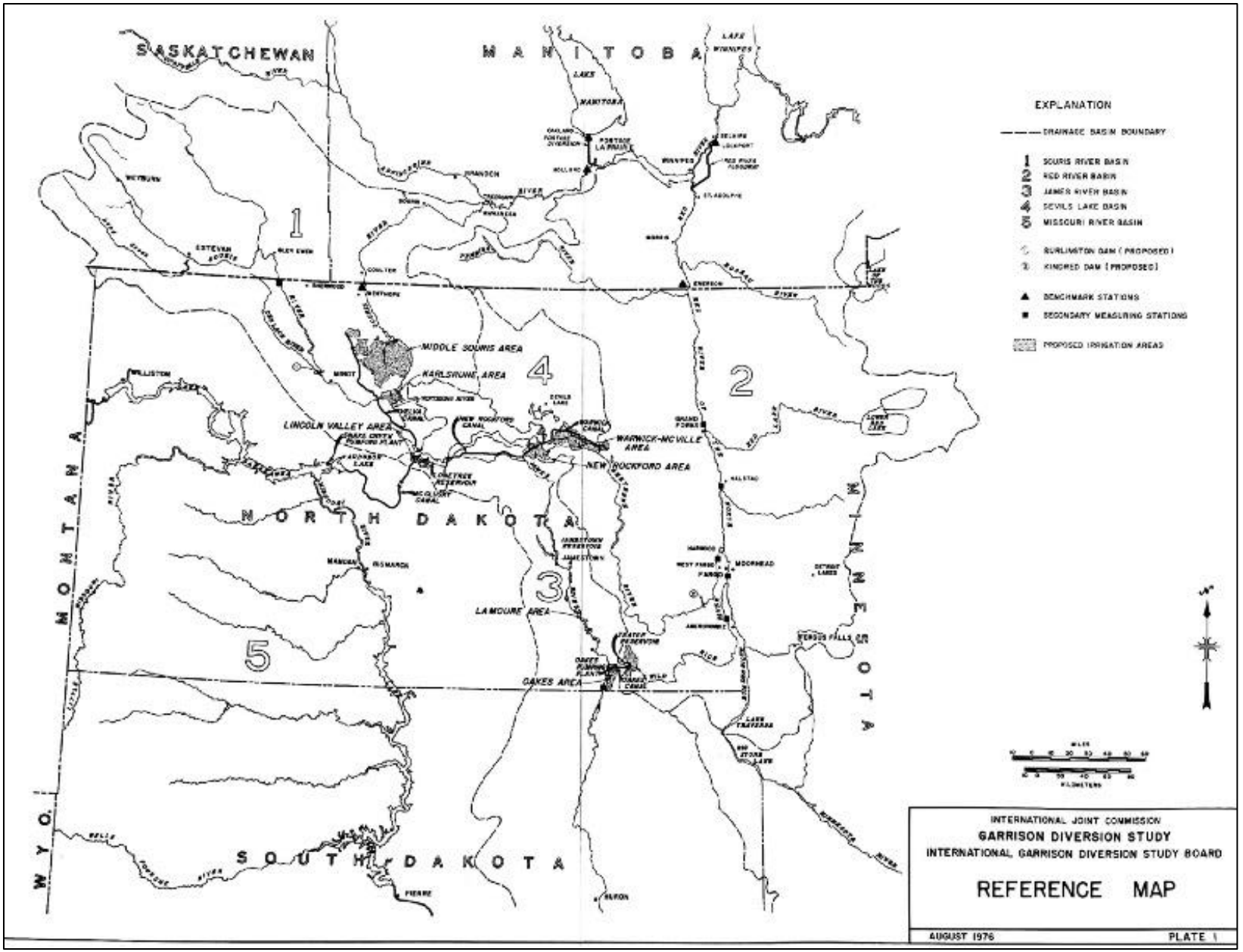
intervention was appropriate and ethical. In the pages that follow, I trace the narratives of various ‘experts' through a critical period in the North American environmental sciences and policy development movement in the mid to late twentieth century, offering a fresh perspective on an old debate.



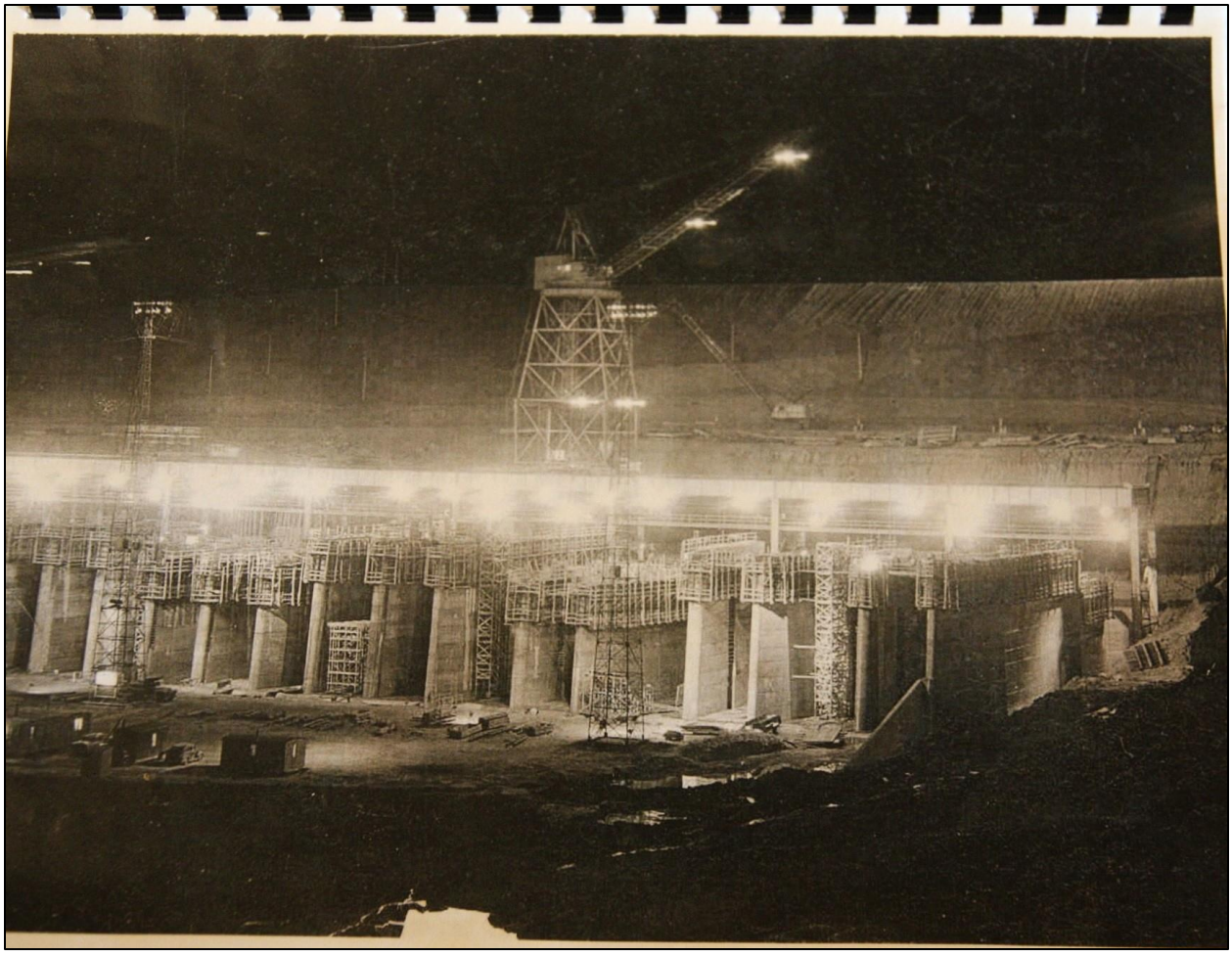
(Map 1.) Map of the Red River Basin in North Dakota and Manitoba. Source: http://www.ijc.org/en/watersheds/red-river



(Map 2.) Map of Garrison Dam, Lake Sakakawea, and the Fort Berthold Reservation relocation area. Source: U.S. Army Corps of Engineers, Omaha District, "Garrison Dam/Lake Sakakawea Project Oil and Gas Management Plan" June 2020, 2.

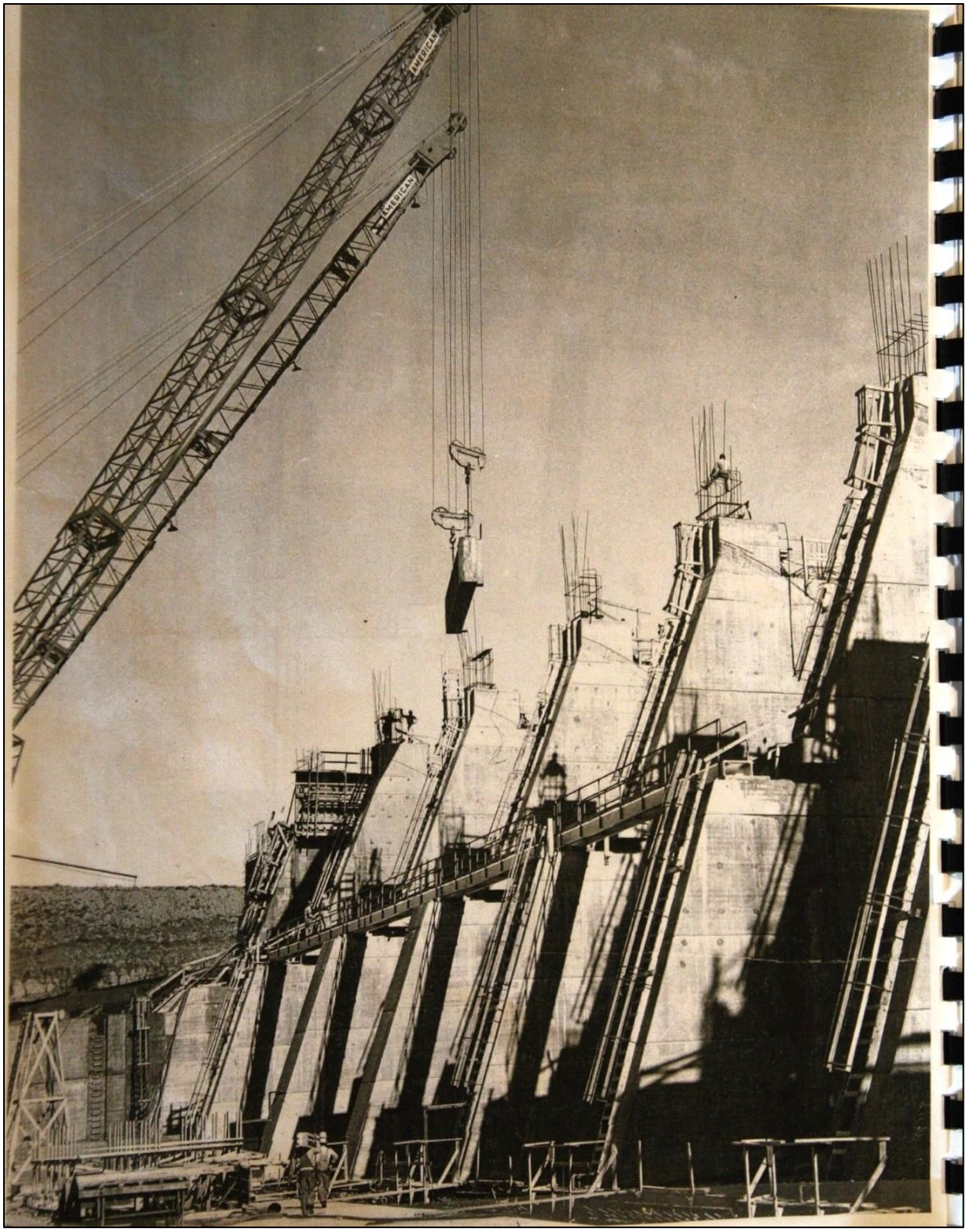

SASKATCHEWAN
MANITOBA
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
MINNESOTA
WYO.
EXPLANATION
DRAINAGE BASIN BOUNDARY
1 SOURIS RIVER BASIN
2 RED RIVER BASIN
3 JAMES RIVER BASIN
4 DEVILS LAKE BASIN
5 MISSOURI RIVER BASIN
BURLINGTON DAM (PROPOSED)
KINDRED DAM (PROPOSED)
BENCHMARK STATIONS
SECONDARY MEASURING STATIONS
PROPOSED IRRIGATION AREAS
MIDDLE SOURIS AREA
KARLSRUHE AREA
LINCOLN VALLEY AREA
WARWICK-MCVILLE AREA
NEW ROCKFORD AREA
LAMOURE AREA
OAKES AREA
INTERNATIONAL JOINT COMMISSION
GARRISON DIVERSION STUDY
INTERNATIONAL GARRISON DIVERSION STUDY BOARD
REFERENCE MAP
AUGUST 1976
PLATE 1

(Map 3.) Garrison Diversion Study Board, Reference Map, August 1976. Map of the revised 1965 GDU project plan including all the main project features. Source: International Garrison Diversion Study Board, and International Joint Committee. “Report.” Ottawa, ON; Washington, D.C.: International Joint Commission, 1976.

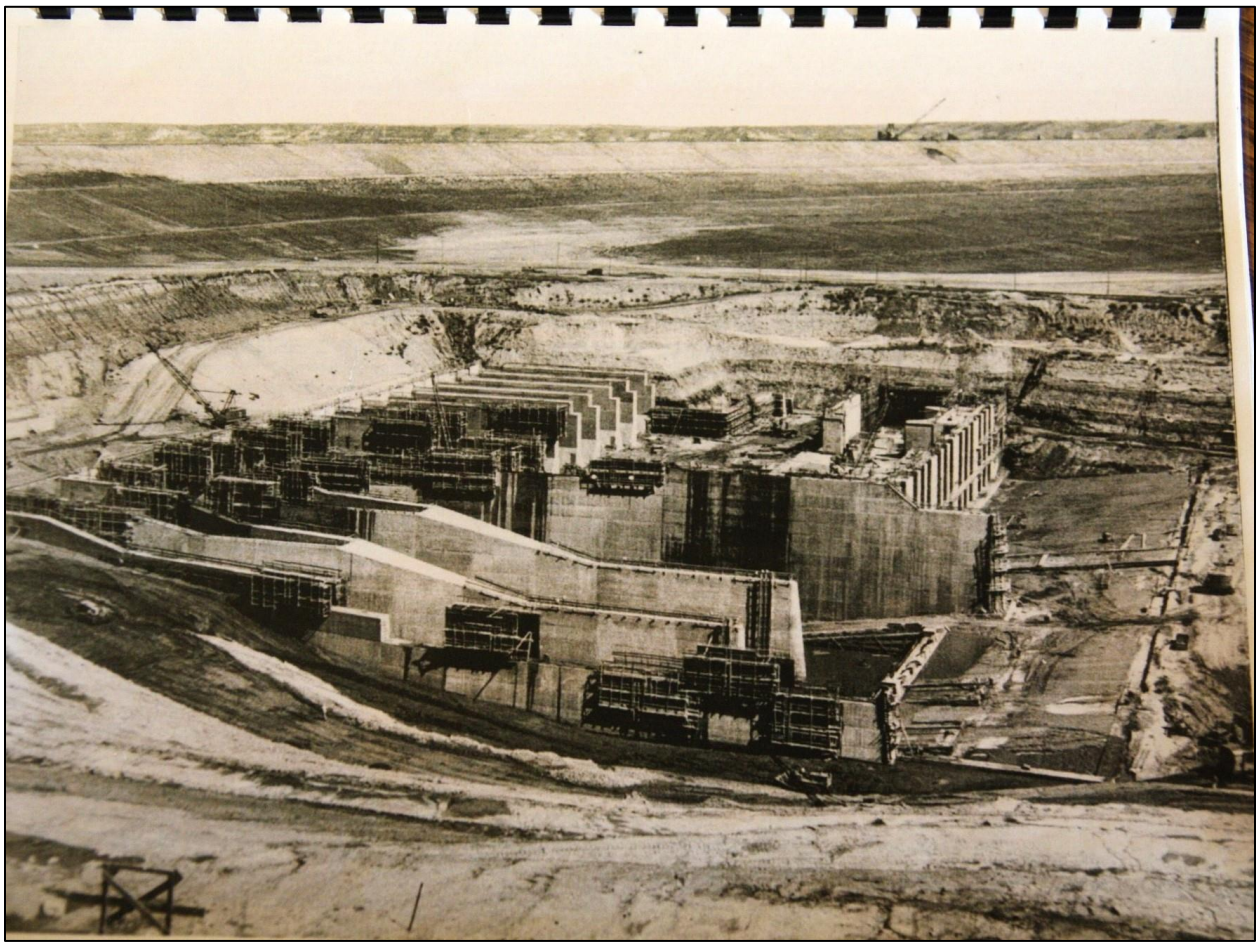


(Figure 1.) Garrison Dam spillway construction by night, ca. 1950. Source: State Historical Society of North Dakota, “Water Commission Photographs,” State Agency Records – Water Commission - #32323

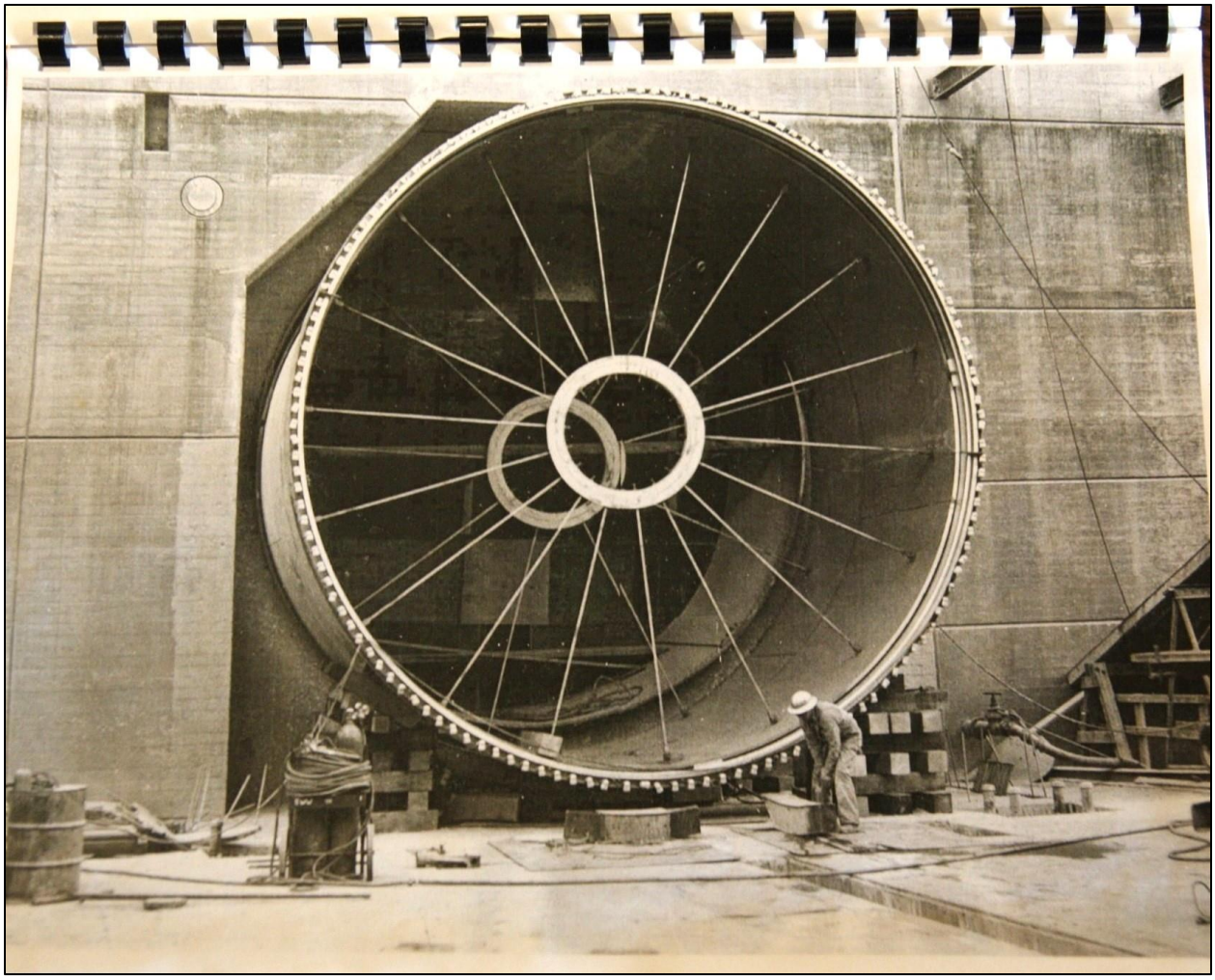
(Figure 2.) Commencement of the construction of the Garrison Dam, ca. 1944. Source: State Historical Society of North Dakota, “Water Commission Photographs,” State Agency Records – Water Commission - #32323



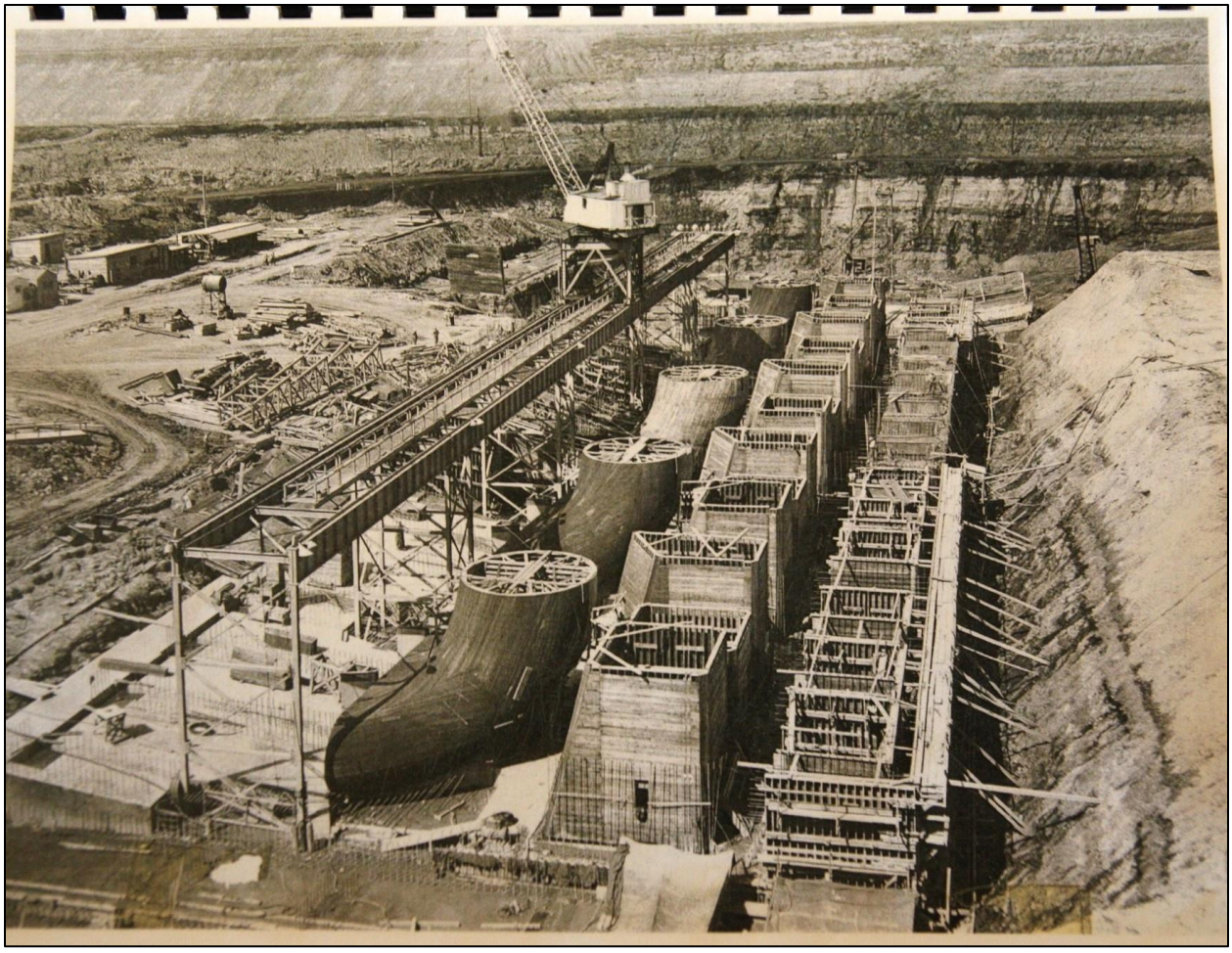
(Figure 3.) Construction of the 28 intake structures, ca. 1950. Source: State Historical Society of North Dakota, "Water Commission Photographs," State Agency Records – Water Commission - #32323



(Figure 4.) Aerial view of construction of the Garrison Dam spillway, ca. 1950. Source: State Historical Society of North Dakota, "Water Commission Photographs," State Agency Records – Water Commission - #32323



(Figure 5.) Construction of the GDU hydroelectric turbines, ca. 1950. Source: State Historical Society of North Dakota, “Water Commission Photographs,” State Agency Records – Water Commission - #32323



(Figure 6.) Construction of the Garrison Dam and hydroelectric turbines, ca. 1950. Source: State Historical Society of North Dakota, “Water Commission Photographs,” State Agency Records – Water Commission - #32323

(Figure 7.) The McClusky Canal. Source: Author’s Collection.

(Figure 8.) Aerial view of the expanse of the construction of the Garrison Dam spillway, ca. 1950. Source: State Historical Society of North Dakota, “Water Commission Photographs,” State Agency Records – Water Commission - #32323

(Figure 9.) Aerial view of the Garrison Dam spillway, July 1, 2011. Source: U.S. Army Corps of Engineers – Omaha District "Garrison Dam and Lake Sakakawea," https://www.nwo.usace.army.mil/Missions/Dam-and-Lake-Projects/Missouri-River-Dams/Garrison/igphoto/2002986227/igphoto/2002986227/

Chapter One: 'We Can Build It': Milo Hoisveen, Engineer and Technocrat, Advocate and Activist, 1953-1969

By the mid-1950s the future of the Garrison Diversion Unit (GDU) for its promoters looked bright; the Garrison Dam had been built, Indigenous communities and farmers had been relocated and the dam had been opened. The project seemed poised to move into the next phase of the construction process of its principal supply works, which would require sustained political and community mobilization. That work was taken up in 1958 by a dedicated and determined individual, North Dakota State Engineer, and GDU frontman, Milo Hoisveen (see figure 10). This chapter provides an analysis of Hoisveen's work for the GDU. While there are many other historical and scientific studies produced on the GDU that allow us to understand and to evaluate the scientific, political, economic, and social history of the GDU, Hoisveen's role in the GDU debate has not yet been explored. Hoisveen is the person who most effectively illustrated the early years of the GDU debates. From 1958 to 1969 Hoisveen crisscrossed the country presenting no less than 114 times to national and local audiences to campaign for the completion of the GDU. An examination of Hoisveen's speeches during these years highlighted his unique ability to sell his scientific authority and to interpret science for each individual audience by strategically tailoring his message about the GDU. We see from Hoisveen's speeches and in the local press coverage of his presentations that he was not only a skilled engineer, but also an effective bureaucrat, translator, and interpreter of science. Without his narration we would not know much about the vision of the North Dakota State Water Commission (NDSWC) and its plans for the GDU.

In addition to providing a unique insight into the GDU and the NDSWC, Hoisveen was a good example of a technocrat engineer of the Cold War era. His confidence was rooted in the

power of technology to remake the environment for the benefit of the nation. The key to the revitalization of the socio-economic potential of North Dakota was, according to Hoisveen, in the development of North Dakota's water resources. Hoisveen believed in the ultimate authority of technical experts such as chemists, geologists, hydrologists, climatologists, and engineers to interpret the science and to decide upon the appropriate technology needed to control and to harness the power of nature.[57] These experts targeted the remaking of the nation's rivers under the belief that "humans and their technological systems could recreate ecological processes like flowing water just as effectively as the river itself."[58] Hoisveen's work as North Dakota State's Chief Engineer and lead of the NDSWC provides us with a unique opportunity to study one man's efforts to put his technocratic ideology into action.

This is a story about post war and cold war America, the American West, and the use and application of technology to control the nation's water supply. It is an examination of one individual who played a key role in this application of technology on the environment at the state level and it is a story shaped by Hoisveen himself.[59] The unusual and copious records of this one man's perspective, enable us to build a history of water as a resource, the place of technology and management in society, and the interactions between publics and those who believed so whole heartedly in the management of nature in the twentieth century state. In this chapter, I will examine Hoisveen's growth and development as an engineer and technocrat. Hoisveen's

[57] The Bureau's GDU employment records in 1957 reflect this emphasis on the authority of technical experts. The Bureau's records for the GDU indicate that it employed land surveyors, agricultural specialists, drillers, engineers (agricultural, canal and drain layout, drainage, planning, and structural engineers), geologists, hydrologists, draftsmen, economists, and laboratory technicians. There is no mention that the Bureau had hired biologists, environmental scientists, or ecologists for its work on the GDU. Milo W. Hoisveen, Statement of Milo W. Hoisveen State Engineer and Chief Engineer North Dakota State Water Commission Before House Subcommittee on Public Works Appropriations, Eighty Fifth Congress, First Session, May 15, 1957, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives, Bismarck.

[58] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 196.

[59] Records from 1961 and 1962 were noticeably absent from the Milo Hoisveen Collection. It is therefore not known if Hoisveen gave any additional speeches beyond those that he included in his collection.

development of his public role shows how one man put into action ideas about resources, technology, the evolution of state and nation. Next, I will explore Hoisveen's viewpoint by looking at his characterization of water. Hoisveen portrayed water as possessing gendered characteristics and agency, as well as a political role in reinforcing democracy, combating communism, and promoting modernization of the agricultural industry. Lastly, I will explore Hoisveen's ever changing depiction of the state and of technology throughout his speeches. A careful analysis of his rhetorical strategies and of how he presents his arguments to various publics illustrates how one man sought to craft public policy.

The Making of a Technocratic Authority, 1929-1953

Born to Norwegian-American pioneer farmers, Louis C., and Louise Forsythe, in Grafton, North Dakota in 1906, Milo Winfred Hoisveen was the youngest of six children. His father Louis immigrated with his family from Lillehammer, Norway in 1860 to Wisconsin in 1861 and then relocated to Grafton, North Dakota in 1878.[60] Louis became a successful tree farmer in North Dakota where he planted and sold upwards of 32,000 trees from his farm and homestead. Milo demonstrated early in his life a drive to pursue his interests and his passions. As a young man, Hoisveen did not automatically join his father in working at the family tree farm, but instead began to pursue his dream of becoming an engineer by taking his first job working for the State Highway Department. Hoisveen began to pursue his passion for engineering by enrolling in the civil engineering program at North Dakota State University. Just as the stock market crashed in 1929 setting off a decade long economic depression across the U.S. Hoisveen graduated from university and began his engineering career, securing a job as a toll line engineer

[60] Walsh County Historical Society, *Walsh Heritage: A Story of Walsh County and Its Pioneers*, vol. 1 (Grafton, North Dakota: Associated Printers, 1976).

for Northwest Bell Telephone Company. After two years with the company, in 1931 Hoisveen received his golden ticket: a job with the North Dakota State Engineer's office. Hoisveen's two years at the state office were marked by thousands of farmers losing their land due to the drought and economic depression that gripped the state and much of western U.S.[61] These two formative years solidified Hoisveen's decision to focus the remainder of his career on hydrological engineering and to become an expert in the design, construction, and operation of large-scale, state-led irrigation projects.[62] Hoisveen believed in the power of engineering and technology to control and to "put to work" resources to reshape and redefine the environment for the benefit of the local communities and the nation.[63]

Having established his engineering career, but before taking on his first significant leadership position, Hoisveen fell in love with and then married Hollis Carrell in 1933. Shortly after the couple settled down in Burlington, North Dakota, Hoisveen's career began to take off. In 1934 Hoisveen was appointed the Chief Engineer for the North Dakota Rural Rehabilitation Commission and the Works Projects Administration and later that year he was endowed with his most sizeable leadership position to date: overseeing the construction of the Burlington Irrigation Project.[64] Hoisveen proved himself as capable of managing large-scale dam projects, which led to another significant step in his career. While thousands of workers across the country were losing their livelihoods and their jobs due to the droughts that had devastated the land through the west and to the economic depression that had crippled the country in the 1930s, Hoisveen stepped into a critical role at the Department of Agriculture as a civil service employee for its

[61] Robinson, *History of North Dakota*, 396.
[62] Unknown, "Milo Hoisveen to Receive Award," *The Bismark Tribune* (Bismark, North Dakota), November 25, 1970, 23.
[63] Unknown, "North Dakota's 'Mr. Water'," *The Bismark Tribune* (Bismark, North Dakota), June 28, 1973, 4.
[64] Unknown, "Milo Hoisveen: Obituary," *The Bismark Tribune* (Bismark, North Dakota), October 21 1990.

western division in 1937. Along with many other reclamation states during the 1930s, North Dakota state officials recognized the need to create a comprehensive plan to develop the state's water resources. While Hoisveen had left North Dakota to work for the Department of Agriculture, in 1937 North Dakota State officials contracted Hoisveen to establish a state level water commission. Given the repeated droughts of the time, North Dakota officials believed that a state level commission would provide an adequate supply of good quality water for people, agriculture, industry, and fish and wildlife.[65]

Hoisveen established the NDSWC as the water resource authority in the state with the mandate to plan, coordinate, and execute all state level water projects. Hoisveen's technocratic values were imbedded into the formation of the NDSWC and were discernable within the Commission's established core objectives, its operations, and even in its organizational structure.[66] The top leadership positions at the NDSWC included the State Engineer and the Governor of the State who was specifically given the authority to appoint six other "qualified electors" to the Commission.[67] The NDSW's objectives included the regulation of stream flows through channeling, the provision of water supplies, drainage, generation of electricity, and the conservation and development of water within natural watersheds. The NDSWC had the

[65] Milo W. Hoisveen, Objectives of State Water Commission Presented to North Dakota Natural Resources Council, "Presentation to North Dakota Natural Resources Council," January 7, 1964, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives; Milo W. Hoisveen, Irrigation Districts Activities in North Dakota, "Speech given to North Dakota Irrigation District Directors," February 9, 1965, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives; Milo W. Hoisveen, Presentation to Water Users Convention in Minot, N.D., "Presentation given by Milo Hoisveen to Water Users Convention," December 11, 1969, Box 2, Milo Hoisveen Papers, 10463-370102.24, North Dakota Archives, Minot, North Dakota., North Dakota State Water Commission, *1969-1971 Budget Report to Appropriations Committees - 41st Legislative Assembly S.B. 23*, North Dakota State (Bismarck, North Dakota, January 20, 1969 1969), 5-16.

[66] The NDSWC was comprised of seven members and 36 staff, including ten engineers, three geologists, four construction inspectors, one attorney, one accountant, survey parties and other staff responsible for implementing the activities of the commission.

[67] Dean F. Bard and Robert E. Beck, "An Institutional Overview of the North Dakota State Water Conservation Commission: Its Operation and Setting," *North Dakota Law Review* 46, no. 1 (1969): 34.

authority to "investigate, plan, regulate, undertake, construct, establish, maintain, control, operate, and supervise all works, dams and projects, public and private, which in its judgement may be necessary or advisable" to achieve its objectives.[68]

After establishing the NDSWC, Hoisveen continued in his role with the Department of Agriculture from 1937 to 1953, travelling to various projects throughout the western states. Hoisveen worked at the Case-Wheeler Water and Irrigation Project, the Sioux Irrigation Project on the Yellowstone River, the Emergency River Project in Salinas, California, and at other projects in Utah, New Mexico, and Washington. His involvement with these diverse projects afforded Hoisveen valuable experience working with complex sprinkler irrigation systems, large-scale dams and reservoirs in a variety of contexts, and concrete irrigation piping projects. Newspaper records indicate that during his tenure at the Department of Agriculture, the Hoisveen's lived in Rushville, Nebraska in 1941, Salinas, California in 1943, Logan, Utah in 1944, Albuquerque, New Mexico in 1945, and Spokane, Washington from 1946 to 1953. This season of constant change for the family was marked by the unfortunate and untimely death of their son. Hollis had given birth to Carrell Hoisveen who tragically died shortly after birth at the local Logan hospital in 1944. Despite this significant family tragedy, however, Hoisveen's pursuit of engineering excellence led him to push forward in his work and to invest heavily in his community service roles. There is no indication in the records that his workload and travel slowed during this season of great personal loss. In 1947, three years after the death of their first child, the couple gave birth to their only surviving child, Barbara Doan. Hoisveen later became the proud grandfather to two granddaughters as shown in figure 11. It only seemed appropriate

[68] Ibid., 35-36.

following the birth of their daughter that the Hoisveen's would finally settle down in Washington after several moves throughout the west.

Throughout Hoisveen's career he was actively involved and maintained memberships with dozens of national and local water associations, committees, and community organizations.[69] Although Hoisveen was connected to a wide range of diverse organizations representing a variety of local, regional, or national interests, a common theme amongst the organizations that he was involved with was a technocratic vision for the management of the nation's water resources. Hoisveen's involvement with these various community organizations highlighted the importance of amassing popular and political opinion to embrace water management technologies. Hoisveen knew that the success of the GDU depended upon the ability of its allies to effectively translate the science behind the GDU for communities and individuals that stood in opposition to the project. Those in opposition to the project needed to be convinced of the relevancy of this technocratic mega-project to their everyday lives. Hoisveen had developed a strong reputation amongst engineers based on his vast and diverse experience as well as on his social knowledge and connectivity to effectively interpret the science behind the vision and design of the GDU.

This time of significant family transition and professional growth were key years in Hoisveen's vocational story that set the foundations for his next role as State Engineer with the NDSWC. Year after year Hoisveen had received promotions within the agency and as such was

[69] State Historical Society of North Dakota, "Milo Hoisveen Papers - Biographical Sketch," (North Dakota: State Historical Society of North Dakota). www.history.nd.gov/archives/manuscripts/inventory/10463.html. Hoisveen worked on many water projects and committees including: the Red River, United States, and Canada Pollution Control Committee; the Western States Engineers Association; Souris, Red, Rainy River Basin Commission; Missouri River Basin Commission; National Rivers and Harbors Congress; Missouri Valley Association; NWC Development Committee; National Council of Water Projects; Water Resources Association; U.S. Water Resources; North Dakota Water Users Association, North Dakota Society of Professional Engineers; National Society of Professional Engineers.

poised for greater prominence and visibility in the sector. Hoisveen was well known within the engineering community throughout the U.S. and this expertise had permitted Hoisveen to build significant social authority within the water resource management sector. To this point, Hoisveen's story is characteristic of many other cold war scientific experts; however, this is where Hoisveen's story took a unique turn.

Hoisveen, an aspiring engineer, veered from the typical career of a cold war technocrat to follow his dream and to embrace his passions at the regional and national levels of engineering. In 1953 Hoisveen left Washington and returned to his humble home state with his family and settled in Bismarck to take the state's top engineering job. Given his formidable success as an elite engineer at the federal level, it is noteworthy that Hoisveen traded an illustrious career alongside other technocratic elites in Washington to become the spokesperson for a seemingly little-known project in a have-not state. Whatever his personal motives for his return to North Dakota, this is a key development in his story, because we can begin to see him adapt his technocratic ideology in his attempt to advocate for the completion of the GDU. Hoisveen was appointed North Dakota State Engineer and the head engineer for the NDSWC, the very organization he had established fifteen years earlier. He dedicated the remainder of his career to campaigning for the completion of the GDU and to promoting a technocratic ideology for water resource management. In the next section I will look at the significant shift in Hoisveen's career from federal engineering technocrat to the GDU chief apologist.

The Technocrat as Activist, 1953-1969

Hoisveen envisioned the GDU project permanently transforming the state socially, economically, and politically. As the state's chief engineer, Hoisveen knew he was in the ideal position to lead the campaign for the GDU. He sought to engage those who opposed the project

as well as those who, by the 1960s, had become skeptical of the need for large-scale engineering projects. Hoisveen faced a challenging task as he turned his attention to convincing diverse local and national audiences that his vision for this water project would indeed deliver prosperity for the people of North Dakota. Hoisveen was transformed in this period from a project manager and implementer of engineering projects to a formidable advocate and communicator. This makes Hoisveen an instructive historical figure, illustrative of post-World War Two technocrats. He developed unique strategies to articulate his vision of technology to a variety of audiences and bridged local and national publics to keep the GDU alive.

Given the formal duties as Chief Engineer at the NDSWC that included direct project management, field obligations, and administrative roles, Hoisveen's extensive focus on promoting the NDSWC and on mobilizing public support for the GDU was remarkable and unique. Hoisveen did not commission another representative from the NDSWC to spearhead this campaign. Rather, Hoisveen personally took on a marketing role that seemed to be a full-time role, while still performing his full-time formal duties leading the many other smaller ongoing projects throughout the state. This marketing campaign is unique especially given that this substantial marketing initiative was not listed as one of his formal duties at the NDSWC.[70] On average Hoisveen's frequent speaking engagements would have taken him out of the office and away from his family for at least one to two weeks every month.[71] In addition to the time

[70] www.swc.nd.gob/theswc/state_engineer.html. Hoisveen's formal duties as the Chief Engineer consisted of several high-level administrative duties including the allocation of the state's waters, dam safety, sovereign land management, and drainage control. The administrative and managerial responsibilities of the Chief Engineer included regular measurements of soil erosion, water quality, agricultural waste management, dam construction, water resource planning, and land use objectives across the state. The formal aspects of his role also required Hoisveen to travel throughout the state to collect data, visit ongoing construction sites, survey existing infrastructure, and investigate and plan any future project opportunities.

[71] Hoisveen travelled on average five times a year to national events and six times per year to local events. Seven out of the ten years that are on record, Hoisveen spoke over ten times per year to various audiences and two of the years he presented 16 times. National speaking engagements would have required Hoisveen to travel for approximately one-week, while local trips would have required one to four days of travel.

commitment required to travel to each of these speaking engagements, Hoisveen invested a significant amount of time preparing each of his speeches.[72]

This analysis will examine the speeches that Hoisveen gave between 1958 and 1969.[73] Of the approximately 114 speeches Hoisveen presented to various audiences, fifty speeches were given to federal or national audiences and sixty-four presentations were made to local and state level audiences.[74] The fifty national level speeches included presentations to the Missouri River Basin Committee, the House Appropriations Committee, the Western States Engineering Association, the International Joint Commission (IJC), the U.S. Senate, and several other miscellaneous national or interstate committees. The sixty-four speeches to local and state level audiences included presentations to municipal or county level associations, state level water users' associations, state level political audiences, to local Kiwanis, Rotary, or Lions Clubs and to a variety of economic, farm, recreation, hydropower, and wildlife and conservation groups. Hoisveen's early years of promoting the GDU prompted him to frequently speak at the federal level, but by the mid-1960s the number of local and regional presentations he gave had increased while his federal presence had decreased.

Hoisveen's speeches reveal a selective and shrewd use of scientific knowledge and discourse to build support across North Dakota and Washington for the NDSWC's technocratic vision and ultimately for the completion of the GDU. Although there may have been instances when groups invited Hoisveen to speak to its members, it was evident from his speech

[72] Both local and national travel would have occurred via the railway system. Although Hoisveen made the effort to combine speaking engagements that were in close in proximity to one another, the highway system and rail system throughout rural North Dakota was limited in the 1960s, which meant longer than expected travel even to local engagements.

[73] Hoisveen gave three speeches to federal audiences in 1958, five in 1959, three in 1960, five in 1963, eight in 1965, three in 1966, four in 1967, 14 in 1968, and five in 1969. Hoisveen's records did not have copies of speeches that he may have given in 1961, 1962, 1964.

[74] On average Hoisveen gave three to five presentations at the national level and five to ten presentations at the local and regional levels each year during his 11-year campaign.

introductions that he intentionally and meticulously selected which audiences he hoped to address, what messages he hoped to convey, and what objectives he had for each presentation.

Characterizations of Water and of Its Agency Over Ten Years of Speechmaking, 1958-1969

As the State Engineer, Hoisveen's speeches provide insight into one man's technocratic vision. Hoisveen promoted a top-down, modern, and gendered paradigm of the Missouri River and of the NDSWC's role in the GDU debate. Hoisveen de-emphasized water's natural characteristics and emphasized its economic potential for individuals, communities, and the state at large. There are three themes that have emerged from Hoisveen's speeches: a gendering and domesticating of the Missouri River; capitalism, communism, and containment ideology; and the role of technology for the modernization of the American rural west. Although these themes are often intertwined in his speeches, they are distinctive enough to deserve separate analyses.

Hoisveen's speeches reveal a gendered perspective within his technocratic ideology that highlighted his ambitious vision to domesticate the Missouri River for the benefit of the state of North Dakota and the nation. Historian Sarah Pritchard demonstrated in her analysis of the historical processes that shaped the Rhône River in France that the Rhône had been gendered masculine dating back to the seventeenth century on account of its powerful flow and aggressive strength. Pritchard argued that engineers, writers, and artists alike personified the Rhône as a Greek god with ultra-masculine characteristics including rippling muscles and a flowing beard.[75] Descriptions of the river's characteristics of its 'power' and 'force' had historically been connected with gendered notions of masculinity as were any attempts to conquer the river using

[75] Milo W. Hoisveen, "Missouri Diversion in North Dakota in Retrospect to the Central Power Electric Cooperative Inc.," (Speech given by Milo Hoisveen to the Central Power Electric Cooperative, Inc., Carrington, North Dakota: North Dakota Archives, January 14, 1970); Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 60.

technology. Pritchard demonstrated that the reconstruction of the river was seen as a combat mission or a war that the nation's technical elites believed they would win.[76]

Hoisveen's use of language to depict the Missouri River presents an interesting and sharp contrast with Pritchard's analysis of the Rhône River. Where Pritchard focused on the Rhône's masculine characteristics, Hoisveen referred to the Missouri River using female pronouns and feminine characteristics. Before an audience of the North Dakota State Beauty Conference in 1965 Hoisveen painted a picture of the water in the Missouri as "a thing of beauty" because of the work that engineers had done along the river.[77] Beauty, in this period, was a characteristic that was reserved for women, and the process of beautification was intended to soften and to domesticate women. In the same way, Hoisveen employed the language of beauty and beautification to talk about the need to domesticate the Missouri River through the GDU. Hoisveen referred to the Missouri as a river with female qualities and depicted it as a women controlled by passion and biology requiring culture, science, and technology to domesticate it. Without the GDU, the Missouri River was a feminine and undomesticated river of suppressed beauty.

While women were described by and valued for their beauty, they were often also characterized as irrational, dangerous, and passion driven. It was believed that society and culture would be able to tame and to domesticate women. In the same way that society attempted to control women's behaviours, Hoisveen spoke of the Missouri as a dangerous woman, wild and untamed with destructive potential requiring restraint. Much like society characterized women's natures, Hoisveen believed that left to its own devices, the river would be wild, and uncontrolled

[76] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 60.
[77] Milo W. Hoisveen, "Water, A Source of Beauty" a Presentation to North Dakota State Beauty Conference, November 30, 1965, Box 1, Milo Hoisveen Papers, 1046300106, 5, North Dakota Archives, North Dakota Economic Development Commission in Bismark, North Dakota.

"on its rampaging journey to the sea."[78] Addressing the federal House Subcommittee on Flood-Control Rivers and Harbors in 1968, Hoisveen emphasized that the Missouri River was only partially controlled and therefore time was of the essence to construct the GDU to subdue it. Hoisveen believed that the GDU had the capacity to slow the Missouri to an almost total standstill, thereby controlling its natural flow so that "the water again becomes beautiful and clear."[79] According to Hoisveen, the Missouri was poised to "unleash her furry in a most compelling manner."[80] Hoisveen's use of a female pronoun when referring to the river justified his call to male, technological experts to husband the resource.

For Hoisveen, the Missouri's full potential and its beauty could only be unlocked by engineering experts at the Bureau and the NDSWC who held the power to fully restore this river's beauty and to bring this nefarious river under control. Hoisveen's use of a female pronoun when referring to the river also justified his call to his skilled male engineering colleagues to exert their technological expertise over the river. In a speech to the North Dakota Water Users Association in 1960, Hoisveen encouraged the engineers in his audience to "guard and to husband their natural resources" on behalf of their nation to secure the nation's future prosperity.[81] Hoisveen's use of gendered language and a call to husbandry demonstrated his vision for the ultimate domestication of the Missouri via the GDU.

In addition to personifying the Missouri River using gendered ideologies, Hoisveen also attributed sub-human characteristics to the river. Where Sarah Pritchard argued that

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[78] Ibid., 1.
[79] Ibid., 1, 4.
[80] Milo W. Hoisveen, Statement by Milo Hoisveen Before the House Subcommittee on Flood-Control Rivers and Harbors, "Statement made before the House Subcommittee on Flood-Control Rivers and Harbors," May 6, 1968, Box 1, Milso Hoisveen Papers, 10463-370103.12, 9, North Dakota Archives, Washington, D.C.
[81] Milo W. Hoisveen, Water Resources of Southwestern North Dakota, "Speech to North Dakota Water Users Meeting," February 5, 1960, Box 1, Milo Hoisveen Papers, 10463-370103.12, 1, North Dakota Archives, Dickinson, North Dakota.; Milo W. Hoisveen, Commemorating Conservation Week, "Speech," March 22, 1960, Box 1, Milo Hoisveen Papers, 10463-370103.12, 1, North Dakota Archives, Valley City, North Dakota.

technological interventions exerted on remaking the Rhône were characterized as "monstrous, Frankensteinian, and apocalyptic meanings," Hoisveen attributed these same characteristics to the Missouri River itself.[82] In a speech to conservationists in 1959, Hoisveen referred to the Missouri as a beast hell-bent on destruction with the power to threaten the region's ecological and agricultural success. The Missouri was a river with "life-giving waters, changing at times to swollen monsters bent on destruction, have been the principal actors in that drama."[83] The "swollen monster" that Hoisveen referred to, was responsible for "attacking," "breaching its banks," and carrying out an "erosive attack" on facilities nearby. The situation was seen as "so severe that it constitutes an emergency" or a "major catastrophe" since properties along the river were being "jeopardized," "destroyed" and exposed to a "frontal attack by the main body of the stream."[84] In a speech to locals in 1968 Hoisveen passionately remarked that the wild Missouri was "swallowing approximately 400 to 500 acres per year" of potentially productive land and then asked his audience the question:

> If this were not true, would we have hordes of farmers and river residents pounding at our door claiming that the river has gone wild and is about to gobble up their entire holdings? Would we have organizations screaming for more bank protection in North Dakota? This area is under severe attack by the Missouri River.[85]

The portrayal of the Missouri River as having sub-human, dangerous, and feminine characteristics justified, for Hoisveen, the application of technology to subdue it.[86] Both Pritchard and Hoisveen refer to the river as dangerous in its natural state. In comparison to

[82] Sara B. Pritchard, "Recreating the Rhône: Nature and Technology in France Since World War II" (Doctor of Philosophy Stanford University, 2001), 69.
[83] Milo W. Hoisveen, Dependency on Water Resources in the United States, 1959, Box 1, Milo Hoisveen Papers, 10463-370103.12, Speech Given at State Conservation Training Center, North Dakota Archives.
[84] Hoisveen, Statement by Milo Hoisveen Before the House Subcommittee on Flood-Control Rivers and Harbors.
[85] Milo W. Hoisveen, Erosion on the Missouri River, 1968, "Speech," June 24, 1968, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives.
[86] Milo W. Hoisveen, Is This the Way to Run A River Basin?, "Milo Hoisveen Presentation to the Missouri Basin Interagency Committee," March 13, 1968, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives.

Pritchard's argument, however, Hoisveen spoke of the Missouri as the female villain needing to be restrained and the technology used to harness this unruly feminine power as a welcome intervention that would bring about positive change. Within the context of an inherently dangerous and gendered river, the technocratic interventions of the NDSWC to tame the river were portrayed as honourable. In a speech given to the County Commissioner Association of North Dakota in 1967 Hoisveen began with a detailed and captivating description of water, encouraging his audience to consider nature's agency:

> It has been said 'Water never resists, yet it wears away the most resistant things. Water fits itself to conditions, takes the shape of any bowl it is poured into. Yet nothing shapes more things than water; the continents upon which we live have the shape that water gives them. Water does work, but it is never busy. It may turn a mill or light a city but not by trying. Water lets itself be used and I might add and abused. Water has learned humility. It is colorless, yet what is a rainbow but water? It is tasteless, yet what is there better to drink? It always seeks the lowest place but those in high places come to drink it. . . The water that we are using today is the same water that our Christ walked upon and the same water that has passed through our systems on many occasions.[87]

Attributing agency to water, Hoisveen engaged his audience's emotional and tangible connection with the water resources used within their communities. Hoisveen painted the picture of water as a humble and willing servant, free to provide for the needs of local communities and farmers. Having set the stage of water as a cooperative entity with quasi-human characteristics, Hoisveen urged his audience that water was eager to offer itself for the benefit of the community and thus was willing to submit to human management. In speaking to the Missouri River Basin Interagency Committee in March 1968, Hoisveen emphasized the role of the NDSWC to "guard our land against further losses to the river."[88] For Hoisveen, the application of technology in the

[87] Milo W. Hoisveen, Water for the Future, January 11, 1967, Box 1, Milo Hoisveen Papers, 1046300108, North Dakota Archives, Speech, County Commissioner Association of North Dakota, Williston, North Dakota.
[88] Hoisveen, Is This the Way to Run A River Basin?: 4.

form of the GDU to the Missouri River held the power to transform this unruly femininized entity from wayward and destructive to beautiful and productive.

Historian Clifford Edward Clark, Jr. argued that design standards were created to simplify and to control the natural world to eliminate any aspects of nature that were wild or unpredictable.[89] These design standards were widely adopted within the state and in scientific traditions. Hoisveen freely employed language that praised the state for exerting its control over the environment and for implementing design standards to remake non-human nature for the benefit of human nature. In a speech given in 1969 Hoisveen stated that "a nation endowed with the capability of putting people on the moon certainly can improve and enhance these areas [of water resource management] to permit their use to all those who desire to enjoy them."[90] According to historian R.K. Schneiders the Corps and the Bureau's application of engineering technology to natural water resources in the form of dams and mega-irrigation schemes, were demonstrations of their "American supremacy over nature."[91] Instead of understanding the Missouri as a living system with interconnected ecologies, the technical elites at the Bureau saw the Missouri River as an unruly waterway requiring expert management to tame its destructive capacities to allow for the development of municipalities and resources. According to Schneiders, engineers effectively "divorced water from life" to create an agricultural, industrial, and urban nation of prosperity and growth through the development of hydropower, flood control, navigation, and irrigation.[92] There was an ongoing battle between nature and technology.

[89] Elaine Tyler May, *Homeward Bound: American Families in the Cold War Era*, Revised edition. ed. (New York: Basic Books, 2017), 172.
[90] Milo W. Hoisveen, North Dakota Water Problems Presented to the National Water Commission, "Speech given to the National Water Commission," September 26, 1969, Box 1, Milo Hoisveen Papers, 10463-370103.12, 12, North Dakota Archives, Denver, Colorado.
[91] Hoisveen, Statement by Milo Hoisveen Before the House Subcommittee on Flood-Control Rivers and Harbors.
[92] Schneiders, *Big Sky Rivers: The Yellowstone and Upper Missouri*, 301.

For Hoisveen, the water of the Missouri flowed to serve human needs and it would be engineering technology that would bend nature's will to meet those needs.

Like the engineers in Schneider's study, Hoisveen believed that the water of the Missouri was a commodity that if channeled, diverted, and dammed would serve the nation's Cold War agenda.[93] Hoisveen ascribed heroic characteristics to the technology wielding elites who sought to control the Missouri. Hoisveen stated that the engineers of the NDSWC were highly "scientific, trained, and technical personnel" and were "required to exercise their imaginations and ability more so than other professions."[94] Elevating the scientific expertise and authority of engineers above other professions, Hoisveen hoped to sell the authority of these men to the local communities. At a conservation training event in 1959, Hoisveen encouraged his local audience to depend upon the technical expertise of the NDSWC to supply water, rather than hoping and praying for Mother Nature to offer rain: "The attempt to use science and technical skill to force water from the clouds is symbolic of the amount of determination to control and use water, rather than to submit to it."[95] Man's ingenuity and enterprise, according to Hoisveen, would control nature rather than be forced to respond to nature. For Hoisveen, submission was a key concept in the GDU debate: either farmers would yield to the Missouri, or the river needed to be forced to submit to the authority and technological interventions of the NDSWC and its experts.

Hoisveen's vision to the control the Missouri was closely connected to his belief in the power of engineering, but it was also connected to the growing political and cultural threats to democracy of the 1960s. Fears of communist expansion into the U.S., threats of an impending

[93] Ibid., 302.
[94] Milo W. Hoisveen, Water Resources and Planning in North Dakota, "Speech," May 3, 1960, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives, Fargo, North Dakota.; Hoisveen, Statement of Milo W. Hoisveen State Engineer and Chief Engineer North Dakota State Water Commission Before House Subcommittee on Public Works Appropriations, Eighty Fifth Congress, First Session.
[95] Hoisveen, Dependency on Water Resources in the United States: 3.

nuclear war, and political instability led Americans to re-embrace the nuclear family, domesticity, and traditional gender roles during the Cold War.[96] According to historian Elaine Tyler May, gender conformity and domesticity were not only social acts but political ones that proved loyalty to capitalism and democracy. May demonstrated that "containment" in the domestic sphere was believed to be the key to ensuring security for Americans while also holding communism at bay.[97] For Hoisveen, then, the adoption of modern irrigation systems and techniques on farms in North Dakota were also political actions that contributed to the containment of communist advances and to the reinforcement of capitalist values.

The call to adopt this Cold War rhetoric was directed especially at the grassroots level across the nation. The fight for democracy would be won at the local level by the engagement of farmers and local communities. Hoisveen regarded support for the NDSW's water management plans as a civic duty to the state and the nation. In 1963 Hoisveen addressed a local audience at the North Dakota Water Users Association toasting the local water users and their role in ensuring the state's advancement:

> Their name is legion! People who farm and irrigate the land! People who serve their fellowman. People who spread the word of the imperative necessity for orderly water resource development. People who make and pass requisite legislation, who guide appropriations and build the structures. . . To each that history shall record his or her worth in the economic and social growth and advancement of our sovereign state.[98]

Connecting local farmers in North Dakota to the advancement of the 'sovereign state' was Hoisveen's strategy connect local communities to a national vision for democracy. In a fourth of July speech in 1959 Hoisveen reminded a local audience at Brush Lake, North Dakota that "evil

[96] May, *Homeward Bound: American Families in the Cold War Era*, 9.
[97] Ibid., 14.
[98] Milo W. Hoisveen, Progress in the North Dakota Water Resources Program, October 8, 1963, Box 1, Milo Hoisveen Papers, 1046300105, North Dakota Archives, Bismark, North Dakota.

forces are continually at work attempting to undermine our democracy. . .both communists and gangsters."[99] Hoisveen encouraged his audience to confidently bolster national democracy and the capitalist system: "we must maintain our position of strength on which rests the future of the free world. We must ever be mindful of keeping our nation strong in order to maintain that independence."[100]

Hoisveen's evocation of "the people" is striking but his use of fear-based language in his speeches was also significant as Hoisveen sought to bolster the American capitalist ideology. Hoisveen regularly highlighted for his local audiences the dangers and concerns associated with the nation's rapidly growing population. Hoisveen referred often throughout his speeches to demographer Thomas Malthus' theory of population growth. Using language meant to alarm his audiences, Hoisveen described the birth of "8,000 new hungry mouths" that were being born each day in the U.S. "since this time yesterday."[101] To Hoisveen it was "obvious that we are headed for a problem with our food production" on account of the "population explosion" that was leading to a "constant depletion of the remaining crop land."[102] In a speech entitled "Water Programs are Bringing Added Prosperity to North Dakota," Hoisveen quoted the United Nations warning that "a tremendous pending world crisis" was on the horizon on account of populations growing faster than the available food supply. Hoisveen used this grim picture to push forward the GDU as the NDSWC's best solution to address the problems of population expansion.[103] Hoisveen suggested to one audience "visualize, if you can, the fact that when today's baby crop

[99] Milo W. Hoisveen, Fourth of July Speech at Brush Lake, North Dakota, "Speech given by Milo Hoisveen," July 4, 1959, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota State Water Conservation Commission, 1, North Dakota Archives.
[100] Ibid., 11.
[101] Hoisveen, Commemorating Conservation Week: 4.
[102] Hoisveen, Water Resources and Planning in North Dakota: 3.
[103]Milo W. Hoisveen, Water Programs are Bringing Added Prosperity to North Dakota, January 13, 1965, Box 1, Milo Hoisveen Papers, 1046300106, 1, North Dakota Archives.

attains the age of twenty-five years" the total population in the U.S. would have doubled in size. Based on that prediction of population growth, Hoisveen vividly painted the picture that "a city the size of Grand Forks is being created every three days" followed by the prediction that "it becomes apparent that we too will join the nation of have nots" without the implementation of an expanded federally funded water program in the state.[104] Hoisveen's references to Malthus were most often combined with an urgent call to local farmers to modernize their farms for the purposes of increasing their productive capacity to feed the increasingly hungry nation of the baby boom years.[105]

Historian Donald Worster demonstrated that the hydraulic society of the west was a "coercive, monolithic, and hierarchical system ruled by a power elite based on the ownership of capital and expertise."[106] These means of control had two distinctive, but mutually dependent centers of power: the private sector farmers and the public sector bureaucrats and agencies.[107] Those who held the financial and political power as well as the technology to redesign, remake, and control rivers, according to Worster, also held the "hydraulic means of production" and the "workers serve as instruments of environmental manipulation."[108] Hoisveen believed that this combination of state-led technocratic expertise and the tangible efforts of locals to promote and support the GDU, would be key components to the state's successful socio-economic

[104] Milo W. Hoisveen, The Outlook for Irrigation in North Dakota: Presented at the Third Annual Meeting of the Greater North Dakota Association, Grand Forks, April 21, 1958, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives, Bismark, North Dakota.
[105] The idea of a "population bomb" was first discussed in 1954 and in 1968 Paul Ehrlich published *The Population Bomb*. See Paul R. Ehrlich, *The Population Bomb* (New York: Ballantine Books, 1968). It is hard to know if Hoisveen read Malthus or other post war publications such as Ehrlich's book, but Hoisveen directly refers to Malthus throughout his work. For more information on the impacts of this study see Pierre Desrochers and Christine Hoffbauer, "The Post War Intellectual Roots of the Population Bomb," *The Electronic Journal of Sustainable Development* 1, no. 3 (2010).
[106] Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West*, 7.
[107] Ibid., 51.
[108] Ibid.

development and the promotion of democracy. The NDSWC was the ideal agent that possessed the political, technical, and economic power to contain, remake, and tame the Missouri River as an ultimate demonstration of capitalist ideology. The farmers, on the other hand, were the ideal conduit through which the NDSWC could activate its vision to modernize the state's agricultural practices.

The NDSWC possessed the technology to conduct topographic mapping, stream gauging, and ground water studies to unearth what the human eye could not perceive.[109] Historian Bruce Braun studied the geologizing of Canada's west coast and the ways that natural spaces were capitalized and became legible through the creation of topographical maps using scientific measurements and statistical assessments.[110] Braun argued that the Canadian government was able to strategically constrain its citizens to use geological resources in ways that benefited the nation.[111] Much like the technical elites in Braun's study, Hoisveen, was the engineering expert seeking to compel local farmers to support the NDSWC in its capitalist efforts to transform the land through the control of the Missouri River.[112] According to Hoisveen, water quality chemists, engineers, and hydrologists performed specialized work that "justified itself as a sound investment."[113] For Hoisveen, the knowledge that farmers could possess about water resources was limited to their experience of water at the earth's surface. Farmers did not possess the scientific knowledge or have the instrumentality to plunge into the depths of the earth to uncover geological and hydrological facts about the soil or the water that lay beneath the surface. These

[109] Milo W. Hoisveen, A Cooperative Water Resources Program, February 3, 1969, Box 1, 1046300201, North Dakota Archives, Speech to the U.S. Geological Survey District Conference.
[110] Braun, "Producing Vertical Territory: Geology and Governmentality in Late Victorian Canada," 30.
[111] Ibid., 34.
[112] Hoisveen, Fourth of July Speech at Brush Lake, North Dakota.
[113] Hoisveen, A Cooperative Water Resources Program: 2.

farmers would therefore be reliant on the expertise of the engineers at the NDSWC to provide the needed infrastructure to transform their land.

The farmers of North Dakota were, however, in the unique position to transform their small, family farms into wealth producing capitalist spheres with vast economic potential.[114] Hoisveen strategically reminded local farmers of their democratic power to conquer and contain the agricultural land that they possessed. In speaking to the North Dakota Water Users Convention in 1963, Hoisveen referred to water as "our most valuable non-human resource and as such it is a commodity which possesses true economic value."[115] The people of North Dakota needed to be ready to "put this lifeblood of all human activities into the arteries of our industry" and to establish methods to store and to put this resource to good use "as it is money in our bank."[116] In another speech to the federal Economic Development Institute in 1966, Hoisveen emphasized the economic benefits of "man's endeavor to rule the river and to utilize its surplus water for his benefit."[117] The willingness of farmers to integrate the modern irrigation schemes that the NDSWC developed was a necessary component of state development and growth.[118] Historians J.R. McNeill and Corinna R. Unger argued that the state's intensification of agricultural production through the introduction of new technological interventions and agricultural initiatives was intended to reinforce capitalist claims to superiority over communist ideologies.[119] The NDSWC held the technological, economic, and political power to manipulate

[114] Milo W. Hoisveen, Water Programs in the Nodak Area, June 21, 1969, Box 1, 1046300201, 9, North Dakota Archives, Grand Forks, North Dakota.
[115] Hoisveen, Progress in the North Dakota Water Resources Program: 6.
[116] Ibid.
[117] Milo W. Hoisveen, Activities in the Field of Water Resources is Now Paying Dividens, January 12, 1966, Box 1, Milo Hoisveen Papers, 1046300107, 1, North Dakota Archives, Bismark, North Dakota.
[118] Hoisveen, Dependency on Water Resources in the United States: 6.
[119] McNeill and Unger, *Environmental Histories of the Cold War*, 6.

the environment, while the farmers of North Dakota held the agricultural power to work the land in their possession.

What did the modernization of American farms entail? What kind of technology and knowledge about that technology did Hoisveen encourage individual farmers to adopt? Farmers use one of two primary irrigation methods to cultivate their crops: the rain-fed or dry irrigation method and the sprinkler-fed or wet irrigation method. The dry irrigation method leaves the land more susceptible to variable weather patterns but reduces the crop's bacterial contamination potential. The wet irrigation method makes it possible to maintain consistent watering through periods of drought but increases the potential for contamination.

The principal crops at the mid-twentieth century in northeast North Dakota were lower value crops including wheat, oats, barley, flax, corn, tame hay, and pastureland which thrived in drier soil conditions and were grown using traditional dry irrigation methods. In a region that faced many droughts, dry farming techniques led to stronger and more resilient crops as plants were forced to root deeper into the soil to locate ground water sources during dry seasons. Farmers using dry irrigation methods had historically worked together with the rhythms of Mother Nature in a symbiotic partnership. Dry irrigation methods required farmers to creatively store and transport their water throughout their land using gravity, windmills, channels, and natural waterflows.[120] Crops grown using the dry irrigation method were, however, highly susceptible to the effects of extreme weather events.

In comparison to dry irrigation, the wet irrigation method applies water to the land via a sprinkler system. Wet irrigation methods train plants to rely on surface water that is applied artificially allowing crops to maintain shallow root systems. Wet irrigation depends upon a

[120] Nye, *America as Second Creation: Technology and Narratives of New Beginnings*, 212.

complex system of technologies to pump, channel, and distribute the water onto fields through an intricate underground watering system and a vast above ground sprinkler system. When water is applied from above onto crops through sprinklers, large quantities of water are lost through both evapotranspiration and run-off. Additional technology is therefore required to manage the heavy run-off water that is generated through overland sprinkler irrigation. The operation of the pumping system depends not only on the availability of substantial electricity but also on the use of manufactured pesticides and fertilizers to offset the leeching of nutrients.

Given the calls for increased food production and the lower economic value of dry irrigation crops, the federal Bureau of Reclamation had plans to modernize North Dakota's agricultural industry.[121] Wet irrigation systems held the promise of the ability for farmers to grow higher market value crops such as alfalfa and potatoes even though these plants were not native to the region. In comparison to the technological advances in wet irrigation methods, traditional dry irrigation techniques were increasingly portrayed as antiquated and limiting. Hoisveen sought to enlist as many local farmers as possible to embrace this vision to modernize North Dakota's agricultural industry.

In the post war period, governments around the world looked to modernize their agricultural industries by encouraging their farmers to move away from dry irrigation methods in favour of adopting new wet irrigation approaches.[122] According to historian Bruce Braun, the government's advancement of irrigation schemes and hydrological systems across the American west in the post war period was a way for the state to "restage the landscape."[123] Given that the construction of large-scale irrigation systems depended heavily upon state investments, the

[121] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota* (Washington: U.S. Department of the Interior, 1974), II-4.
[122] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 127.
[123] Braun, "Producing Vertical Territory: Geology and Governmentality in Late Victorian Canada," 15.

emphasis in the postwar period on irrigation sciences enabled the state to maintain its primary role in the management of the nation's water and of the environment.[124] Braun argued that governmentality was the way in which the state "optimized relationships between men and things so as to make the forces of the state grow from within."[125]

Government investments in water technologies, according to Hoisveen, would lead to the widespread adoption of wet irrigation systems, resulting in the transformation of the agricultural industry in North Dakota.[126] According to historian David Nye, the state's promotion of "homesteading by irrigation" not only restaged the landscape but it also created "debt and dependency" on the state.[127] Irrigation projects were extremely costly endeavors and the costs of these projects fell to the taxpayers and to the local farmers who were forced to incur large debts to retool their farms for wet irrigation systems. The GDU was a good example of Nye's findings: a large-scale government investment in technology that promised to redefine the socioeconomic possibilities of the landscape while also creating economic dependencies for farmers upon the state.[128] The agricultural industry, for Hoisveen, was the site where technology and science intersected with modernity and his speechmaking was the vehicle that he used to put his modernist vision, values, and presumptions into action.

While the Bureau and the NDSWC indicated that the modernization of the state's agricultural industry would stimulate and transform the state's socioeconomic status, who would bear the burden of the costs associated with this transformation was not evident. Under the GDU plan, the Bureau was responsible for the delivery of water to the farm owner's property line,

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[124] Ibid.
[125] Ibid., 12.
[126] Milo W. Hoisveen, Activities in the Field of Water Management in the North Dakota Portion of the Red River Basin, May 28, 1965, Box 1, Milo Hoisveen Papers, 1046300107, 4, North Dakota Archives, Bismark, North Dakota.
[127] Nye, *America as Second Creation: Technology and Narratives of New Beginnings*, 239.
[128] Ibid., 207.

while it was the farmer's responsible to purchase and provide the pumps, motors, pipes, and sprinklers to distribute the water to the various corners of their land. The technology and infrastructure upgrades that farmers would need to adopt to transition their farms from gravity-fed irrigation to sprinkler fed irrigation were extremely costly.[129] The Bureau promised farmers access to financial loans to support the steep investments needed to purchase and install the new irrigation infrastructure on their land. These loans, however, would take decades for farmers to repay. The total outstanding farm mortgage loans in North Dakota between 1964 to 1972 had increased by 102 percent, and fifty-three percent of that increase was already attributed to technological improvements and land costs.[130]

Not only was the equipment expensive to purchase, but the operating costs associated with this new technology were also prohibitive for most financially strapped farmers. The Bureau estimated that it would require approximately 100 million kilowatt hours annually to irrigate the full 250,000 acres that the GDU proposed. The Bureau did not stipulate who would pay for this massive expenditure of electricity, but it was clear that the on-farm electricity requirements and costs associated with irrigating the land would be the responsibility of each individual farmer. Farmers not only bore the upfront costs of the transformation of their farms to accommodate a wet irrigation system, but also the ongoing costs of running this system.

The economic benefits associated with the technological overhaul of a farm would not be recognized immediately but would only be felt many months and years later. Farming and harvesting activities needed to be paused for extended periods while technological changes were implemented on their land. The Bureau required that pipes be buried eight feet underground and

[129] Robinson, *History of North Dakota*, 465.
[130] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota*, II-4.

that drains be installed in the designated irrigation areas. Previously fruitful land thus became unproductive and unprofitable for a period until the installation of the pumping system and the irrigation pipes had been completed. Once the pumps had been set up, the pipes laid, and electrical connections and lines established, only then could the local farmer connect their system to the larger GDU water distribution system. With the water now ready to be discharged onto the land, large sprinklers and sprinkler stands would need to be purchased, assembled, and connected to the underground pipes. Once the entire system had been connected only then could the farmer begin to prepare the scarred landscape for planting. The application of wet irrigation methods necessitated farmers to be re-educated on the cultivation of unfamiliar crops using new technology. It was through trial and error that farmers tested how much fertilizer, pesticide, and water needed to be applied to their land. Farmers who decided to implement the wet irrigation system on their land faced the dismal prospect of a complete loss of revenue for that season. This loss was incurred while also taking on large debts and loans to purchase and install the irrigation infrastructure and equipment.

Given the financial burdens that farmers were expected to bear with the modernization of their farms, it was not surprising that many North Dakota farmers did not internalize the vision behind the GDU. The state's gradual implementation of complex irrigation systems throughout the American west increasingly limited farmers' ability to reject wet irrigation methods meant to modernize the agricultural industry. As the state controlled more and more of the nation's water supplies, farmers became increasingly dependent upon the state for the provision of water supplies that were critical to a farmer's success; the NDSWC increasingly gained influence and power in the management of the state's water resources with the introduction of the GDU. While individual farmers had the freedom to cultivate their crops according to their preferred

agricultural method, according to historians Edward Jones-Imhotep and Tina Adcock, the slow and individual internalization of modern values influenced and shaped people's choices and actions.[131] Hoisveen repeatedly reminded his local audiences that "water resource development is the key to North Dakota's future growth and prosperity" and the transition to wet irrigation infrastructure would usher in "a new era of agricultural growth and expansion" in the state.[132] This new era of growth, however, would require the "wholehearted support of everyone."[133] We do not know from Hoisveen's records how his message of modernization was received by farmers and local communities. Given that Hoisveen repeatedly emphasized this vision in his speeches, suggests that farmers contested or at the very least remained unconvinced by Hoisveen's message. Hoisveen, however, was not deterred. He knew that enrolling locals and enlisting federal officials to support the completion of the GDU required a nuanced and persistent marketing approach.

Hoisveen's past experiences as a traditional technocrat in the engineering sector as well as his experience working at the grassroots level with communities empowered him to become an effective translator of science to both local communities and federal agencies. He had developed the necessary political standing with state officials in Washington and at the state level to request audiences with a diversity of influential state agencies and offices. Hoisveen's success as a political salesman was also connected to his ability to engage with a variety of local, regional, and national associations and to use the local press effectively to disseminate his message about the GDU. Building on William Cronon's observation that nature is a profoundly human creation,

[131] Edward Jones-Imhotep and Tina Adcock, eds., *Made Modern: Science and Technology in Canadian History* (Vancouver, British Columbia: University of British Columbia Press, 2018), 7.
[132] Milo W. Hoisveen, Water Resources, "Speech to Second Annual Convention of the North Dakoa Water Users Association," December 23, 1960, Box 1, Milo Hoisveen Papers, 10463-370103.12, 1, North Dakota Archives, Minot, North Dakota.
[133] Ibid.

this exploration into Hoisveen's narrative provides a reflection of one man's perceptions of nature and his vision for the state's water supply.[134] Hoisveen's narratives also highlight the methods and strategies enacted to communicate his ideology and the process whereby ideas became reality.

A rhetorical analysis of Hoisveen's many speeches showed the clear, intertwined themes outlined above. Yet Hoisveen is still more important as an illustration of how such rhetoric was applied. Hoisveen exhibited skill, nuance, and adaptability in the way he revised ideas to his listeners, and bridged communities while also pitting them against each other. Hoisveen was a master tactician, shrewd, and a man of significant action. A study of Hoisveen's marketing campaign provides historians with a unique window into one man's views of nature and technology. We also gain insight into the development of environmental policy and into the process whereby one technocrat masterfully translated his visions, ideas, and policies at different scales to different audiences.

Selling the GDU: Political Salesman and Shrewd Bureaucrat

By 1965 the available funding for reclamation work was rapidly disappearing. At the federal level, Hoisveen seized every opportunity to persuade politicians and scientists of the economic value of the GDU, the scientific merit of the project, and of the NDSWC's ability to execute the construction and implementation of the GDU. For Hoisveen to enroll the local communities, he needed to convince farmers of the authority of the NDSWC as both distinct from, yet connected to, the federal government. Hoisveen, the strident politician and bureaucrat, set to work tailoring his messages to engage these two dissimilar audiences.

[134] William Cronon, "The Trouble with Wilderness: Or, Getting Back to the Wrong Nature," *Environmental History* 1, no. 1 (1996): 8.

Hoisveen travelled to the nation's capital regularly to justify the GDU to the nation's scientific experts and politicians and to advocate for the NDSWC. Hoisveen presented large quantities of economic data as well as statistical records on water quantity, water quality, geological surveys, and engineering information. A careful read of the data, however, reveals that he most often offered statistics from past reports or highlighted his future predictions rather than presenting current information. In a speech made in 1967 in Bismarck to fellow engineers, four out five pages were focused on presenting his audience with historical flooding data from the past twenty-five years, to justify his request for additional funding to build another dam.[135] Although Hoisveen did not present any new or current data, he still made his request with confidence. Hoisveen's avoidance of current data or reports may have been part of his effort to keep the GDU out of the federal spotlight since the GDU had become a point of contention in Washington. Keeping the message focused on past reports as validation for future action, Hoisveen was able to avoid unnecessarily sparking or fueling any debates surrounding the GDU.

Shrinking federal budgets for reclamation and water resource management meant that existing funding designated for programming in North Dakota could be redirected if officials perceived that there was a greater need elsewhere or if the expertise of the NDSWC to implement projects was questionable. At his federal talks, compared to the speeches given to locals, Hoisveen emphasized his extensive technocratic credentials. He introduced himself by his academic qualifications, his numerous high-level roles and responsibilities, the number of years as head engineer at the NDSWC, his accomplishments, and his connections to various regional

[135] Milo W. Hoisveen, Statement for SWC Project #1344, June 30, 1967, Box 1, Milo Hoisveen Papers, 1046300108, 4, North Dakota Archives, Bismarck, North Dakota. Hoisveen cited only outdated reports from 1932, 1933, 1935, 1936, 1937, the Missouri River Basin Plan, flood records and climatological data from the late 1800s and early 1900s.

and national committees or organizations.[136] Hoisveen's introductions were tailored even further to the specific audience that he addressed. When speaking to a political crowd or a commission, Hoisveen would include personal experience in his introduction to increase his political relevance; however, when speaking to an audience of scientific experts, he spoke only of his technocratic credentials. In a statement given to the Subcommittee on Flood Control at the House of Representatives in 1965, Hoisveen strategically began his talk with an introduction that highlighted his academic expertise as Chief Engineer and his experiential authority. To establish his credibility, Hoisveen assured his political audience that he was a "native North Dakotan" who was "well and personally acquainted with and have professional knowledge of the geographic lands and areas" in the state.[137] He also emphasized his unique familiarity with each of the regions that the Committee was investigating before addressing the issues from a scientific perspective.

Hoisveen's individual speeches to national audiences versus to local audiences revealed distinctive patterns: to any national committees, agencies, or scientific groups, Hoisveen emphasized quantitative data while to local committees or groups he presented more qualitative and narrative-based information. When speaking to local audiences, Hoisveen knew that the scientific facts alone would not win them over to the benefits of the GDU nor to the authority of the NDSWC. Instead, Hoisveen creatively appealed to his local audiences by creating connections with them using emotional storytelling and narrative-based language. For example, in 1968, Hoisveen presented to a federal audience on the issue of the erosion of the banks beyond

[136] Milo W. Hoisveen, Statement Before Interstate Commerce Commission Regarding Discontinuance of the Northern Pacific Railroad-Mott Line, March 28, 1963, Box 1, Milo Hoisveen Papers, 1046300105, 1, North Dakota Archives.
[137] Milo W. Hoisveen, Statement of Milo W. Hoisveen, on Pipestem Dam and Reservoir on Pipestem Creek, A Tributary of James River, North Dakota, August 17, 1965, Box 1, Milo Hoisveen Papers, 10463-370103.12, 1, North Dakota Archives.

the Garrison Dam. To the House Committee on Public Works on June 20 Hoisveen described the bank erosion using only scientific language and focused on the statistics and figures of the river's flow rates and of the quantity of soil being removed.[138] Only four days later, Hoisveen addressed the same issue, but with a local audience on June 24 and June 29. Rather than presenting hydrological or geological statistics, Hoisveen simply appealed to the emotions of his local audience. Hoisveen described a dire situation that "much of our bottomlands are currently under attack" including the three local power plants, municipal facilities, golf course, sewage lagoons, and the recreational complex. He then asked his local audience "if erosion does not destroy it [the local irrigation pumping site], the fluctuating level of the river either floods their pump or leaves it high and dry."[139] Instead of flooding his local audiences with scientific facts and figures, Hoisveen used expressive language to appeal to their sensibilities. Hoisveen's ability to tailor his message to a specific audience demonstrated his technocratic salesmanship and aptitude as an advocate of the NDSWC and of the GDU.

Although fighting to obtain authorization for the GDU and funding for the NDSWC at the federal levels was a central aspect of Hoisveen's marketing campaign, he also knew that to move his agenda forward it would be imperative that he revive local support. As the GDU had suffered major setbacks at the federal level in the early 1960s, the project had significantly begun to lose favor amongst locals and questions about the NDSWC's commitment to local interests and needs had begun to arise. The repeal and revision of the GDU authorization had led to increased mistrust of federal officials and revived beliefs that federal authorities were working for their own interests and not for that of local communities. Recognizing these local suspicions,

[138] Milo W. Hoisveen, Statement Before House Committee on Public Works, June 20, 1968, Box 1, Milo Hoisveen Papers, 1046300109, House of Representatives, 2, North Dakota Archives, Washington, D.C.
[139] Hoisveen, Erosion on the Missouri River, 1968: 3.

Hoisveen identified an opportunity to create and even enlarge this gap between local citizens and federal officials. Hoisveen cleverly promoted the NDSWC as the ideal liaison, able to bridge this federal-local divide. Hoisveen sought to assure his local audiences that the NDSWC was the ideal entity that locals could trust to promote their specific interests at the federal level. According to Hoisveen, not only was the NDSWC well acquainted with the varied concerns of its local communities across the state, but it also had the needed political authority and clout at the federal level to request funding for ongoing and future water resource planning.

Hoisveen regularly pitted federal interests against local needs in his speeches to local communities. Hoisveen portrayed the federal government at best, as ignorant to the needs of local communities, and at its worst, as a villain waiting to victimize local communities by imposing its federal interests without regard for local needs. In a speech in 1960 to the County Commissioners' Association of North Dakota, Hoisveen referred to the federal government as "big government" that used every means of "creeping controls" including grants and financial aids to control local needs to meet national interests. Hoisveen argued that the process of control "starts out very innocently. . . a natural run of events" where federal interests engulfed local needs, interests, and solutions.[140] According to Hoisveen the federal government ought to freely provide financial supports to local and state communities to meet their priorities instead of becoming a decision maker of suitable programming at the local level. Hoisveen began this speech with the statement:

> Certainly, the theme of my talk will be water. It will also deal with the trend in our National Government, which makes it imperative that we take steps to thwart the encroachment that is currently being undertaken by the Federal

[140] Milo W. Hoisveen, Address to the County Commissioners' Association of North Dakota, January 13, 1960, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota State Water Conservation Commission, 2, North Dakota Archives.

> Government to take jurisdiction over the administration of waters that rise and flow through state boundaries.[141]

Employing fear-based language to describe federal action at the state level, Hoisveen suggested that federal officials will encroach on local autonomy and therefore could not be trusted.

Once Hoisveen had successfully created this gap, he strongly advocated for the need for a liaison. In 1963 Hoisveen argued that it was best for all federal water projects slated for the state to be "cleared" with the NDSWC since it was an agency according to Hoisveen that could provide local proponents of water projects "an unbiased opinion as to the program the Commission believes to be the most desirable for the area for which it is being considered."[142] Hoisveen reminded the local flood control district that they should not be "confused" by the competition of federal agencies for the project nor make their decision based on "which agency may appear to be the most friendly," but on the "cold economic facts."[143] If trusted, the NDSWC was perfectly suited to act as the most effective coordinating agency.

When Hoisveen believed he had gained sufficient trust from a local community Hoisveen shifted his narrative once again to highlight the scientific prowess of the NDSWC. Leaning heavily into a flood of statistics and figures from past reports as well as on the NDSWC's future water management plans, Hoisveen offered his local audiences' solutions to local issues. Speaking at the North Dakota Water Users Meeting on February 5, 1960, Hoisveen presented the data of the semi-arid conditions in the state, arguing that the collection, evaluation, and interpretation of the water data as well as the development of standards and criteria for water use

[141] Ibid., 1.
[142] Milo W. Hoisveen, Statement at Public Hearing for Flood Control, January 15, 1963, Box 1, Milo Hoisveen Papers, 1046300105, North Dakota State Water Conservation Commission, 1, North Dakota Archives, Bismark, North Dakota.
[143] Ibid., 3.

"is a job that only a state can do."[144] To a regional Rotary Club audience Hoisveen began by recounting several sad stories of how previous droughts had decimated the herds and the livelihoods of the local ranchers. Hoisveen then shared a barrage of impressive sounding facts and figures asserting that the GDU would lead to the creation of 650 new farms, to population increases of 17,500, to a fifty percent growth of returns on established farms.[145] Hoisveen went on to list the total predicted increases of the GDU for the whole state including 345 new service, wholesale, and manufacturing establishments, 4,500 new job opportunities, a rise in non-farm personal income of $26,355,000, and $3,750,000 annual increases in federal and state level taxes.[146] Rather than contextualizing these statistics as state-wide predictions, Hoisveen simply relayed the largest possible predictions that the Bureau had offered of the GDU's economic advantages. The GDU's influence, according to Hoisveen, "on our economy will be fabulous."[147] The scientific reports that Hoisveen quoted from in his speeches were not publicly available, so in most cases, few, if any of his local audiences had read the reports nor could the numbers be verified. Statements of the GDU's benefits to local audiences were often overstated and justified only with explanations of the progress that the NDSWC was making in developing the state's water resources.

Hoisveen entrenched these predictive figures into his speeches to local audiences using fear-based language. In a speech in December 1969 Hoisveen spoke to a local water users convention and highlighted the "numerous problems, but of a much greater magnitude" that the state of North Dakota would face if the GDU was not allowed to be completed. Using

[144] Hoisveen, Water Resources of Southwestern North Dakota: 5.
[145] Milo W. Hoisveen, The Garrison Diversion Unit and Its Influence on Southwest North Dakota, December 1, 1965, Box 1, Milo Hoisveen Papers, 1046300106, 2, North Dakota Archives.
[146] Ibid.
[147] Hoisveen, Water Programs are Bringing Added Prosperity to North Dakota: 4.

predictions into the future, Hoisveen quoted from the NDSWC Interim Plan that called for the irrigation of approximately 3,900,000 acres of land between the years 2000 and 2020. Without providing evidence for those predictions Hoisveen ominously highlighted that "our minds should be changed and rapidly" for international "jockeying" will require at least twenty years of "diplomatic maneuvering." Therefore, if planning did not commence shortly, Hoisveen stated, "consequently, we will have no water for exportation, in fact we will be an importer."[148]

Hoping to convince his local audiences that immediate action was needed, Hoisveen painted a bleak picture of local conditions. In an address to the North Dakota Water Users in Dickinson, North Dakota in 1960, Hoisveen stated, "you folks who live in southwestern ND where even the average annual rainfall is barely sufficient to support farming and ranching economy know of the value of water more so than do people living in other sections of the country."[149] Given these dire conditions, "it should be obvious to all of us that the answer to the problem lies in the construction of dams and storage reservoirs."[150] In another speech to County Commissioners in 1960 Hoisveen appealed to his audience by beginning his presentation with a detailed story of a hypothetical small-town farmer whose 'simple life' incrementally became more and more complex over time. The story vividly depicted the introduction of the automobile, the needed road expansions from dirt to four-lane highways, the creation of large volumes of traffic, and finally federal interventions to alleviate these new local problems.[151] Hoisveen used this story to highlight the NDSWC ability to plan far into the future to address complex issues that farmers, like the man in the story, faced each day. The NDSWC was poised to specifically ensure that local water resources would be used for the benefit of the local community, but

[148] Hoisveen, Presentation to Water Users Convention in Minot, N.D.: 1.
[149] Hoisveen, Water Resources of Southwestern North Dakota: 1.
[150] Ibid., 8.
[151] Hoisveen, Address to the County Commissioners' Association of North Dakota.

would also ensure not to 'overuse,' 'overwork,' and even 'abuse' those limited and precious resources as federal officials might.[152]

In his local speeches Hoisveen creatively connected the prosperity of the local community to the success of the NDSWC by elevating the state agency and denigrating federal efforts.[153] In 1966 Hoisveen spoke of the "devastating storms" that hand torn through the local communities and described how it had been "virtually impossible" for farmers to reach their haystacks for reserve feed since they were "inaccessible to farmers and ranchers using conventional equipment."[154] Although helping communities after a storm was not part of the NDSWC's duties and responsibilities, Hoisveen used the opportunity to champion the efforts of the NDSWC. Hoisveen described at length how the NDSWC moved from community to community with Commission equipment to assist its local farmers and ranchers in digging their properties out of the rubbish left by the storm. Hoisveen heralded the NDSWC for "acting in a liaison capacity" and for "assisting in relieving the hardships brought on by the fierce storm" and for the follow-up inspections the Commission carried out on account of the threat of severe flooding that followed.[155] In positioning the NDSWC as a central character, Hoisveen effectively elevated the NDSWC as the hero, deserving of local confidence and trust. The state, according to Hoisveen, was in "great danger" and he urged his local audience that "we may be literally fighting for our lives" if individuals and groups did not begin to strongly support the NDSWC.[156] Into this gap Hoisveen strategically promoted the NDSWC as a local agency that was uniquely

[152] Hoisveen, Water for the Future: 1-2.
[153] Milo W. Hoisveen, Bank's Stabilization on the Missouri River Segment in North Dakota, "Speech before The Rotary Club of Bismarck," June 29, 1960, Box 1, Milo Hoisveen Papers, 10463-370103.12, North Dakota Archives, Bismarck, North Dakota.
[154] Hoisveen, Water for the Future: 13.
[155] Ibid., 14.
[156] Milo W. Hoisveen, "The Need for Added Support for Reclamation at the Grass Roots," in *Milo Hoisveen Papers* (Speech to the Upper Missouri Basin Water Users Association: North Dakota Archives, December 7, 1967), 1.

qualified to act on behalf of its citizen's local concerns and needs yet politically situated to tap into the federal purse strings when needed. The ownness, according to Hoisveen, for the success of the state rested not only on all levels of government, but on the grassroots level citizenry to collectively support its greatest asset and advocate: the NDSWC.

Hoisveen also promoted the NDSWC as the state's water resource gatekeeper. Local speaking engagements provided Hoisveen with the opportunity to demonstrate that the Commission was knowledgeable of local needs and to educate locals on the state-wide work that it was accomplishing on behalf of its citizenry. These descriptions of local projects were meant to widely educate the local audience of the Commission's home-grown efforts to alleviate flooding, increase drainage, provide water access and oversight to the planning and the coordination of all water projects within the state. Hoisveen emphasized the NDSWC's role in growth of the state to "mature far beyond the fondest expectations of those pioneers who first turned over its sods."[157] Hoisveen stated in a speech in 1960 to the North Dakota Water Users Meeting that the NDSWC was the necessary agency that serve as the "focal point" of all water projects in North Dakota, whether federal or local. According to Hoisveen the NDSWC's ability to coordinate data, planning, resources, and staff "will bring about the soundest and best" water programs for the area.[158] The NDSWC "is in an excellent position to provide a definite service to all concerned . . . and stands ready to provide all assistance it can within its ability and authority."[159]

Convenient Truths

[157] Hoisveen, Water Programs are Bringing Added Prosperity to North Dakota: 7.
[158] Hoisveen, Water Resources of Southwestern North Dakota: 4.
[159] Ibid., 9.

Many elements of Hoisveen's presentations revealed him to be a savvy translator of science who masterfully tailored his message to each individual audience in the hopes of enrolling supporters in his technocratic vision for the state's water resources. But it is also true that Hoisveen altered project details and knowledge about the GDU, and North Dakota more generally, according to the needs of each audience. When Hoisveen hoped to solicit local participation in the NDSWC's plans, he spoke highly of and elevated the experiences and knowledge of locals; however, when speaking to scientists or politicians at the regional or national levels, Hoisveen diminished the knowledge held by local communities as outdated and unimportant. When Hoisveen intended to generate patronage from social and cultural organizations, he emphasized the significance of maintaining the cultural and historical heritage of the Indigenous communities; however, when speaking to technocrats, Hoisveen blamed Indigenous groups for slowing down the GDU process. When federal support was needed, Hoisveen praised the federal government for its investments in reclamation states and in the hard-working Americans in the state of North Dakota; however, when enlisting local communities, Hoisveen did not hesitate to criticize federal officials for imposing its national agenda on local communities. The NDSWC agenda had to have flexible appeal.

When Hoisveen had an audience of local communities, he was highly complementary of their practical, lived experience; however, when speaking to a national audience to a group of scientists when it was necessary to dismiss the local, lived experience, Hoisveen did not hesitate to denigrate and demean North Dakota's local citizens. In an address on June 10, 1965, to the International Joint Commission on behalf of the grassroots communities in attendance, Hoisveen hailed the "capabilities and the desires of many of the landowners" who would be responsible for the operation of the GDU's irrigation works. Hoisveen highlighted how the "attitude is

excellent" of local landowners which would contribute to "the success of an irrigation project."[160] Hoisveen thanked the International Joint Commission for "the courtesy extended the citizens of this state in holding this hearing at grass roots level."[161] Hoisveen portrayed local landowners as competent and positively invested in the GDU to elicit support for the NDSWC from the IJC. In contrast to his praise of local landowners, when speaking to the national Soil Conservation Committee's participation in the NDSWC's GDU planning in 1969, Hoisveen argued that even though North Dakota was an agricultural state, its citizens had lost interest in such projects across the State. Hoisveen dismissively hypothesized that the reasons for this "are probably manyfold but they usually stem from apathy and ignorance."[162] Hoisveen further stated that the public "has a short memory and the majority are also intent on the present and they ignore the future."[163] Painting a picture of the public as ignorant, simple, and unprepared to face the state's future water needs, Hoisveen boldly called the Soil Conservation Committee to participate in the NDSWC's urgent mission to collaborate to "realize maximum utilization of our state's waters and land resources through planning efforts."[164] According to Hoisveen, resource planning was the weapon of the educated scientists, while ignorance and daily survival was the plight of the local community. In another instance in 1968, Hoisveen was focused on enlisting various regional stakeholders to maximize the state's political influence at the federal level and to support the NDSWC's comprehensive water resource plan. Hoisveen stated that "too frequently, Federal agencies came before congressional committees and advanced their projects

[160] Milo W. Hoisveen, Statement Before the International Joint Commission for Development of the Water Resources of the Pembina River Basin Manitoba and North Dakota, June 10, 1965, Box 1, Milo Hoisveen Papers, 1046300106, 4, North Dakota Archives, Bismark, North Dakota.
[161] Ibid., 7.
[162] Milo W. Hoisveen, Discussion: Soil Conservation Committee Annual Meeting, November 4, 1969, Box 1, Milo Hoisveen Papers, 10463-370103.12, 1, North Dakota Archives, Bismark, North Dakota.
[163] Ibid., 4.
[164] Ibid., 10.

with little or no consideration of the grass roots thinking in regard to the project."[165] Hoisveen devalued the role of the local citizenry in one speech, while highlighting their value and elevating their status in another.

The same pattern is obvious in Hoisveen's references to Indigenous communities. In one speech Hoisveen depicted Indigenous groups with colonial nostalgia and in another speech Indigenous groups were described simply as one more roadblock to the completion of the GDU. In speaking to the Rotary Club in Bismarck, North Dakota in 1960 Hoisveen spoke of how apparent it was that "no state has given so much and really received so little in return" and then went on to list the sacrifices that North Dakotans had made to meet the demands of federal reclamation projects. Among the list of contributions, Hoisveen highlighted the devastating effects of the appropriation of Indigenous lands to accommodate the filling of Lake Sakakawea. Hoisveen stated that the creation of the Garrison and Oahe Reservoirs had forced the relocation of 5,000 state residents including "2,500 Indians who had become well-adjusted citizens were likewise required to find homes elsewhere." [166] Hoisveen sought in this speech to unify the local community by highlighting their collective sacrifices and emphasizing the negative benefits of federal reclamation efforts. Hoisveen strategically hailed the value of the Indigenous communities in his description of Indigenous people as "well-adjusted citizens."

Hoisveen's inclusive narrative to local communities evaporated when speaking to a wider audience when his speech became marked by colonialist discourse. To these larger audiences, Indigenous communities were roadblocks that needed to be overcome. When speaking to The Central Power Electric Cooperative in 1970 of the Missouri River Basin Project, Hoisveen told

[165] Milo W. Hoisveen, North Dakota's Water Resources Development Program: A Report to the Association of Western State Engineers in Jackson Lodge, Wyoming, September 1968, Box 1, Milo Hoisveen Papers, 1046300109, 1, North Dakota Archives.
[166] Hoisveen, Bank's Stabilization on the Missouri River Segment in North Dakota: 1.

the history of the various barriers the project had faced from within and without. Hoisveen argued that just as the GDU had begun to develop support and interest at the regional and federal levels, "then smoke signals began to arise from the cliffs that bordered the proposed Garrison Reservoir site. The beat of the tom-tom echoed and reechoed through the valley that harbored the Berthold Indian Reservation, which assured another obstacle."[167] In one speech the response of Indigenous communities to their relocation from riparian bottomlands to construct the Garrison dam and to create Lake Sakakawea was lamented and in another it was condemned.

A pattern is evident throughout Hoisveen's discourse: Hoisveen actively shaped and adapted his message to enroll supporters to the NDSWC and its plans revising his message to satisfy the expectations of each audience, even if it meant contradicting himself. Hoisveen maintained a flexible and malleable narrative in his efforts to mobilize and enact public policy.

Does Rhetoric Matter?

I have told the story of one man and of the methods that he employed to enroll various audiences in his vision to see the GDU completed and the NDSWC empowered to implement this project. Why dwell in such detail on the rhetoric of one man, advocating for a relatively insignificant project, in a have-not state, in mid-twentieth century America? This is not simply a discussion that celebrates or critiques Hoisveen's ability as an orator within the water resource management sector. Rather this is an historical analysis of how policies are developed and how ideologies gain their footing in practical contexts far from the academy or the political arenas where they are developed. Hoisveen enjoyed professional successes through his profile with the GDU, but the evidence that he successfully enrolled the public in his confidence in the GDU is less clear. Hoisveen's records provide a unique window into how environmental policy was

[167] Hoisveen, "Missouri Diversion in North Dakota in Retrospect to the Central Power Electric Cooperative Inc.," 2.

activated and how technical and hydrological policies got traction and were translated to various audiences. It is within this context therefore, that Hoisveen's various strategies to enroll national and local supporters to his cause matters to historians. Hoisveen's technocratic narratives – the stories he told to his audiences - reveal not only one man's perspective, but more broadly how interconnected the construction of water management systems were with evolving understandings of nature, the development of environmental policies, and Cold War politics. An analysis of Hoisveen's speeches offers valuable insights into the contested history of the development and management of America's rivers in the 1960s and 1970s.[168]

The ideological themes that were woven throughout Hoisveen's speechmaking highlight how Hoisveen understood the river as well as his role as a technocratic expert in the process of remaking the river. Hoisveen saw the Missouri River as a gendered river that if strategically controlled and tamed, possessed the potential to reinforce the domestic anti-communist, capitalist, and containment efforts of the Cold War era and to redefine and modernize the state's agricultural industry. Hoisveen, the political salesman and shrewd bureaucrat, delivered individualized speeches that shifted and bent the truth to meet the needs and expectations of his listeners. He was clever, strategic, and at times manipulative in the delivery of his technocratic ideology. As a result, Hoisveen translated scientific narratives to a variety of audiences and demonstrated that he could masterfully maneuver between local and national audiences.

Given the limitations in telecommunications, Hoisveen's speeches were only available to those individuals who were able to physically attend his speaking engagements. Therefore, in his bid to enroll supporters, Hoisveen was able to deliver convenient truths without his other audiences being aware of how he adeptly maneuvered his message to target each public. These

[168] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 4.

information silos bolstered Hoisveen's confidence to strategically advance his technocratic agenda in the face of increasing opposition to the construction of large-scale engineering infrastructure and a growing environmental movement.

This is a chilling picture of how one man sought to move policy and an envirotechnical system into practice across location and time. Hoisveen's speeches allow us to gain a picture of how envirotechnical systems and regional environmental policies were communicated. Although Hoisveen was unsuccessful in his quest to see the GDU built and implemented, he was widely revered across North Dakota for his efforts to develop the state's water resources. Hoisveen's reputation locally shows how watertight the information silos that he created were, and how these silos ultimately contributed to the effectiveness of his campaign.

For Hoisveen, the NDSWC was the ideal platform to advocate for his technocratic vision for the state's water resources. The GDU was a project unlike any other for Hoisveen; it held the power to redefine the state from a have-not state to one of socioeconomic prosperity. He envisioned the GDU as a project that would transform 'unproductive' water to 'productive' water through its movement from the 'unfruitful' areas of the state to the perceived 'fruitful' areas of the state. Hoisveen's big dreams for North Dakota and the GDU led to the birth of a strategic campaign to enroll allies across the state and the country for his technocratic GDU vision. An examination of his work as the North Dakota State Engineer at the NDSWC is instructive of a particular kind of science and of a particular mobilization of that science. Hoisveen's unofficial marketing campaign to raise support for the NDSWC's mega irrigation project during this time of heightened opposition to technocratic, mega water management projects, highlights the ideological metamorphosis of one man's technocratic narrative.

Hoisveen's extensive engineering and leadership experience on the job site, in boardroom offices, with community associations, and at government meetings over the first fifteen years of his career as North Dakota State Engineer afforded him invaluable social engagement experience which changed the way Hoisveen staged his marketing campaign for the GDU. Hoisveen's speeches over an eleven-year period revealed one man's sustained belief in a traditional technocratic engineering approach to the management of the state's water resources. Hoisveen's speeches show the malleability of his message and the fact that he did not feel that he had to use science extensively in order to promote the project – his confidence in engineering science is almost a given – he is a cold warrior in that sense, trying to drum up support for his technocratic vision as much as he is trying to explain the science to his various audiences.

Even though the GDU had stalled out and had not moved any closer to completion through his campaign, Hoisveen was admired by many citizens and politicians alike in North Dakota. Hoisveen was honoured in 1971 with the Kennedy rocking chair as only the twenty-second North Dakotan to have received the state's leadership award. Governor William L. Guy said of Hoisveen: "He's probably the best – I think he is the best – water engineer in the United States."[169] Hoisveen received praises from Chairman of the Missouri River Basin Commission, the Governor of South Dakota, and from the North Dakota Water Users Association that praised Hoisveen's "eloquence and studious deliberation" for the state's water resource development.[170]

Over the 1960s Hoisveen fought hard to convince his audiences of the value of the GDU and of the NDSWC, but by 1970 the tide had shifted significantly. While Hoisveen had effectively delivered his technocratic message, by the early 1970s it was clear that he was unable

[169] Dave Jameson, *Hoisveen Earns a Rocking Chair*, The Bismarck Tribune, (Bismarck, North Dakota, October 19, 1972).
[170] Ibid.

to adapt his technocratic ideology to the rhetoric of the second-generation experts in the environmental movement. As the next chapter reveals, a group of environmental experts emerged in the 1970's whose vision for human and non-human nature came into conflict with the goals of the traditional technocrats of the early- to mid-twentieth century. Following a heart attack in March 1973 Hoisveen made the decision to retire in July 1973 at the age of sixty-eight. It is not clear whether Hoisveen left his post of twenty years because of his heart attack or because he could sense that engineers' dominance as leaders in the GDU debate was waning. Hoisveen could not have known the extent to which the GDU debate would shift over the next ten years and what other voices reshaped the discourse surrounding the GDU, the NDSWC's technocratic crown jewel.

(Figure 10.) Milo Hoisveen. Source: http://weremember.com/milo-hoisveen/2t9d/memories.

(Figure 11.) Milo Hoisveen with his two granddaughters, Anastasia Doan born on December 28, 1965, and Angela Doan born on September 25, 1969. Source: “Proud Grandpa Beams at Banquet,” *Bismarck Tribune*, 1971; http://findagrave.com/memorial/47587308/milo-winfred-hoisveen.

Chapter Two: 'Should We Build It?': Disputed Sciences, Environmental Consciousness, and the Building of a Profession, 1970-1975

The technocratic approach to water resource management that had defined Milo Hoisveen's twenty-year tenure as North Dakota's State Engineer came under increasing scrutiny by the late 1960s with the rise of the environmental movement. Conservationists, activists, and scholars began to question the environmental impacts of large-scale water projects on local landscapes and interrogated the traditional promise of technology and of its ability to master nature.[171] According to historian Richard Andrews, the greatest revolutionary element of the environmental movement was "a powerful new awareness of the environment as a living system- a 'web of life,' or ecosystem- rather than just a storehouse of commodities to be extracted or a physical or chemical machine to be manipulated."[172] As one of the nation's preeminent agents of the government's attempts to dominate and control the nation's waterways, the Bureau of Reclamation was increasingly criticized by the late 1960s for "taking good water and making it bad" and for being unable to perceive non-human nature as a living ecology.[173]

By 1970 the U.S. federal government had introduced the National Environmental Protection Act (NEPA) in response to this heightened environmental consciousness. Under this new legislation, all federally funded water projects, including the Garrison Diversion Unit (GDU), were required to report on the project's potential environmental effects. Implementing agencies were expected to prepare a formal Environmental Impact Statement (EIS) to assess the

[171] Rachel Carson, *Silent Spring* (New York: Fawcett Crest, 1964); Susan R. Schrepfer and Douglas Cazaux Sackman, "Gender," in *A Companion to American Environmental History*, ed. Douglas Cazaux Sackman (Chichester, West Sussex; Malden, MA: Wiley-Blackwell, 2010), 134; Langdon Winner, *Autonomous Technology: Technics-out-of-control as a Theme in Political Thought* (Cambridge, MA: MIT Press, 1977).
[172] Richard N. L. Andrews, *Managing the Environment, Managing Ourselves: A History of American Environmental Policy*, 2nd ed. (New Haven: Yale University Press, 2006), 202.
[173] Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West*, 317.

project's environmental impacts and to introduce mitigation measures to reduce these adverse effects. Where the Bureau's water projects had historically only been evaluated for their engineering feasibility and economic viability, the introduction of this new legislation marked a momentous shift for the agency and for the water sector at large. Although the Bureau had faced significant political opposition throughout the 1960s, nothing could have prepared the agency for the resistance it would face from within the scientific community following the publication of its EIS for the GDU in 1971. Rather than drawing widespread applause, this highly anticipated report elicited a firestorm of criticism over the next five years from a new cluster of environmental researchers representing various organizations. This emerging group of experts vehemently refuted the agency's conclusions and questioned its technocratic approach. The group of experts working within these emerging organizations included countercultural academics, designers, ecologists, entrepreneurs, and natural and environmental scientists. These scientists focused not on engineering design as a foundation for water management, but on environmental research, ecological thinking and advocacy, the use of appropriate technology, and eco-technological research.[174] Positioned within environmental advocacy organizations these experts therefore regarded themselves increasingly as nature's primary caretakers and guardians responsible for the protection, conservation, and effective use of non-human nature.

Moving from an examination of the rhetoric of one man in chapter one, this chapter will broaden my scope of analysis to look at the debate between the Bureau and its environmental critics. I examine how the introduction of NEPA opened the door for a new cohort of experts, who were situated within a variety of environmental advocacy groups, to engage in the GDU

[174] Andrew G. Kirk, "From Wilderness Prophets to Tool Freaks: Post-World War II Environmentalism," in *A Companion to American Environmental History*, ed. Douglas Cazaux Sackman (Chichester, West Sussex; Malden, MA: Wiley-Blackwell, 2010), 298-99.

debate and in the management of the nation's water resources. Where chapter one focuses on one man's promotion of the GDU, this chapter will focus on the organizations and institutions that opposed the GDU. These new experts promoted a new environmental ethic that challenged the Bureau's historical dominance in the water management sector. I will not only examine the scientific rhetoric in the reports that the Bureau published and the swelling opposition of environmental organizations between 1971 and 1976, but also the ways that this rising group of ecological scientists sold their ecological authority.

The methodological challenge in working with the reports from these advocacy organizations is that the reports did not contain the names of specific authors but were published under the name of the organizations. Where I was able to study the records of one individual person in chapter one, the increase in the scale of my study in this chapter, to committees and organizations, means a shift in methodology. Since I am not looking at the documents of each individual person on the committee, but at the collective documents of the organizations, it is hard to know who specifically contributed towards, wrote, and edited the final reports. The documents reveal the positions and official statements of the organizations and of the scientists that published them. The archive available also only permitted an examination of a selection of reports that the various committees and organizations produced and of the response reports that were created. While this is not an exhaustive examination of all the reports that exist by these organizations, it is a valuable window into the conversation between the Bureau and its critics. The conversation that can be traced through these documents, provide evidence of the Bureau's continual attempts to produce an acceptable environmental assessment and of the ways the Bureau adapted its message to meet the expectations and demands of its critics. Just as I

examined the rhetoric in Hoisveen's speeches in chapter one, I will analyze the scientific discourse that both engineering technocrats and environmental scientists employed.

A study of these documents serves several purposes. First, these reports afford insight into the making of environmental expertise and water diversion projects in the post NEPA era. What do the response reports reveal about the values and assumptions that the ecological scientists held about expertise, water management, and technological interventions? It was evident from the various reports that definitions of environmental impacts were not clearly outlined. The conflict over the definitions of environmental impacts provided this emerging field of scientists with an opening into which they could assert their expertise over that of the waning authority of the Bureau.

Another purpose for exploring these reports is to uncover the ways that society encountered scientific expertise. In a time when scientific exploration was inaccessible to those outside of the scientific community, citizens engaged with experts through their interactions with societies, advocacy groups, and institutions. They also encountered scientific rhetoric and values through access to physical published scientific reports in libraries and government offices. The Bureau's EIS and the subsequent response reports therefore are sites of inquiry where environmental policy became practice. What do these agencies' interactions with NEPA teach us about the development of public policy? A third reason to study these scientific reports is to understand the professionalization goals of the environmental experts in the post NEPA era. A close read of the response reports revealed that the defense of non-human nature was not the only concern driving these scientists in their criticism of the Bureau. These experts engaged in the GDU debate to establish themselves as a profession in the halls of academia and with decision

makers in Congress, all to gain authority in the water resource management sector in Washington.

The National Environmental Policy Act, 1970

NEPA legislation provided federal officials with the legislative instrument to assess the environmental costs of technological interventions on non-human nature.[175] NEPA legislation had two primary aims: first, to require all federal agencies to produce an EIS that evaluated the environmental effects of all federal projects, and second, to ensure that these agencies informed the public of their actions, the environmental considerations made, and of the decision-making process surrounding any project action with environmental concerns. As an executive Federal agency, the Bureau was expected to apply the new NEPA legislative requirements to the GDU even though eighteen percent of the project had already been constructed. The Bureau was required to halt construction until it had assessed the project for its environmental impacts.

The Bureau's first draft of an EIS for the GDU was submitted to the Council on Environmental Quality on April 23, 1971, in the form of an eleven-page report. The Council quickly determined that this initial draft did not fulfil NEPA requirements and requested that the Bureau review its comments and revise the document.[176] The Committee to Save North Dakota, a local farmers activist group, simultaneously filed a civil action with the U.S. District Court on

[175] Three Federal agencies shared responsibilities for overseeing NEPA including the Council on Environmental Quality and the Environmental Protection Agency (EPA). The EPA was a regulatory and enforcement agency with the authority to investigate and to bring to justice those agencies in non-compliance with NEPA. Congress established the Council on Environmental Quality and placed it in the Executive Office of the President and gave it primary oversight responsibilities for the NEPA process. Responsibilities included ensuring that Federal agencies met their NEPA obligations, providing interpretations for the implementation of NEPA, reviewing and approving individual Federal agency NEPA procedures, resolving disputes between Federal agencies and with other governmental entities or with the public.

[176] The Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," ed. Gary L. Pearson et al. (Washington: Bureau of Reclamation and U.S. Department of the Interior, 1975), 5.

December 11, 1972, charging the Bureau with "violating NEPA by continuing to develop the project without preparing an adequate EIS."[177] Succumbing to this dual pressure to comply with NEPA from both the Council on Environmental Quality and the possible court injunction, the Bureau hurriedly compiled and submitted an expanded, 145-page second draft of its EIS. Responding to the Bureau's second draft, the Environmental Protection Agency's Deputy Administrator noted that "many environmental issues of a serious nature are yet to be resolved . . . the Environmental Protection Agency has very serious objections of an environmental nature regarding the completion of the GDU as outlined in the final EIS."[178] By April 1973 the Bureau released a portion of its third draft in the form of a 246-page document which was followed up in January 1974 with the submission of its final 600-page EIS.[179] In the four years that it took the Bureau to submit its final EIS, a swell of formal and informal criticisms had grown against the Bureau. It is clear from the Bureau's failed attempts at assessing the GDU for its environmental impacts, that the NEPA requirements for defining and determining environmental impacts were unclear. This lack of clarity from NEPA meant that the Bureau fashioned four separate reports based on its own interpretation of environmental impacts.

Failure to Comply

Regardless of what the critics at the time said, reading the Bureau's final EIS forty years later, there is no pretence that this is an objective, dispassionate, scientific assessment of the

[177] Patricia Bossert, "An Analysis of the Scope of the Final Environmental Impact Statement of the Garrison Diversion Unit Project: Applying a Totality of Circumstances Test," *North Dakota Law Review* 53, no. 3 (1976): 431.
[178] Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*. 21
[179] The final 600-page EIS was broken into nine sections: 1. The description of the proposal, 2. The Description of the Environment, 3. Environmental Impacts of the Project, 4. Mitigation Measures and Air and Water Quality Aspects, 5. Unavoidable Adverse Effects, 6. Short- and Long-Term Environmental Uses, 7. Irreversible and Irretrievable Commitments of Resources, 8. Alternatives to the Project, and 9. Consultation and Coordination.

environmental impacts of the GDU. It is the story of an agency that was fighting to maintain its legitimacy while being forced to re-evaluate its marquee project according to a new set of environmental guidelines that conflicted with its engineering foundations. The Bureau had no intention of providing its critics with a balanced report. An analysis of the Bureau's EIS provides a unique opportunity to better understand how one agency responded to, and grappled with, the introduction of NEPA. I will start by breaking down the report's findings and by highlighting its various limitations. Once I have examined its various themes, I will examine the response reports that were generated and the Bureau's last attempt to thwart its critics before the entry of the International Joint Commission (IJC) into the GDU debate. This is an analysis of the Bureau's discursive and narrative strategies that it employed in its attempts to comply with, or to satisfy, NEPA standards.

The Bureau's final report does not suggest that the agency viewed the EIS process as a growth opportunity for the project or the agency, to eliminate or address any unforeseen environmental impacts of the original design of the GDU. Rather, the Bureau had two primary goals in its preparation of the GDU's final EIS. First, engineers at the Bureau hoped that in producing an enormous 600-page EIS, the agency would be seen as having obeyed the letter of the new environmental law. Second, the agency produced this exhaustive EIS as a defense for its keystone project, to silence its critics, and to shore up support for the GDU with federal officials and environmental activists at various environmental organizations. The report thus reads not as a dispassionate or balanced appraisal of the GDU's impact on the environment – which one might think would be the rationale for an EIS – but rather as a justification of the value of the GDU and a celebration of the project's benefits.

The Bureau insisted throughout the EIS that its initial GDU designs were already the most comprehensive plans possible and were inclusive of all environmental considerations. The Bureau downplayed the need to explore both adverse impacts of the GDU and any mitigation measures throughout the EIS, citing the Bureau and Congress's consideration of the "many alternatives to the action which were available for review at the time of the project authorization."[180] To demonstrate the EIS' comprehensiveness, the Bureau listed ninety-five entities at the outset of its report from whom, it suggested, it had received feedback on its draft. The list that spanned three pages included key federal and state agencies or organizations as well as environmental and wildlife associations at the local level including the Bureau of Sport, Fisheries, and Wildlife, the National Park Service, other Federal agencies, and the State of North Dakota.

At first glance it would seem from this list that all ninety-five entities had provided the Bureau with feedback on its EIS, and that the Bureau had fully considered and integrated this feedback into its EIS. The extensive list also suggested that the Bureau had received a significant amount of support for its environmental assessment of its project. A close examination of the list, however, revealed the presence of a small, almost unnoticeable notation at the end of the list, indicating that only those organizations that had responded to the Bureau's request and had provided the Bureau with feedback on its EIS, were highlighted with a small asterisk. Of the ninety-five agencies that the Bureau invited to comment on its EIS, only thirty-five had in the end submitted formal comments to the Bureau.[181] Without this key explanation, readers would conclude that the Bureau had received widespread support for its EIS from ninety-five entities. It

[180] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota*, VIII-1.
[181] Ibid.

is only upon closer inspection that readers are alerted to the true number of contributors that provided feedback.

The Bureau also did not specify the nature or the substance of the feedback that it had received. The Bureau failed to provide an explanation of how it had measured its responses and of how it determined which critiques to incorporate and which to reject. Without an explanation of the process whereby comments were considered, the presumption is that the Bureau considered and even integrated all the feedback it received. Although this source does not permit us any access to the substance of the comments the Bureau did receive or of how the Bureau handled them, it does enable us to better understand the choices that the Bureau made and the purpose of those decisions. The Bureau's strategic presentation of information led the reader to believe that its EIS was widely supported. This exaggeration of support from various authoritative agencies and activist organizations for its EIS highlighted the Bureau's goal of justifying its GDU programming rather than reassessing the project by its environmental impacts.

In doing so, the Bureau repeatedly overstated the positive impacts of the GDU's predicted environmental and wildlife enhancements, while downplaying any adverse environmental impacts. According to NEPA guidelines, an EIS was required to contain five detailed statements including the environmental impacts of the proposed actions, any adverse environmental impacts that cannot be avoided, the identification of any alternative mitigation efforts for the proposed actions, a discussion of the relationship between short-term uses and long-term needs of the project under examination, and an investigation of the irreversible impacts on the environment of

the proposed action.[182] While the final EIS did contain each of NEPA's required sections, it was evident that the Bureau's definition of "environmental impact" differed significantly from that of NEPA.

Where NEPA intended for agencies to assess the adverse environmental impacts of the project, the Bureau focused on assessing "the overall cumulative impacts of the GDU . . . based on what is known today and the best possible projections into the future."[183] In the opening paragraphs of the section entitled "Environmental Impacts of Project," the Bureau boldly stated that its overall assessment of the GDU was that it "will enhance the quality of the human environment of North Dakota by stimulating the economy of the agricultural community, stabilizing the economy and growth of its municipalities, and increasing recreational, fish and wildlife opportunities."[184] Not only did the Bureau's summary statement not address any potential adverse impacts, as NEPA required, but only emphasized the positive benefits of the project. The GDU, according to the Bureau, would promise three major impacts: the conversion of 250,000 acres of dry land to irrigated agriculture, the provision of a stable water supply to fifteen or more towns and industrial areas, and the identification of 146,000 acres of land to be developed for fish and wildlife. These impacts would result in a more viable agricultural economy in which irrigation would contribute to the growth of local business activities and rural communities and would combat the effects of the state's uncertain weather patterns.[185] Rather than identifying and examining the possible adverse environmental impacts of the GDU, the

[182] Dinah Bear, "The National Environmental Policy Act: Its Origins and Evolutions," *Natural Resources & Environment* 10, no. 2 (1995): 6., Linda Luther, *The National Environmental Policy Act: Background and Implementation,* Science Resources, and Industry Division, CRS Report for Congress (February 29, 2008 2008), 8, https://fas.org/sgp/crs/misc/RL33152.pdf.
[183] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota*, I-1.
[184] Ibid., III-1.
[185] Ibid., III-3.

Bureau redefined 'environmental impact' to include descriptions of the positive benefits of projects alongside the adverse impacts.

Where the Bureau did identify several adverse impacts of the GDU, it referred to them as "unnamed impacts" rather than adverse impacts. The list of adverse impacts included the inundation of 73,000 acres of land for project reservoirs, the alteration of some natural wetlands,[186] the decommissioning of 220,000 acres of land to accommodate right-of-way requirements,[187] the decreased flow of the Missouri River by five percent at the diversion points, the increase in salinity levels in the streams, and the inundation or destruction of some archeological sites.[188] A project's perceived environmental impacts were, according to the Bureau, contextual and subjective. To some agencies the existence of canals, reservoirs, pumping plants, and other project features were beneficial, while to others, the introduction of these features constituted adverse impacts on the environment.[189] The Bureau's argument that a project's impacts were in the eye of the beholder enabled the agency to focus primarily on highlighting the positive impacts of the GDU while negating its adverse impacts.

The Bureau strategically set the stage for its focus on the positive impacts of the project, by beginning each section with lengthy descriptions of the existing or predicted deteriorating environmental conditions without the GDU. These descriptions repeatedly emphasized the region's low water levels, low precipitation rates, above average evaporation, a lack of

[186] Ibid. The Bureau was quick to remind its audience in the EIS that "the overall impact on waterfowl, fish, and wildlife will be beneficial."
[187] U.S Bureau of Reclamation, *Initial Stage of the Garrison Diversion Unit: Final Environmental Statement* (Washington, D.C.: Bureau of Reclamation, 1974), I-7.
[188] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota*.
[189] Ibid., III-1. Environmental impacts were defined as Beneficial – "those that directly or indirectly improve the environment"; Adverse – "those that directly or indirectly degrade the environment"; or Problematical – "those with an unknown unquantifiable degree of impact, impacts that have not been tested, or impacts that depend upon the viewpoint of the observer."

waterfowl, and a deterioration of nesting and marsh habitats. The Bureau argued that if the GDU was not permitted to open, the number of farms would decrease from 1,000 to 300 within thirty years, the out migration of 4,500 people, marshes would continue to shrink exponentially, drinking water supplies would dry up for urban areas and in areas were water supply was not an issue, water quality would become "very poor."[190] The Bureau further predicted that "for those communities without ground water potential, no development would be possible, which would result in further decline in rural population and economic activity."[191] According to the Bureau, life without the GDU for North Dakotans would be bleak at best and therefore required the technological and scientific interventions that the Bureau offered. In one section of the EIS, all nine wildlife development areas in the Oakes section of the GDU plans were described as insufficient to sustain local wildlife without the project. The Bureau argued that only about one-third of the marsh habitat in the Crete Slough area of the Oakes section was "of value" to the waterfowl during normal to wet years and during the dry years most of the water dried up leaving "little habitat for the waterfowl."[192] In the Denver Slough area of the Oakes section, "under present conditions only about one-third of the marsh habitat is of value to waterfowl."[193] Having established that the existing environmental conditions without the GDU were not sufficient to support a flourishing environment, the Bureau could emphasize the many positive impacts that the GDU offered.

The Bureau presented the GDU not as the environmental villain it was criticized to be, but as the unsung state hero that would save the environment from the destructive habits of farmers and inhabitants and from Mother Nature herself. The Bureau claimed that the GDU was

[190] Ibid., III-5.
[191] Ibid., II-87.
[192] Ibid., II-69.
[193] Ibid.

"designed to compensate for project-induced damage to the wildlife habitat and yield substantial fish and wildlife enhancement benefits." The GDU would develop thirty-six fish and wildlife areas and without the GDU in place as a "compensatory measure," farmers would implement dangerous irrigation techniques that would "result in serious losses of waterfowl production habitat."[194] The Bureau argued that the principal project features of the GDU would adequately compensate for wildlife losses, leaving an "overall enhancement of fish and wildlife habitat" and stated that "the total net effect of the project . . . will be a benefit to fish and wildlife resources amounting to about $1,000,000 annually."[195] In every section of the EIS the Bureau sought to construct a convincing argument for how the environment, the economy, and society at large would benefit from, rather than be negatively impacted by, the GDU project. If the Bureau could draw attention to the positive contributions of the GDU, then it could avoid the controversial concerns attached to environmental impacts and the issues surrounding culpability and responsibility.[196] Absolving itself of any responsibility over environmental impacts, the Bureau focused exclusively on the public good of the project.

That the Bureau was selling, rather than evaluating, the GDU, was evident in its use of quantitative versus qualitative data. Throughout the EIS, the Bureau defined the GDU's positive impacts using the language of certainty and employing definitive and quantifiable data and providing measurable predictions. On the other hand, when exploring the adverse impacts of the GDU, the Bureau employed speculative, abstract language that it supported only with ambiguous

[194] U.S. Bureau of Reclamation, *Statement on Environmental Impact. Garrison Diversion Unit - Missouri River Basin Project - North Dakota Pursuant to Section 102(2)(c) of National Environmental Policy Act 1969* (Washington, D.C., 1973), 2.
[195] Ibid.
[196] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 151.

data and vague calculations. The Bureau, for example, began the EIS with the quantified list of the positive impacts of the GDU, each quantified and specific:

> Project irrigation will result in a conversion of 250,000 acres of dry land to irrigated agriculture. A stable water supply will be available for fifteen or more towns and unidentified industrial areas. Approximately 146,000 acres of Federal, State, and privately-owned land will be developed for fish and wildlife.[197]

The adverse impacts on the other hand, were written in speculative, generalized language and did not include any specific or calculated estimates or projections:

> some natural wetlands will be altered but the overall impact on waterfowl, fish and wildlife will be beneficial. Salinities in streams will increase and flows of intermittent streams will be stabilized. Rough fish may colonize some new waters. After investigation, study and salvage archeologists, some archeological sites will be inundated or destroyed.[198]

According to historian Naomi Oreskes, large-scale industries looking to defend themselves against their detractors, strategically raised doubts and created uncertainty around the scientific evidence or of technical claims that had been made against them.[199] "Doubt-mongering" was a strategy that Oreskes argues continues to be used by stakeholders to "undermine science related to dangerous products and activities."[200] The Bureau sought to generate doubt about the water quality and quantity data of return flows and of the project's adverse impacts by presenting scientific evidence in its EIS that was probabilistic and confusing.

The use of unclear and hedging language was also prevalent throughout the EIS whenever mitigation solutions were offered. In explaining the impact of canal construction on the water table, the Bureau stated that if the canal did have a negative impact on wells (despite their

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[197] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota*, Summary.
[198] Ibid.
[199] Naomi Oreskes, "The Fact of Uncertainty, the Uncertainty of Facts and the Cultural Resonance of Doubt," *Philosophical Transactions Royal Society* 373 (2015).
[200] Ibid., 2.

assertion earlier that it would indeed adversely impact the wells in the project areas) "measures will be taken to have the existing wells deepened or new wells developed to mitigate the impact."[201] The mitigation measures that would be taken, however, were not specified including who would take responsibility for the labour of deepening the wells and who would finance the work.

In addition to the Bureau's use of vague language to talk about the project's adverse impacts and the creation of uncertainty about the scientific facts, the report was rife with vague statements, conflicting information, and contradictory assertions. Many broad and sweeping statements that were unsupported or unsubstantiated with specific evidence dotted the report. For example, the benefits of the GDU included: "the volume of retail and wholesale trade will increase. Employment will rise to fulfill the increased needs for special services. Professional business will expand."[202] What constituted industrial growth, employment rises, professional expansions? Where the Bureau did quantify its claims, it often failed to provide evidence for how its projections were substantiated. The Bureau listed the many benefits of the GDU to society including an increase in total farm incomes "2.7 times as great as that of dryland farms, and net farm income will more than double" but failed to provide any source evidence for these statistics.[203] In another section the Bureau estimated the GDU's economic and social benefits at $88.5 million annually, cash crops and livestock at an additional $28 million, and outdoor recreation activities at $5 million annually.[204] The Bureau did not provide evidence of how it calculated these predictions. Even in other cases the Bureau did cite its source, it failed to

[201] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota*, III-36.
[202] Ibid., III-5.
[203] Ibid.
[204] Ibid., III-1.

provide full documentation of these reports, making it impossible to verify the Bureau's numbers.[205]

The EIS was also full of inconsistencies. Page III-6 stated that fifteen communities would be impacted, while on page III-10 the number was fourteen. On page III-11 the impacted farm population was estimated at 2,500 while on II-86 the population impact was accounted for in number of farms not in the total farm population.[206] These inconsistencies throughout the EIS highlighted gaps in the Bureau's research and their reliance upon project estimations rather than on definitive quantitative research causing the reader to question the Bureau's evidence throughout the EIS and their ensuing arguments. It also meant that its readers could not follow the Bureau's calculations throughout the report to understand the Bureau's plans or its justifications for those plans.

In other instances, the Bureau's presentation of data was unclear and contradictory. In addressing the GDU's adverse impacts on waterfowl and their habitat, the EIS stated that "the Bureau of Sport Fisheries and Wildlife estimates that waterfowl production will be substantially increased along with an improvement in habitat as availability of water and water control and management are possible with the project."[207] With that statement the Bureau argued that the GDU would improve habitats for waterfowl and thereby leading to their increased numbers; however, in the next paragraph the Bureau argued that wetland habitats would be altered due to project activity. The Bureau insisted that the Bureau of Sport Fisheries and Wildlife and the North Dakota State Game and Fish Department "will offset (mitigate) adverse impacts and result in an overall improved resource."[208] Those statements beg the questions: If project construction

[205] Ibid., III-3.
[206] Ibid.
[207] Ibid., III-5.
[208] Ibid., III-55.

was slated to alter and disturb wetland habitats then would the waterfowl in those habitats not be adversely affected? Yet the Bureau claimed that the habitat would be improved without providing any detail of how these improvements would take place. If, as the Bureau predicted, the waterfowl habitats would be improved then why would two government agencies need to focus their time, resources, and expertise on offsetting any adverse impacts? If these two government departments were tasked with mitigating the adverse impacts, then would the mitigation plan not need to be outlined and examined? The many contradictory statements made throughout the EIS created room for the Bureau's critics to question the Bureau's methods, intentions, and conclusions.

Throughout, the EIS failed to explore in detail, as NEPA regulations stipulated, the major and long-lasting adverse impacts of the project, but focused on examining temporary and insignificant impacts. The construction of the GDU's right-of-way passages resulted in irreparable damage to private property, the loss of family farms and livelihoods, and the destruction of archeological sites. The New Rockford Canal alone would alter 1,740 acres and would impact 100 separate parcels of land and would sever thirty-nine roads.[209] The Bureau recognized that: "the canal will be a barrier to the local movement of wildlife" suggesting, however, that this was merely a temporary disruption during the construction process.[210] The long term economic and social repercussions of farmland being severed for landowners remained unexplored, while the report detailed the inconveniences to local residents including "extra driving expense, gasoline, and time from increased distances of travel to reach a canal crossing."[211] Farmers would have been more concerned with mass relocations, productive

[209] Ibid., III-33.
[210] Ibid., III-27.
[211] Ibid.

farmland being divided or becoming inaccessible to farm equipment, or the high costs for farmers associated with the integration of wet irrigation technologies than with the extra driving expenses or the inconvenience of increased travel times that the Bureau listed as impacts.

One long-term adverse impact that was identified in the EIS was the construction of the McClusky Canal and its effects on the local groundwater levels. The opening of the McClusky Canal was expected to significantly lower ground water levels and wells located within 1.5 miles of the canal were predicted to fail. Farmers were dependent on access to water not only for their crops and livestock, but also to sustain a rural lifestyle for their families. Instead of exploring this issue and discussing the various mitigation strategies, the Bureau merely suggested that landowners increase their pump capacity to extract the water from further away or drill their existing wells deeper. Beyond merely identifying the risk, the Bureau did not examine the dangers associated with deep drilling including the possible contamination of the ground water and the aquifer or of the impacts of a lower water table.[212] Mitigation plans for the long-term and permanent impacts on the livelihoods and lifestyles of hundreds of farmers, individuals, and communities went unexplored while mitigation plans for the short-term, temporary construction nuisances such as increased light, noise, and dust pollution were included and explored.

Throughout its report, the Bureau presented a one-dimensional perspective of the land, the environment, and its natural inhabitants. The land was portrayed as static and segmented instead of as a complex, interconnected, and ever-changing entity. This was evident in the Bureau's belief that through the application of technology on the environment, the agency could control the presence, absence, and movement of wildlife in the project area. The Bureau also believed

[212] Ibid., III-28. The final excavation of the GDU canal temporarily lowered the water table by 32 feet and permanently lowered it by 15 feet below its original level. The same drop in water table occurred along several of the other canals near GDU project features.

that the project wildlife management unit could fully manage and balance the countless environmental variables including pool levels, the number of wetlands, salinity levels in lakes, and even variations in the moisture cycles. The Bureau argued that any future project management could manipulate the environment so that "target species can be selected and favored as needs dictate."[213] The Bureau's confidence that the application of technology produced predictable environmental outcomes, highlighted the Bureau's understanding of the environment as a wild, non-living entity. The Bureau failed to acknowledge the interconnected and intricate nature of diverse ecosystems and of the multifaceted impacts technology could have on the environment. For example, the Bureau linked the low habitation of waterfowl in the project areas with the lack of natural precipitation in the project areas. No other factors were explored or identified to explain the low habitation of waterfowl and yet this single causal connection was listed in one of the EIS sections over a dozen times.[214] Not surprisingly the development of a causation narrative that connected the region's variable water levels with significantly decreased wildlife figures, suited, and thereby served to endorse the Bureau's existing GDU plans. The Bureau firmly believed in its capacity as an agency to address the issues of the region stating emphatically that "all adverse impacts of the project will be mitigated and there will be an enhancement of fish and wildlife resources."[215] The Bureau used conclusive language that it had the ability to manipulate water, to "improve and stabilize migrating and nesting waterfowl," to stabilize water levels, to create "dependable water supplies," to improve habitats, to control water levels, to restore and to enhance fish and wildlife resources, and to optimally manage wildlife.[216] Despite the concerns that environmental activists and

[213] Ibid., III-69.
[214] Ibid., II-58.
[215] Ibid., III-48.
[216] Ibid., I-25 - I-33.

environmental scientists expressed over the adverse impacts of the GDU on the environment, on transient wildlife, and on the water quality and water quantity of adjacent water flows, the Bureau failed to acknowledge the possibilities that its actions could produce these adverse impacts.

What was somewhat surprising, when reading the EIS, was the near absence of the acknowledgment and analysis of the GDU's potential international impacts. Despite the repeated appeals that Canadian officials made to the U.S. Congress in the late 1960s and 1970s about the GDU and its adverse effects on Canadian waters, the Bureau did not address these concerns in its EIS. Of the 600-page report, the Bureau dedicated a mere three pages to describe Canadian portions of the international rivers, one page to describe the environmental impact on Canadian portions of the international rivers, one page on international negotiations, and five pages on the possible alternatives of the GDU to reduce the return flows to Canada.[217] Chairman of the Manitoba Environmental Council Ken Arenson stated in a 1975 publication "I fear that the damage we in Manitoba will suffer is in proportion to the magnitude of the project."[218] The American Committee on Governmental Operations argued that the Bureau employed a segmented approach to their environmental assessment of the GDU which "has prevented significant information concerning the environmental impacts of the Garrison project on Canada, Minnesota, South Dakota, and the national wildlife refuge system from being available in a timely fashion to guide decision making."[219] The Bureau's perfunctory examination of Canadian

[217] Ibid., I-83-86, III-80, IV-33, VIII-35-39.
[218] D. H. Boyd, University of Manitoba (Agassiz Centre for Water Studies), and Garrison Diversion Unit, *The Impacts of the Garrison Diversion Unit on Canada: Volume 2 of a Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit* (Winnipeg: Manitoba Environmental Council, 1975), Foreword.
[219] Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*, 2.

concerns demonstrated the Bureau's belief that cross-border concerns were not central to the GDU debate.

Criticisms of the Bureau's failure to address these concerns in its EIS were swift. Experts from both Canadian and American organizations began to publish response reports critiquing the Bureau's EIS and highlighting the Bureau's cursory attempts at addressing Canadian claims about the ecological, economic, and social damage of GDU run-off water.[220] The Bureau's failure to address Canadian concerns, highlighted specifically the conflict that existed within American politics around the definition of international environmental impacts. Federal environmental goals and policies and the international political implications of those policies were not yet well defined in the years immediately following the introduction of NEPA.[221]

Gaps in the project's design were bound to exist given that the NEPA process required existing projects to apply the knowledge from the emerging ecological sciences to old technocratic designs. Rather than acknowledging that these types of gaps existed in the project's initial planning, the Bureau confidently stated that its experts had fully considered all the potential environmental impacts. The agency also asserted that there was no need for it to consider adding any environmental mitigation measures to the project as these efforts would only prove to be superfluous. The Bureau stated that "practically from the inception of the project, mitigation of existing fish and wildlife areas and enhancement of the same have been under consideration."[222] The Bureau emphasized that its standard policy required that any of its

[220] Boyd, University of Manitoba (Agassiz Centre for Water Studies), and Garrison Diversion Unit, *The Impacts of the Garrison Diversion Unit on Canada: Volume 2 of a Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit*, 134.
[221] Robert M. Wilson, *Seeking Refuge: Birds and Landscapes of the Pacific Flyway*, Weyerhaeuser Environmental Books, (Seattle: University of Washington Press, 2010).
[222] U.S. Bureau of Reclamation, Statement on Environmental Impact. Garrison Diversion Unit - Missouri River Basin Project - North Dakota Pursuant to Section 102(2)(c) of National Environmental Policy Act 1969 BR 740058-D, 2 (Washington, D.C. 1973).

projects "improve the appearance of structure and preservation of landscape at all installations" with the purpose of "providing environmental protection.[223] Instead of humbly and curiously engaging in the NEPA process to creatively identify and address any adverse impacts of the GDU plans to improve the project, the Bureau simply doubled down on its belief in its existing plans.[224] Did the Bureau fail to conduct a robust EIS of the GDU for fear that the project would be cancelled?

Historians Daniel Macfarlane and Andrea Olive's study on the process of the creation of Saskatchewan's first environmental assessment on the Wintego dam in the 1970s provides an interesting comparison to the Bureau's creation of its environmental assessment of the GDU. Where Macfarlane and Olive found that while the government initially did not intend to create a thorough environmental assessment on the Wintego project, in the end such a study was undertaken on account of the impact the project would have on Indigenous communities.[225] Unlike government officials in Saskatchewan, the Bureau produced three inadequate drafts, demonstrating that the Bureau entered the EIS process to justify its project and to meet the minimum standards of NEPA, not to accurately assess the GDU for its true environmental impacts. The 600-page EIS clearly demonstrated that for the Bureau, a project's worth was best evaluated solely on its technological rationale, scientific evidence, and its positive social and economic benefits to human nature, not by its secondary ecological impacts on non-human nature.

Under Attack: Widespread Condemnation of the Bureau's EIS

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[223] U.S. Bureau of Reclamation, *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota*, IV-1.
[224] Ibid.
[225] Daniel Macfarlane and Andrea Olive, "Whither Wintego: Environmental Impact Assessment and Indigenous Opposition in Saskatchewan's Churchill River Hydropower Project in the 1970s," *Canadian Historical Review* 102, no. 4 (2021).

Given the outstanding limitations of the Bureau's EIS, it is no surprise that the report generated significant criticism from environmental scientists within both governmental and private organizations on both sides on the border. Critics from a variety of scientific disciplines including biology, ecology, environmental sciences, fisheries research, and wildlife management challenged the conclusions of the EIS using several diverse methodological approaches and unique assessment tools. While differences in scientific ideology and methodology could have divided these various organizations, their opposition to the Bureau's EIS became the glue that uniquely bonded this cluster of diverse experts together. Each of these organizations could have disputed the Bureau's EIS using only the data from their own scientific approach. Instead, these organizations generated reports that built upon one another's conclusions and cited one another's work. Where engineers had historically held the balance of power in the federal water management sector, the environmental and ecological debates surrounding the GDU offered environmental experts a unique opportunity to establish themselves as a professional authority within the sector. The interdependence of this diverse group of environmental scientists served to create a groundswell of resistance against the Bureau's EIS that could not be ignored.

Within the first year of the Bureau's EIS being made public, three significant reports were published by scholars and government officials in Canada openly criticizing the EIS.[226] These included a master's thesis written by Zoologist Alison Hine, a report from the University of Winnipeg, and the joint federal-provincial report published by Environment Canada and the Manitoba Department of Mines, Resources and Environmental Management. Hine explored the

[226] Alison Hine, *The Garrison Diversion: An Overview*, University of Manitoba (Winnipeg, Manitoba, May 1974 1974); Laureen Ann Campbell et al., *University S.T.E.P. Programme: The Garrison Diversion Study*, University of Winnipeg (Winnipeg, Manitoba, 1974); Inland Waters Directorate, Environment Canada, and Manitoba Department of Mines Resources and Environmental Management, *Some Effects of the Garrison Diversion Unit on the Souris River in Canada*, Environment Canada (Ottawa, ON; Winnipeg, MB, 1974).

extensive environmental and social impacts of the GDU in Canada based on the existing evidence that Hine argued, the Bureau had failed to examine.[227] The University of Winnipeg report identified that the Bureau's evaluation of the GDU's impacts on Canadian waters was insufficient. Several chemists from the University of Winnipeg therefore conducted a chemical analysis of the Souris River, Angler River, Gainsborough Cree, and the Red and Assiniboine Rivers to provide baseline data of the current state of these waterways.[228] The joint-federal report evaluated the effects of the GDU on the Souris River, arguing that the proposed construction of the GDU would cause significant degradation of the river's water quality and increased flooding.[229] All three reports concluded that a moratorium on construction of the GDU was needed to prevent irreparable damage to Canadian waters. They also argued that the Bureau had dismissed Canadian concerns about the GDU, had not adequately accounted for changes to the Souris River, and had failed to examine the existing data on the GDU's adverse impacts on Canadian waterways. Canadian governmental agencies generally depicted the Bureau as "a mighty neighbor dressed in a cloak and dagger outfit sneaking up to the border and dumping his garbage in 'our rivers.'"[230]

In addition to these three initial reports in 1974, Canadian experts continued to sound the alarm on the Bureau's EIS and attempted to make Canadian concerns known in Washington. Between the Bureau's publication of its EIS in 1974 to the time that the IJC referral was made in 1976, nine substantial reports were published by Canadian governmental agencies,

[227] Hine, *The Garrison Diversion: An Overview*.
[228] Campbell et al., *University S.T.E.P. Programme: The Garrison Diversion Study*.
[229] Resources and Environmental Management Department of Mines, *Garrison Diversion Project: Concerns of the Province of Manitoba* (Winnipeg, Manitoba, November 20 1975).
[230] Campbell et al., *University S.T.E.P. Programme: The Garrison Diversion Study*, 3.

environmental organizations, scholars, and activists.[231] I was unable to locate any report that the Bureau produced that directly responded to any of these Canadian publications. It seemed that the Bureau was indifferent to Canadian concerns pertaining to the GDU's international environmental impacts.

Unlike the Bureau's palpable silence to Canadian environmental experts, engineers at the Bureau were quickly roused with the entry of an innovative and increasingly influential American agency, the Institute of Ecology (TIE), in January 1975. With roots in both Canada and the U.S., TIE simultaneously published two influential critiques of the Bureau's EIS, one in Manitoba and one in Washington. The Bureau responded directly to the American TIE report with a lengthy, detailed response report in April 1975. Even though the Bureau had remained

[231] Hine, *The Garrison Diversion: An Overview*; Campbell et al., *University S.T.E.P. Programme: The Garrison Diversion Study*; Inland Waters Directorate, Environment Canada, and Manitoba Department of Mines Resources and Environmental Management, *Some Effects of the Garrison Diversion Unit on the Souris River in Canada*; Manitoba Environmental Council, *Submission to International Joint Commission on the Hearings of the Garrison Diversion Unit*, University of Winnipeg (Winnipeg, Manitoba, November 20 1975); Boyd, University of Manitoba (Agassiz Centre for Water Studies), and Garrison Diversion Unit, *The Impacts of the Garrison Diversion Unit on Canada: Volume 2 of a Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit*; Lloyd Axworthy, *Notes for an Address: Public Participation Workshop*, University of Winnipeg - Institute of Urban Studies (Winnipeg, Manitoba, 1975); Department of Mines, *Garrison Diversion Project: Concerns of the Province of Manitoba*; Manitoba Environmental Council, *Submission to International Joint Commission on the Hearings of the Garrison Diversion Unit*; Inland Waters Directorate and Environment Canada, *Garrison Information Kit #1: Impact of the Garrison Diversion on Canada: An Overview* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #2: The Current Status of the Garrison Project* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #3: Text of the Canada - U.S. Garrison Diversion Unit Reference to the International Joint Commission* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #4: Impacts on Water Quality in Canada* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #5: Flooding Potential Increased* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #6: Foreign Species* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #7: Federal and Provincial Activities* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #8: Canada - U.S. Environmental Relations: An Important Precedent* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #9: Other Sources of Information* (Ottawa, ON; Winnipeg, MB, 1975); Inland Waters Directorate and Environment Canada, *Garrison Information Kit #10: Canadian Position on the Garrison Diversion Unit* (Ottawa, ON; Winnipeg, MB, 1975); Environment Canada, Garrison Information, 1976, Environment Canada, University of Winnipeg Library, Ottawa, ON.

unresponsive to the criticisms it had received from Canadian governmental and scientific institutions, the Bureau could not ignore its detractors at the American TIE office.

TIE was a non-profit organization created in 1971 by a Study Committee of the Ecological Society of America to coordinate ecological research projects that were outside of the scope of capabilities of any single university or research institution. That same year, TIE received a private multi-year grant that enabled it to establish the interdisciplinary Environmental Impact Assessment Project in which it would review twenty to twenty-five EIS's that had been published to improve the implementation of the new NEPA legislation. Staff at TIE selected the Bureau's EIS for an intensive review for the following reasons: The initial stage of the GDU was merely a segment of a planned large-scale project with substantial environmental impacts, the GDU raised international watershed law concerns between Canada and the U.S., and the Bureau's EIS was "clearly inadequate to satisfy the requirements of NEPA and the Council of Environmental Quality Guidelines."[232] Since the GDU was predicted to impact waterway in both the Canada and the U.S., TIE assembled two interdisciplinary teams in Canada and in the U.S., to review, analyze, and report on the Bureau's compliance with NEPA.[233] The American team consisted of twenty-four academics from a variety of institutions and several disciplines including law, economics, wildlife management, agricultural engineering, environmental studies, natural resources, and limnology. The Canadian team was also a diverse group engineers, botanists, zoologists, soil scientists from a variety of institutions including from the University of Manitoba, the Freshwater Institute, the Manitoba Environmental Council, and the Prairie

[232] Gary L. Pearson et al., *A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)*, Environmental Impact Assessment Project of The Institute of Ecology (January, 1975), iv.
[233] TIE's Washington headquarters published the first volume and an interdisciplinary team of scientists at the University of Manitoba alongside the Natural Resource Institute of the University of Manitoba and the Agassiz Centre for Water Studies at the University of Manitoba published the second volume in Canada.

Environmental Defense League. Although the two volumes were produced and published separately, their conclusions and critiques of the EIS identified similar shortcomings. The two TIE reports both condemned the Bureau for its limited study of the Souris River basin, for its disregard of the Red River or James River basins in its investigations, and for its conclusions about all Canadian rivers, from its one study of the Souris River.[234] Both reports also emphasized that the Bureau failed on every level to fulfill the purpose of a well-written, well-researched, and thoroughly considered NEPA environmental assessment.

Despite their similar conclusions, however, these two reports reflected the unique perspectives of the GDU that Canadians and Americans held. The American assessment focused on ten areas: Economics, Energy and Water Resources, Water Quality, Impacts on People, Vegetation, Wildlife, Fisheries, Recreation, and Legal Analysis. The report placed a significant emphasis on evaluating the scientific shortcomings of the Bureau, leaving the largest critique of the project's international impacts to Canadian TIE experts. The Canadian report, on the other hand, focused on only three areas including Water Quality, Hydrology, and Fish and Wildlife with a disproportionately large emphasis on Water Quality. The Canadian report dedicated eighty-one pages to exploring the alleged water quality impacts of the GDU on Canadian waters, emphasizing issues around the politics of international water governance and regulation. Officials in Canada stopped just short of recommending that the construction of the GDU be halted, while the American report called for a complete moratorium on the GDU project construction.

[234] Boyd, University of Manitoba (Agassiz Centre for Water Studies), and Garrison Diversion Unit, *The Impacts of the Garrison Diversion Unit on Canada: Volume 2 of a Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit*, 22.

The American study boldly criticized the Bureau and attacked the academic integrity of its EIS, while the Canadian TIE study was primarily critical of the EIS itself and refrained from attacking the Bureau alongside the EIS. The American report depicted the Bureau as an antiquated institution whose work and projects were out of touch with the practical needs of post-war progressive Americans TIE employed increasingly aggressive language throughout its report to describe the Bureau. These aggressive statements culminated in the report's conclusion with repeated statements that the Bureau had "failed" and that the EIS was an "inadequate" report; it even stated emphatically that the Bureau's EIS "prostitutes the NEPA process" through its essentially dishonest balance of the GDU's economic benefits versus environmental costs to determine the project's viability.[235] TIE's use of inflammatory language highlighted its divisive intentions and its interest in galvanizing an anti-garrison and anti-Bureau following through the publication of its report. TIE therefore openly criticized the Bureau for failing in its EIS to present the information about the GDU in such a way that "easily allows the public to grasp the trade-offs implicit in the project."[236] Both TIE reports argued that the Bureau's claims were founded upon "often inaccurate, insufficient, or misleading" information that was "superficially descriptive" and that "the absence of substantiating evidence diminishes the credibility of these claims."[237] Both the Canadian and American TIE reports concluded that the Bureau had prepared the EIS "as a justification for the GDU" instead of fulfilling its intended objectives as an evaluation of the project's environmental impacts.[238]

[235] The Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," 90.
[236] Ibid., 7.
[237] The Bureau had included an expansive general reference list at the end of its EIS, but the Bureau failed to provide specific evidence throughout its report substantiating its various claims. Ibid., v, 40, 37.
[238] Pearson et al., *A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)*, v.

Following the publication of TIE's influential dual reports, the U.S. Fish and Wildlife Service added another surprising twist to the narrative when it published a scathing review of the Bureau's EIS in March 1976. This report certainly would have come as a shock to the Bureau since the U.S. Fish and Wildlife Service had championed the Bureau and the GDU from the outset. The Service had believed that the project would benefit the national wildlife refuges in North Dakota, until the Bureau revealed in its EIS the full details of its wildlife mitigation plan. Like many such publications, the authorship of this review was attributed to the Service and not to any individual researcher.

The U.S. Fish and Wildlife Service's report identified several adverse impacts of the GDU on the wildlife refuge system in North Dakota. It argued that the changes in water temperature that would occur on account of GDU operations would extend the periods of open water in the area beyond the regular freezing point. This change in temperature would cause waterfowl to delay its natural migration patterns, which would invariably lead to increases in the waterfowl's susceptibility to disease and starvation.[239] The agency also argued that the GDU would contribute to higher nutrient levels in water return flows resulting in the proliferation of algal blooms, water turbidity, and a reduction in the population of water plants thereby increasing the probability of the growth of the toxic blue-green algae. Herbicide use within the irrigation areas would destroy waterfowl food plants, invertebrates, and some fish and its use could lead to unwanted spills and leeching into project canals and drains.[240] The report contended that the GDU would negatively impact eight wildlife refuges, representing eighty percent of the total refuge acres in North Dakota, predicting that adverse impacts would only increase into the future

[239] Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*, 75.
[240] Ibid., 71.

assuming "greater significance as the value of quality wildlife land increases."[241] The report's damning concluding statement argued that "this project not only devalues a considerable effort and investment in the refuge system and threatens valuable national wildlife resources," but it sets a dangerous precedent for all refuges nation-wide to become vulnerable to non-wildlife development and use.[242]

The various critiques of the bureau's EIS collectively focused on three major issues. First, the Bureau's segmented EIS approach was seen by its critics as a failure to comply with NEPA legislation. Rather than preparing a program-wide EIS to analyse the GDU's impact within the broader Missouri River Basin Project, the Bureau not only examined the GDU separately, but it further divided its review of the GDU into three isolated impact statements. The Bureau intended to publish one EIS at a time for each of the GDU's three primary irrigation districts (the LaMoure and Oakes Section, the Central North Dakota Section, and the Souris Section) over a seven- or eight-year period from 1974 to 1982. The Bureau had contended that a segmented EIS approach would provide its critics with the fastest possible access to the missing data that they had demanded on return flows, fish and wildlife resources, operating plans, and construction techniques.[243] Critics nonetheless argued that the agency's method was merely a tactic to appear to adhere to NEPA regulations while avoiding true compliance of NEPA guidelines. The Institute of Ecology denounced the Bureau's method as failing to "comply with the spirit and the letter of the NEPA and the Federal Committee on Government Operations stated that the Bureau's segmented approach over a lengthy period was an improper observance of the spirit of

[241] U.S. Fish and Wildlife Service, *An Evaluation of the Impacts Caused by the Garrison Diversion Unit on National Wildlife Refuges in North Dakota*, U.S. Fish and Wildlife Service Bismarck Area Office (Bismarck, North Dakota, March 1976 1976), 93, 96.
[242] Ibid.
[243] U.S. Bureau of Reclamation, *Response to 'A Scientific and Policy Review of the Final Environmental Statement for the Initial State, Garrison Diversion Unit (North Dakota) by the Environmental Impact Assessment Project of The Institute of Ecology'* (Washington, 1975), 561.

NEPA even if it was technically permitted within NEPA guidelines.[244] Critics in Canada argued that the Bureau intended to conduct an EIS on the least contentious sections of the GDU first, thereby delaying its assessments of the most divisive segments in the hopes of receiving NEPA approval before the most controversial impacts had been evaluated. Alison Hine stated in her critique of the EIS that the Bureau was likely to "delay the showdown while they are busily spending more, digging more and creating more 'justification' for continuing the project."[245] Legal scholar, Patricia Bossert argued in 1976 that "NEPA was designed to ensure overall project assessment, rather than assessment 'in small but steady increments which perpetuate rather than avoid the recognizable mistakes of prior decades.'"[246]

Second, the critics collectively agreed that Bureau's EIS did not provide a clear picture of the project's environmental impacts on Canadian waters and that its data was confusing and misleading. Critics claimed that the GDU would indeed impact the water quality of the return flows to Canada, but that more quantitative evidence was needed to effectively evaluate extent of the international impacts of the project. Hine argued that "despite the voluminous size of the EIS . . . it is ambiguous, qualitatively inconsistent and terms are often left undefined. The task of extracting a concise description of the project is therefore very difficult and a discussion of the impact . . . even more difficult."[247] Hine had enumerated areas that the Bureau had not quantified and found that the Bureau's irrigation plan was economically unrealistic, the social impacts unclear, the ecological impacts not specifically defined, and the Canadian impacts "subjective and vague." The alternatives to the GDU that the Bureau had presented in its EIS were examples,

[244] Pearson et al., *A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)*, iv; Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*, 108.
[245] Hine, *The Garrison Diversion: An Overview*, 31.
[246] Bossert, "An Analysis of the Scope of the Final Environmental Impact Statement of the Garrison Diversion Unit Project: Applying a Totality of Circumstances Test," 445.
[247] Hine, *The Garrison Diversion: An Overview*, 7.

according to Hine, of the Bureau's "intention to proceed with construction before they know the impact of large-scale irrigation."[248]

Third, the response reports concurred that the EIS did not provide adequate evidence for the adverse impacts of the GDU on local waterfowl and wildlife. Although the U.S. Fish and Wildlife Service and several other prominent organizations including the National Wildlife Federation, the National Audubon Society, the Committee on Government Operations, and the Council for Environmental Quality had all provided the Bureau with support for the initial GDU plans – especially because the Bureau's 146,000-acre wildlife plan indicated that the GDU would significantly increase the quantity of wetlands and waterfowl in the region -- this widespread support was withdrawn following the Bureau's publication of its EIS.[249] The EIS, according to critics, demonstrated that, contrary to its original plan, the GDU would destroy acres of naturally occurring prairie potholes, cause degradations in the water quality of rivers, streams, and lakes in the area, cause flooding of wildlife refuges, which would lead to overall net losses in wildlife and wildlife refuges, not increases.[250] The U.S. Fish and Wildlife Services Assistant Secretary Nathaniel Reed believed that the GDU was "a net loser…no question about it."[251] Reed further stated that the GDU is "going to completely change the whole basis of those refuges" and emphasized that given the data that was available, scientists could not legitimately predict the

[248] Ibid., 31.
[249] U.S. Fish and Wildlife Service, *An Evaluation of the Impacts Caused by the Garrison Diversion Unit on National Wildlife Refuges in North Dakota*, 2.
[250] TIE calculated in its report that the GDU would result in the loss of well over 350,000 waterfowl and other marsh birds, the destruction of wildlife habitats for ducks and other migratory birds, the draining of 26,950 acres of wetlands. The Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," v.
[251] Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*, 64. The net losses referred to both the acres of productive wetlands and the numbers and varieties of wildlife species.

specific effects of the project.[252] According to Reed, the Bureau had supplied the U.S. Fish and Wildlife Service with four "completely different sets of data regarding return flows to the J. Clark Salyer National Wildlife Refuge" between January 1974 and March 1976.[253]

The Bureau Fights Back

While it is unclear what response the Bureau believed it would receive from the wider scientific community after the publication of its EIS, its reaction to the flurry of reports offers some insights into its confidence in the science that it had produced in its EIS. As we have seen, many of the earliest critiques of the Bureau's EIS came from organizations in Canada, but the Bureau did not react to these reports. Four months after the simultaneous TIE reports were published in January of 1975, the Bureau published its first passionate counter report to its American TIE critics. What prompted the Bureau to respond in April 1975 so vigorously, specifically to the American TIE report and what does this response reveal about the Bureau's perceptions of the environmental movement?

The Bureau stated in its response report that its purpose in replying to the TIE reports was to "clarify issues and answer valid questions raised, and to investigate recommendations made by the Institute."[254] The Bureau stated that it would consider the "suggestions offered by landowners and concerned citizens" as it developed "the most workable plan" for the GDU.[255] A cursory read of the Bureau's response, however, demonstrated that the Bureau was not prepared to offer additional scientific evidence to respond to its critics, nor was it interested in responding to

[252] U.S. Fish and Wildlife Service, *An Evaluation of the Impacts Caused by the Garrison Diversion Unit on National Wildlife Refuges in North Dakota*, 3.
[253] Ibid.
[254] U.S. Bureau of Reclamation, *Response to 'A Scientific and Policy Review of the Final Environmental Statement for the Initial State, Garrison Diversion Unit (North Dakota) by the Environmental Impact Assessment Project of The Institute of Ecology'*, 553.
[255] Ibid., 554.

Canadian concerns. Rather, the Bureau sought to defend its EIS in the face of an increasingly vocal group of environmental experts that openly questioned the Bureau and its technocratic approach.

Presenting verbatim and condensed excerpts from the TIE report, the Bureau dissected the American TIE report line by line. It rejected all of TIE's seventeen principal conclusions outright and failed to acknowledge any of the actions that TIE had recommended. The Bureau unequivocally stated that the TIE review of its EIS was insufficient and "did not produce justification to support a moratorium on the GDU" and dismissed the report arguing that it was "based largely on misconceptions and erroneous assumptions apparently derived from sources other than the EIS."[256] Given this type of accusation, one would have expected the Bureau to have produced new scientific data to challenge TIE's conclusions. The Bureau, however, did not provide this new evidence to counter the claims that TIE had made or to support its own assertions. Rather, it simply dismissed the questions of its critics with generic statements that failed to answer TIE's questions directly and clearly. For example, TIE had concluded that the GDU costs would outweigh its economic benefits. Instead of refuting this claim with evidence to the contrary, the Bureau responded with an unsubstantiated assertion that "Bureau investigations indicate that benefits to be expected far exceed costs of the project."[257]

The Bureau's harsh, line by line retorts and its guarded and impassioned rhetoric merely pointed to its primary goal: to justify its scientific methodology for the design and construction of the GDU that was built on a technocratic ideology. TIE had accused the Bureau of failing to include an explanation of the model it had used in its EIS. Instead of simply providing clarifications to satisfy its critics, the Bureau stated vehemently that it had included a description

[256] Ibid., 553.
[257] Ibid., 581.

of its model in an earlier report and that "one description, as widely disseminated as this one seems to be, would appear to be adequate for most purposes."[258] This non-response was intended to antagonize its opponents and it was clear that the agency was willing to stand upon its technocratic authority. According to the Bureau, its EIS was a "model study" that was "one of the most comprehensive water quality studies of this type."[259]

The Bureau also failed to recognize the complex international impacts of the GDU, highlighting its belief that the Red River and Missouri Rivers were static entities rather than ever-changing enviro-technical systems. The TIE reports pointed out that several of the Bureau's predictions did not consider the ever-changing and fluctuating reality of the application of technology onto a living, ecological system. TIE authors in both Canada and the U.S. had pointed out that the data the Bureau had used to calculate its water quality predictions were made using fixed data points, failing to acknowledge the variations that would occur when technology was implemented and maintained by human subjects.[260] Despite, however, the critiques it had received for these oversights, the Bureau refused in its response report to acknowledge the role of human action and error or to adjust its calculations of water quality based on a range of data points.

Following its first response report to the American TIE report in April 1975, it had become evident that the Bureau did not possess sufficient data on the GDU's impacts on return flows. Sensing the growing international political crisis over this issue, the Bureau commissioned The Harza Engineering Company in September 1975 to model the quantity and quality of water

[258] Ibid., 584.
[259] Ibid., 556.
[260] The Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," 42; Boyd, University of Manitoba (Agassiz Centre for Water Studies), and Garrison Diversion Unit, *The Impacts of the Garrison Diversion Unit on Canada: Volume 2 of a Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit*, 21.

in the receiving streams, to characterize the river's ecosystem with and without the GDU, and to identify water uses along the river ecosystem. The Bureau requested that Harza mathematically model the water quality characteristics of approximately 1,400 miles of receiving streams throughout North Dakota and to provide supplemental data and analyses of the effects of the GDU on water quality and quantity of the project areas river systems.[261] The Harza study concluded that during low flow periods there would be substantial water quality improvements in the receiving streams, there would be some increases in TDS during high flow periods, water uses in agriculture and wildlife management would be increased, recreational uses would be enhanced, and wildlife and aquatic ecosystems would be diversified and enhanced.[262] Although the Harza report was meant to substantiate and to bolster the Bureau's EIS and wildlife mitigation plan and to decrease opposition to the Bureau, the Harza report only prompted a significant intensification of the condemnation that the Bureau was facing in the early 1970s.

In 1971 Ralph Nader and a cluster of independent researchers investigated the activities of the Bureau since its inception as an organization. Nader's damning report entitled *Damming the West* attacked the Bureau for its self-serving policies that chiefly benefited politicians, bureaucrats, and a few profiteering irrigators. Nader concluded his report by asking Congress to freeze the Bureau's ongoing construction efforts.[263] The agency was also facing a fresh wave of detractors including legal action regarding a different EIS that it had produced for another irrigation project in 1971, the Teton Dam in Idaho. NEPA had empowered environmental scientists, politicians, and citizens to increasingly question the utilitarian uses and implications of

[261] Harza Engineering Company and U.S. Bureau of Reclamation, *Garrison Diversion Unit Effects of Return Flows on Receiving Waters* ([s.i.]: Harza Engineering Co., 1976), II-2.
[262] Ibid., Abstract.
[263] Berkman, Viscusi, and Nader, *Damming the West*; Ben A. Franklin, "The Bureau of Reclamation and Its Many Critics," *The New York Times*, June 13, 1976.

the construction of big dams and the values, perceptions, and uses of natural resources was also rapidly changing.[264] The Bureau was in a fight for its existence and for influence in Washington. Its impassioned and aggressive response reports were merely evidence of the agency's attempts to protect and to justify itself in the increasingly crowded water management sector.

Widespread and immediate condemnation of the Harza report erupted amongst the same organizations that had criticized the Bureau for its EIS. The U.S. Fish and Wildlife Services was especially critical of the Harza report arguing that Harza "neither requested any documentation from the Service" nor utilized even the data that the agency had provided.[265] The North Dakota State Natural Resources Coordinator was asked to review the Harza report and in a letter dated October 1, 1980, it was stated that the report was "unreliable and less than credible," and the "conclusions are speculative and unsubstantiated," recommending that any uses of the report be "suspended indefinitely."[266] In addition to the myriad of organizations that opposed the Bureau's EIS, its response report, and its Harza report, the Bureau was facing much wider questions about the agency's water strategy and of its engineering expertise.

Although the IJC report, that was published five months after the Harza report, employed some of the same data that the Harza report had used, the conclusions differed substantially. Where the Harza report concluded from its evidence that the impact of the GDU would be beneficial or insignificant at the worst, the IJC determined from that same evidence that the GDU would adversely impact water quality and water quantity downstream. According to the authors of the S.T.E.P. study that had been published several years earlier, the lack of clear evidence in

[264] Billington, Jackson, and Melosi, *The History of Large Federal Dams Planning, Design, and Construction in the Era of Big Dams*, 386.
[265] U.S. Committee on Appropriations, *Department of the Interior and Related Agencies Appropriations for Fiscal Year 1982: Hearings Before a Subcommittee of the Committee on Appropriations, United States Senate, Ninety-seventh Congress, First Session, on H.R. 4035*, 1st, U.S. Senate 1004, 610 (1981).
[266] Ibid.

the Bureau's data permitted scholars to generate a variety of conclusions since the evidence "seems to vary depending on the concern of the investigator."[267] Historian Mike Hulme argued that the varying and contrasting interpretations of scientific narratives provide insight into the human story of diverse beliefs, values, visions, and attitudes of risk.[268] Hulme also argued that scientific disputes are often used "as a proxy for much deeper conflicts between alternative visions of the future and competing centres of authority in society."[269]

For the Bureau, TIE was an agency that represented a new cluster of environmental experts and organizations that were increasingly receiving attention at the federal level; TIE represented a threat to the Bureau's existing authority. It had become clear by 1971 that the Bureau was fighting not only with the Corps for authority and funding federally, but with an increasingly powerful and influential environmental lobby. With connections to the Executive Office of the President, TIE embodied a growing threat to the Bureau and its report was evidence of the mounting academic and political potency of this new cluster of environmental experts. As scholars Josephine Doherty and Arthur Cooper have argued, TIE's parent organization, the Ecological Society of America, was known as a "first-class scientific organization" that brought together society, politics, and science.[270] The first interim Board of TIE included sixty individuals from thirty-three institutions across the U.S. and by 1971 the Institute had attracted forty institutions from the National Science Foundation to the Council on Environmental Quality and the National Academy of Science.[271] In addition to this support, TIE boasted of receiving coveted funding from the Department of Energy for several of its projects and of partnering with

[267] Campbell et al., *University S.T.E.P. Programme: The Garrison Diversion Study*, 8.
[268] Mike Hulme, *Why We Disagree About Climate Change: Understanding Controversy, Inaction, and Opportunity* (Cambridge, U.K.; New York: Cambridge University Press, 2009).
[269] Ibid.
[270] Josephine Doherty and Arthur W. Cooper, "The Short Life and Early Death of the Institute of Ecology: A Case Study in Institution Building," *Bulletin of the Ecological Society of America* 71, no. 1 (1990): 6.
[271] Ibid., 8.

the U.S. Fish and Wildlife Service, another agency that was situated under the Department of the Interior. In 1975 TIE had also developed a strategic partnership with the Council on Environmental Quality, which was a division of the Executive Office of the President and the federal overseer of the implementation of NEPA amongst federal agencies. TIE also had appealed to environmental advocates and the local public in both Canada and in the U.S. by publishing dual studies that addressed the local concerns of Canadians and Americans. Having identified itself as an institution that bridged the gaps that existed between scientists and the public, TIE created reader-friendly reports to reach a wider non-scientific audience. TIE believed that if the public truly understood the real environmental, economic, and social tradeoffs of the GDU, average citizens would quickly join its anti-Garrison and anti-Bureau campaigns. TIE represented a real threat to the Bureau's GDU agenda on both sides of the border.

Historians have documented the ways in which other government water management agencies around the world adapted their strategies to "improve the odds of their projects being built," in the face of mounting pressure from environmentalists during the same period.[272] Unlike these other technocratic agencies, however, the Bureau did not alter its approach to the GDU to incorporate the knowledge of environmental experts, but rather simply doubled down on its beliefs in the power of technology to shape the environment for socioeconomic benefits. The Bureau's EIS was led by engineers. Its response reports were also written by engineers. The follow up Harza study was also compiled by engineers. According to historian Dolly Jorgensen, the unchanging nature of an agency's argument over many decades, "reveals the conviction of the actors in their enactments, which correspond to their environmental values."[273] The Bureau's

[272] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 225.
[273] Dolly Jørgensen, "Environmentalists on Both Sides: Enactments in the California Rigs-to-Reefs Debate," in *New Natures: Joining Environmental History with Science and Technology Studies*, ed. Dolly Jørgensen, Finn Arne Jørgensen, and Sara B. Pritchard (Pittsburgh: University of Pittsburgh Press, 2013), 68.

unwillingness to engage the environmental sciences in its responses to its critics demonstrated that the agency was committed to its technocratic roots and was not prepared to re-assess the GDU for its potential adverse impacts on non-human nature.

The Environmental Debate that Changed Everything

This irreconcilable conflict over the Bureau's EIS between environmental experts and the engineers at the Bureau led to three unanticipated outcomes: First, the growing conflict about the Bureau's EIS launched the GDU back onto the federal government's radar, sparking and eventually reigniting the decades old debate about the GDU's economic viability. Second, the Bureau's EIS and its successive responses to environmental experts did not bolster, but rather served to undermine the agency's technocratic reputation and eventually contributed to the IJC's recommendation to issue a complete moratorium on GDU construction. Third, the EIS debate unexpectedly created an unprecedented opportunity for this new group of experts in the environmental and ecological sciences to assert their scientific authority and to claim their professional position within the water resource management sector.

Even though the Bureau had hoped to move through the NEPA process quickly and smoothly, by 1975 the escalating dispute over the Bureau's EIS thrust the Bureau and the GDU back into the political spotlight. After the Canadian and American governments had referred the GDU to the IJC in October 1975, the U.S. Committee on Government Operations opened an investigation into the political and economic impacts of the GDU. Having assumed the economic debates about the viability of the GDU had been resolved, the re-entry of the U.S. Committee on Government Operations into the GDU debate was deeply concerning for the Bureau. The Committee's investigation goal was to "separate fact from fiction in order to report accurately to

the Congress the true status of Garrison, its prospects, and its problems."[274] According to Committee Chairman Moorhead, "Our intention is to take a steady, clear look at an expensive and complex water resource project which already has, and promises to have even further, far-reaching effects not only in North Dakota but in the Northern Great Plains region as a whole."[275] The Committee decided to separate its analysis into two reports: one to evaluate the project's economic viability and one to analyse the project's environmental viability. The initial economic viability report published on February 26, 1976, found that the GDU had exceeded its federally approved cost ceiling by $46 million.[276] In preparation for their second report, the House held public hearings where they heard testimony from more than thirty North Dakotans, South Dakotans, Minnesotans, Canadians, Members of Congress, federal officials, and interest groups that addressed the economic, environmental, and international concerns surrounding the project. The report highlighted the growing list of unfavourable reports filed against the Bureau's EIS including from the Council on Environmental Quality and the Environmental Protection Agency, the U.S. Fish and Wildlife Services, and the federal General Accounting Office. The Committee's second report on June 30, 1976, identified fifty-nine findings and made forty-five recommendations to the Bureau, concluding that "the Bureau's environmental assessment effort is inadequate" and that authorized cost ceilings had been excessively overrun.[277]

The U.S. Committee on Government Operations justified the concerns that Canadians had highlighted, drawing attention to the Bureau's failure to include data that accurately identified how the GDU irrigation return flows would specifically affect Canadians through the water

[274] Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*, 5.
[275] Ibid.
[276] Ibid.
[277] Ibid., 2.

quality of the Souris River.[278] The Committee expressed similar concerns to that of the U.S. Fish and Wildlife Services and agreed with the Council for Environmental Quality that Bureau did not have adequate evidence to support its GDU design. According to the Committee, "the Bureau is apparently proceeding with blinders on in planning…while this 'head-in-the-sand' approach may make life much simpler for Bureau planners, it certainly does not provide the public or the Congress with accurate information about Garrison."[279] The Committee argued that to determine the impacts of the GDU on Canada, Minnesota, and South Dakota and to inform effective planning, more information was needed immediately, and not into the unknown future, as the Bureau had suggested. The Committee also maintained that the Bureau's segmented approach to the environmental assessment process was flawed since it had not provided decision makers in a timely fashion with the information that was needed to determine the future of the GDU. The Bureau had claimed that it had not completed its wildlife mitigation plan in the time allotted due to a lack of funding. The Committee, however, adamantly stated that it "rejects the argument that funding is not adequate for wildlife mitigation, it is because the Bureau of Reclamation has not budgeted or allocated funds for this purpose."[280]

Engineers at the Bureau could not have anticipated how their own reports would destabilize their scientific credibility and eventually undermine their scientific authority in the water management sector. The Bureau's defensive and impassioned questioning of its critics rather than a dispassionate and clear presentation of evidence, only served to delegitimize the agency. The Bureau's vague and inconsistent presentation of data was what history of science professor, Naomi Oreskes has called 'doubt-mongering.' Oreskes argued that 'doubt mongering'

[278] Ibid., 22.
[279] Ibid., 65.
[280] Ibid.

was a defensive strategy that experts used to deflect its critics by creating doubt and uncertainty about the scientific evidence.[281] The Bureau attempted to generate widespread 'fact uncertainty' amongst experts and the public. The agency's strategy of "doubt-mongering" failed, however, to divide the agency's detractors but served instead to empower and unite this diverse group of environmental experts.

The Bureau's initial attempts to submit two draft EIS reports, neither of which met NEPA standards, and its repeated attempts to respond to its critics also highlighted how out of touch the Bureau was with changing societal values. The Bureau had failed to recognize the rising social influence of the environmental movement. If the engineers at the Bureau had been genuine in their desire to explore the environmental implications required by NEPA legislation, the agency would have hired environmental scientists and ecologists to evaluate its GDU plans and to conduct its EIS. Rather than entrusting environmental experts with the task of assessing the GDU according to emerging environmental standards, the Bureau relied on engineering experts to assess the environmental impacts of its marquee project. The Bureau's EIS was "scientific legitimation" for its high modernist vision for the management of non-human nature and was a signal to the new group of ecological scientists of the Bureau's disregard for the rising populist environmental movement.[282]

Rather than quell and satisfy its detractors, the Bureau's many reports that produced inconsistent data only served to discredit and undermine its scientific authority. It also served to reinforce its commitment to its technocratic ideals and its reluctance to engage with the growing field of environmental sciences. The Bureau unintentionally bolstered the international, national,

[281] Oreskes, "The Fact of Uncertainty, the Uncertainty of Facts and the Cultural Resonance of Doubt," 3.
[282] Christopher Hamlin, *Science of Impurity: Water Analysis in Nineteenth Century Britain* (Bristol: Adam Hilger/Oxford University Press, 1990), 51.

and local opposition to the GDU project through its attempts to engage with the environmental sciences on its own terms. The Bureau's engineer-driven, technocratic vision for the GDU would in the end be undermined by this emerging cluster of ecological scientists and organizations whose powerful and unified swell of criticism challenged the Bureau's claims to scientific knowledge.

The last unanticipated outcome of these environmental debates was the opportunity for environmental experts to gain scientific and professional authority. With the rise of the environmental movement, public confidence in the power of technology to control the environment had begun to wane and trust in both engineering experts and in the ability for governments to adequately address the needs of its citizens had dwindled. The once held belief in technology's power to transform non-human nature, started to be rivalled by a new understanding of the relationship between non-human and human nature as complex, living, and interconnected.[283] It is into this gap that ecologists and environmental scientists asserted their expertise to gain the public's trust. This new group of experts exemplified a diverse set of values about the environment that stood in stark contrast to that of engineers. Willing to consolidate a dissimilar group of environmental and ecological specialists, this group strategically sold their scientific authority as cohesive and as accessible to a broad public increasingly invested in environmental issues and solutions.

Divisions existed between the various environmental scientists on account of the many sub-categories that existed within the environmental sciences including, but not limited to, environmental studies, ecology, microbial ecology, conservation biology, marine biology, climatology, forestry, atmospheric sciences, and soil science. Each of these sub-disciplines had

[283] Jørgensen, Jørgensen, and Pritchard, *New Natures: Joining Environmental History with Science and Technology Studies*, 2.

developed unique methodological and ideological approaches to the study of the environment. According to historians Alan Marcus and Amy Sue Bix, scientists in America had developed distinct scientific methodologies that led to a fracturing of the scientific community into sub-disciplines, causing these groups to fight vehemently for recognition and for funding.[284] In addition to the creation of scientific sub-disciplines, historians have argued that World War Two pitted scientists against one another due to the severely restricted federal budgets of the post war period.[285] According to Alan and Bix, scientists did not "constitute a cohesive community, but rather various interest groups. American science as a singular, unified, coherent entity did not exist."[286] Prior to the 1970s then, ecological, and environmental scientists did not represent a collective group with a unified purpose. Environmental scientists from each of the environmental sub-disciplines drew from various data sets, engaged different methodological approaches, and implemented unique assessment tools to legitimize their unique scientific discipline. Fighting for academic credibility and scientific authority, each group sought to highlight and to advance its particular kind of science within the academy and in Washington. What would prompt this diverse community of scientists then, to mutually rely on one another's research and methodological approaches during a period when scientific disciplines were striving to legitimize their work to federal funding institutions whose available dollars were shrinking?

Historian Charles Hamlin's study on the scientific enterprise of water analysis in London in the 1850s, provides a foundation to understand this unprecedented alliance and professionalization of a diverse group of experts. Hamlin examined the transformation of a large group of chemists that had historically been characterized by divisive analytical disputes into a

[284] Alan I. Marcus and Amy Sue Bix, *The Future is Now: Science and Technology Policy in America Since 1950* (Amherst, N.Y.: Humanity Books, 2007), 109.
[285] Ibid., 92.
[286] Ibid., 105.

unified, collective, group of professional chemists. The success of this group was not only connected to their ability to offer new knowledge, but to their ability to sell "credibility, authority, and rationality" through "aggressive and successful discipline-promotion."[287] Much like the chemists in Hamlin's study, the environmental experts in the GDU dispute chose to set aside their differences to mount a collective opposition against the Bureau. Instead of insisting on analyzing the Bureau's EIS from each of their own disciplinary perspectives, these scientists united to build upon and to reference one another's data, research, and conclusions. This interdependence of a diversity of scientific approaches allowed this cluster of individual scientists at individual organizations to establish a new and more powerful, broad-based ecological and environmental authority. Together, this group of scientists inserted their expertise into the water resource management sector, forging for themselves a new professional identity and scientific influence.

This new group of experts defined themselves as environmental gate keepers and advocates that stood in opposition to the traditional technocratic approach to the environment. Hoping to gain the public's trust as a united body of experts, these scientists used the GDU debate to implement a campaign of "aggressive and successful discipline-promotion."[288] This new group of scientists marketed themselves as the builders laying the foundations for environmental, technical, and scientific progress. Like the chemists in Hamlin's study, selling authority entailed not only highlighting the new knowledge and information that these scientists brought to the GDU debate, but also establishing themselves as the providers of that knowledge and authority.[289] This new group of scientists sought to establish their authority by discrediting

[287] Hamlin, *Science of Impurity*, 48, 3.
[288] Ibid.
[289] Ibid., 48.

the Bureau's technocratic methodology, by aligning themselves with the messaging of the highly popular social and environmental movement, and by self-declaring their group of experts as academic guardians of the environment.

This new group of experts strategically discredited the Bureau not by disputing the agency's scientific evidence, but by critiquing its scientific methodology. These experts argued that the Bureau's scientific methodology was incompatible with the new environmental regulations and argued that the agency's technocratic vision conflicted with the new environmental order. The TIE reports both argued that the Bureau had failed to employ highly sophisticated tools of analysis to evaluate the GDU and the environmental impacts. Where the Bureau had employed computer modeling, TIE argued that the Bureau had not provided adequate details of the models used or of the assumptions employed in its calculations.[290] TIE argued that the Bureau provided only "unquantified, unsupported assertions and promises of future studies to obtain the very data that are necessary now to evaluate the project before it proceeds further."[291] TIE effectively found and pointed out the discrepancies in the Bureau's work and strategically inserted its scientifically informed method as superior to that of the Bureau. Attempting to legitimatize its process and scientific authority, TIE described in detail the breakdown of its own computer modeling, arguing that it's sophisticated programs would "more accurately predict resultant flows and dissolved salt concentrations."[292] TIE asserted at the outset of its report that the EIS could be improved with the "consistent use of scientific knowledge and

[290] The Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," 34.
[291] Ibid., 13.
[292] Boyd, University of Manitoba (Agassiz Centre for Water Studies), and Garrison Diversion Unit, *The Impacts of the Garrison Diversion Unit on Canada: Volume 2 of a Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit*, 26.

perspectives," accusing the technocratic agency of failing to employ the most advanced scientific technology in its evaluation of the GDU.[293]

Having actively distanced its science from that of the Bureau's by denouncing the Bureau's scientific approach, ecological and environmental scientists established themselves as the preeminent authority and provider of the emerging sciences and scientific methods. Highlighting their unique scientific perspective, knowledge, and expertise, these scientists strategically positioned themselves next to, but not with, the rising populist environmental movement that focused on the protection of non-human nature. Mainstream environmental activist groups such as the Manitoba Environmental Council and the National Audubon Society had rapidly gained favour with citizens and nationally in both Canada and the U.S. Recognizing this swelling popular appeal, environmental experts selectively referenced the reports of these environmental groups and including testimony and experts in their processes. As we saw earlier, the scientists that critiqued the Bureau's reports and the organizations they represented freely shared their data with the other environmental organizations and cross-referenced one another's findings in their conclusions. These academic organizations, did not, however, reference the work of the more extreme activist groups in their work such as the Farmer's Canal Protestors Association, the Manitoba Indian Brotherhood, the Committee to Save North Dakota, Friends of the Sheyenne, and the World Wildlife Fund. Apart from referencing the documents from the National Audubon Society's legal case against the Bureau, this group of emerging environmental scientists even avoided cross-referencing the reports of the National Audubon Society.[294] Individuals who spoke on behalf of the National Audubon Society in reports or at public hearings were widely known to

[293] The Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," iv.
[294] Ibid., 92-97.

focus on condemning the GDU employing political rather than scientific arguments. To bolster their scientific authority, environmental scientists seemed to connect with other scholarly or academic environmental experts and distanced themselves from the political activism of the more radical environmental groups.

Despite the ways in which environmental experts distanced themselves from the radical activist groups, interestingly the activists within these groups still perceived themselves as presenting a united front against the GDU alongside ecological and environmental scientists. The Committee to Save North Dakota had set up a meeting with the U.S. Fish and Wildlife Service to understand its support for the Bureau's GDU wildlife mitigation plan as outlined in the EIS. Many had told the Committee to Save North Dakota to publicly condemn the U.S. Fish and Wildlife Service's support of the GDU, but the Committee to Save North Dakota had decided that "we cannot attack conservationists, environmentalists, and others concerned about wildlife without dividing ourselves on the Garrison front. . . to flatly condemn the U.S. Fish and Wildlife Service would alienate many of these dedicated and influential persons who now are on our side."[295] Activist groups recognized that if they alienated themselves from those scientists with political influence, that their credibility would be significantly diminished. Therefore, the Committee to Save North Dakota and the National Audubon Society focused much of its efforts on political lobbying in Washington to stop the GDU, instead engaging in the scientific environmental debate that the environmental experts were leading.

Having aligned themselves with, but distinguished themselves from the environmental activists, ecological and environmental experts sought to establish themselves as principal guardians of the environment and therefore key representatives of the public interest. TIE's hard-

[295] Committee to Save North Dakota, "Newsletter," (Fargo, North Dakota: Grand Forks Chapter of the North Dakota Audubon Society, April 1976), 4.

hitting methods demonstrated the desire of its scientists to make a name for themselves as the scientists and as the agency that practically would hold traditional scientists at the Bureau accountable for their inability to consider the environmental implications of the agency's projects. Within this context of heightened public distrust of government to manage the nation's water resources, as historian Marcus Alan highlighted in his study there was a lack of clarity about "who guarded, who guaranteed, and who spoke for the public interest?"[296] Environmental experts sought to establish themselves as the altruistic authority with the capacity to responsibly implement technology, to guard non-human nature from the harmful impacts of technology, and to work for the public good.

These environmental experts recognized that if their organizations were able to exert enough unified pressure onto the Bureau in the case of the GDU to comply with the new environmental policies, that a precedent could be set, of the need for the inclusion of third-party assessment organizations. The Bureau's "consistent history of nonenforcement" of reclamation laws was used to emphasize the Bureau's unwillingness to comply with existing laws.[297] TIE boldly stated that the NEPA process had failed to produce an EIS that met its intended purposes and standards. According to TIE, this failure occurred on account of the "unresponsiveness" of the Bureau to the appeals that Congress had made, that the public had made, and that other agencies had made for the Bureau to provide the necessary information and data on the project areas. TIE also brought attention to the other pieces of legislation that the Bureau had failed to comply with on the GDU including the Federal Water Pollution Control Act, the Migratory Bird Treaty, and the Boundary Waters Treaty (BWT).[298] Organizations like TIE and the U.S. Fish and

[296] Marcus and Bix, *The Future is Now: Science and Technology Policy in America Since 1950*, 105.
[297] The Institute of Ecology, "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)," 81.
[298] Ibid., 87-89.

Wildlife Service actively sought to build a case of the Bureau's environmental record of non-compliance to argue for their own value as third party organizations in the water sector with the authority and the expertise to conduct and enforce NEPA within all water management projects across the country. TIE suggested the inclusion of a third party review panel that could truly enforce NEPA principles through the "research and testimony of qualified witnesses free from pre-committed and vested interests" so that projects could be assessed publicly before irrevocable water management commitments are made.[299] The Bureau's refusal to comply with NEPA was highlighted as a pattern of the agencies' behaviour and served to identify the need for third party evaluators to assess the Bureau's work for its compliance to NEPA standards: "without the establishment of an effective and fair adversary process, such long-run politicized projects offer little opportunity for adequate unbiased review."[300]

No one could have predicted how the institution of NEPA in 1970 and the publication of the Bureau's first EIS in 1971, would impact the trajectory of the GDU project. Yet the federal policy initiative and the resulting Bureau report sparked a fiery four- to five-year scientific battle between engineers and ecological scientists. The Bureau's first attempts at practically implementing NEPA policy highlighted how out of step the agency was with the emerging environmental consciousness. Engineers had historically dominated the management of rivers across the nation, but the introduction of NEPA opened the door to a new cluster of scientists. Environmental scientists seized the opportunity to challenge the Bureau and its lack of environmental consciousness of the impacts of the GDU. The scientific debates that ensued between these two groups of scientists offer significant insights into the unintended

[299] Ibid., 91.
[300] Ibid.

consequences that emerged from the implementation of this national environmental policy. Four conclusions emerge from this analysis of the scientific debates.

First, the definition, meaning, and evaluation of environmental impacts was contested. Even though NEPA had become a national policy in 1970, the application of this policy was, for implementing organizations, ambiguous and its interpretation left to each organization to determine. Engineers at the Bureau held one view about how to define and evaluate the environmental impacts of a project while the cluster of emerging natural and environmental scientists held another. This gap in ideology created significant tension between these two groups of scientists and changed the course of the GDU debate. Second, this new generation of environmental scientists sold their authority as distinct from, and in opposition to, the Bureau's traditional technocratic approach to water management. These experts asserted their scientific authority by flooding the scientific dialogue with environmental critiques of the Bureau's scientific approach to the GDU and by strategically aligning themselves with the popular environmental movement. The Bureau's failure, on the other hand, to modify its technocratic approach alienated and diminished the agency's political and scientific power at the national and international levels.

The third conclusion from this analysis of the scientific debates is that although this group of experts were comprised of scientists from distinct fields and disciplines, they successfully united to oppose the technocratic vision of the Bureau. These diverse ecological and environmental scientists, as represented by the organizations they worked for, opposed the Bureau in a unified manner to create space for, and to legitimize, their environmental and ecological approach to water management. The integration of this disparate group of experts afforded them a unique opportunity to speak into and to contribute to the larger national and

international water management debates from which they had traditionally been excluded. Fourth, while these emerging experts aligned themselves with a growing environmental consciousness amongst the public, they deliberately distanced themselves from radical environmental activist culture. Their reliance on rigorous scientific and academic methodologies to dismantle the Bureau's EIS distinguished them from the extreme environmentalists whose rhetoric was more politically motivated; this intentional distinction elevated their credibility in Washington.

The scientific and environmental debates surrounding the GDU only deepened and widened in scope in the post NEPA era. The impasse that existed in 1975 between these two groups of experts would not be resolved. In 1975 the governments of Canada and the United States agreed to refer the ongoing debate around the GDU to the IJC. It was believed that the entry of this seemingly multi-national, neutral organization into the debate would provide the objective, impartial guidance needed to determine the way forward for this embattled project. Was this quasi-judicial organization the unbiased commission that governments, scientists, and the public perceived it was and how did this commission impact the trajectory of the GDU? As we will see in the next chapter, the IJC's report on the GDU revealed as much about the IJC as it did about those who enlisted it.

Chapter Three: 'We Don't Need It': Public Voices and the Remaking of an Old Institution and an Old Debate, 1975-1977

By the mid-1970s Milo Hoisveen, the Garrison Diversion Unit's (GDU) most influential and public figure had retired. The introduction of the National Environmental Policy Act had reshaped the GDU debate, enmeshing the project in a dramatic environmental controversy. The environmental debates that raged between engineers at the Bureau of Reclamation and environmental experts from 1971 to 1975 had not produced any definitive answers for politicians about the environmental implications of the GDU on Canadian waters. Scientists remained divided and the science unclear, leaving Congress ill equipped to decide whether to grant or to revoke federal approval and funding for the project. Within this context of a scientific impasse and given the international implications of the GDU, the governments of Canada and the U.S. together appealed to the International Joint Commission (IJC).

In this final chapter, my scope of analysis expands to the international debate. I will assess the multiple kinds of expertise mobilized through the IJC's engagement in the GDU debate. With sound scientific inquiry as the historical foundation of the Commission's work, and with the perception of the Commission as an impartial agent, the governments of Canada and the U.S. enlisted the IJC to evaluate the confusing and conflicting scientific evidence and to provide guidance on the future of the GDU. The entry of the IJC into the GDU debate, however, only further served to complicate legislative decisions surrounding the GDU.

Historians have argued that the IJC underwent a significant organizational and ideological transformation in the post-1960s period, distinguishing its function in the first half of the century

from its behaviour in the second half of the century.[301] This shift was messy for the IJC as it widened its scope from a quasi-judicial role to more of an investigative role and as it strategically became an active agent of environmental governance in the water resource management sector. The GDU investigation provides one example of the IJC's messy shift in the post-1960 period. My analysis focuses on one specific aspect of this complex shift at the IJC that historians have only just begun to explore: the value and the role of the public voice in the IJC's dispute-resolution process.[302] Did the IJC's pioneering model of public engagement reorient and reshape the Commission's final recommendations and conclusions in its GDU investigation? What can we learn about the IJC's function and ideology from an examination of its public consultation strategy? This chapter seeks to answer these questions through an analysis of the IJC's ambitious attempt to engage, listen to, and consolidate the voices of diverse stakeholders into its investigative process surrounding the GDU. The first section surveys the history of the IJC and of the IJC's involvement in the GDU conflict. Section two examines a range of narrative themes that emerge from the public hearings. The final section provides an analysis of the IJC's public engagement strategy.

History of the Boundary Water Treaty (BWT) and the IJC, 1909-1975

Canada and the United States share over ninety percent of North America's total fresh water along 300 boundary water rivers and lakes that span 8,800 km.[303] Throughout the nineteenth century, the rising number of disputes and conflicts between the two countries

[301] Of the 50 cases that the IJC was asked to engage in prior to 1944, only 11 were references requiring the IJC to initiate its investigative function under article ix; however, between 1944 and 1977 of 55 references required the mobilization of this function. Clamen and Macfarlane, "Introduction," 15-17.
[302] Murray and Macfarlane highlighted that the role of public consultations in the IJC was significant and stated that "an entire volume could be written to study this yet unexplored aspect of the IJC's work." Clamen and Macfarlane, "Conclusion," 540.
[303] Gordon Walker Q.C., "The Boundary Water Treaty 1909 — A Peace Treaty?," *Canada-United States Law Journal* 39, no. 14 (2014): 172.

signaled the need for a mediating body or institution to address water disputes in an efficient and effective manner. On January 11, 1909, Canada and the U.S. agreed to sign an international water management treaty entitled the Boundary Water Treaty. The Boundary Water Treaty was created to address issues arising between the two countries relating to jurisdiction and sovereignty, special agreements, the definition of terms, the question of pollution and water quality management, and water diversion projects.[304] As part of the Boundary Water Treaty, communities on both sides of the border were given equal and unequivocal rights to use boundary waters for domestic and sanitary purposes, navigation, power generation and irrigation. Both Canada and the U.S. had the right to "use its upstream waters as it sees fit, but nationals in the other country have the same rights of redress as those in the upstream state."[305] The Boundary Water Treaty identified that any alteration of boundary waters, downstream waters, and upstream waters required the permission of the IJC.[306]

The IJC was established as a non-partisan, quasi-judicial body.[307] Although the IJC has little regulatory capacity or legal function apart from the consent of both Canadian and American governments, historically it has been widely perceived as "objective, impartial, and expert."[308] The IJC served four primary explicit functions and one implicit function under the Treaty: administrative, quasi-judicial, investigative, and arbitral explicit functions, with monitoring

[304] Mayhall Sherr, "Understanding the International Joint Commission: A Comparative Case Study Approach," 41.
[305] Carroll and Logan, *The Garrison Diversion Unit*, 7, 34-35.
[306] Matthew E. Welsh, "Role of the International Joint Commission" (paper presented at the 12th Conference on the Great Lakes Research, Ann Arbor, Michigan, 1969). Boundary Waters are defined as rivers and lakes located along the border between Canada and the U.S. Downstream waters are defined as waterways that originated and crossed from one country over the boundary to the other country. Upstream waters consist of the waterways that flow toward, and drain from, one country into boundary waters and rivers to the other country.
[307] Walker Q.C., "The Boundary Water Treaty 1909 — A Peace Treaty?," 178. The IJC is governed by six key values which is reflected in every aspect of its work: consultation and consensus building, public participation, local government engagement, joint research efforts, objective and independent examinations, and flexibility.
[308] Macfarlane and Clamen, *The First Century of the International Joint Commission*, 17, 533.

being the fifth implicit function.[309] The IJC's quasi-judicial duties included receiving and evaluating permit applications for the diversion, use, and obstruction of treaty waters. The investigative function focused on examining and producing recommendations on issues arising along the boundary waters (the Great Lakes and the GDU were examples of two such references). The IJC has never used its arbitral power, but it has been given the ability to make binding decisions about any water rights issues that arise between the two countries, regardless of whether it was a boundary water issue.[310] Out of a reluctance to establish any legal precedents, the IJC focused in its early years on its quasi-judicial role, but pivoted in the second half of the twentieth century to embrace its investigative role as exemplified in its investigation of the GDU in 1975.[311]

As we have seen, the debate over the GDU had been raging since its inception in the 1940s, but the Government of Canada had only begun sending diplomatic notes to its American counterparts, outlining its concerns about the GDU's potential detrimental impacts on Canadian waters in 1969.[312] The two primary concerns of Canadian officials were the dangers associated with the integration of two distinct and potentially incompatible ecosystems and water basins as well as the negative impacts of project irrigation return flows on Canadian water quality and water quantity. According to Canadian officials, these two impacts would cause vast and irreversible damage to the Red River and to the Hudson Bay Basin, thereby violating the Boundary Water Treaty. Officials in Manitoba were still reeling from the damage that had been caused by vast commercialization of the fishery on Lake Winnipeg in the 1950s when concerns

[309] The IJC was assigned administrative authority over the waters of the Niagara River and the St. Mary-Milk Rivers.
[310] Clamen and Macfarlane, "Introduction," 7.
[311] Ibid., 16.
[312] Diplomatic Notes were sent in April 1970, October 1971, January 1973, October 1973, March 1974, January 1975, and June 1975. Inland Waters Directorate and Environment Canada, *Garrison Information Kit #7: Federal and Provincial Activities*, 3.

about potential harm that the GDU could cause to the lake began to arise.[313] Despite the urgency that Canadian officials expressed in these various diplomatic notes, American officials failed to reply until 1973. The Canadian government sent a diplomatic note in October 1973 that referenced Article IV of the Boundary Water Treaty and asserted that the GDU was being constructed and implemented in violation of that treaty; it called for a moratorium on all GDU project construction activities until an agreement could be achieved between the two governments.[314] Senior officials were sent from both countries for the first of many in-person meetings between February 1974 and January 1975 in Washington and in Ottawa to discuss the GDU and its international implications.[315] Despite the numerous discussions that took place, the two countries could not come to a mutually satisfying agreement. The Canadian government's final note on June 23, 1975, clearly outlined that the GDU "as currently envisaged, would have adverse effects on the Souris, Assiniboine and Red Rivers, and ultimately Lake Winnipeg, which would cause injury to health and property in Canada."[316]

Given that the Canadian and American governments had increasingly made use of the IJC's mediatory role in its international boundary water disputes since the Commission's inception in 1911, it was not surprising that the two countries then turned to the IJC for direction in the GDU dispute. As a non-government entity of three members assigned from each country, the Commission was expected to act as "a single body seeking solutions to common problems in

[313] Historian Liza Piper demonstrated that the intensification of the commercialized fishery on the Lake, led to the decline in the local fish populations so that by the 1950s the whitefish fishery had collapsed and the goldeye and sturgeon had declined significantly. Liza Piper, *The Industrial Transformation of Subarctic Canada* (Vancouver, British Columbia: University of British Columbia Press, 2009), 175.
[314] Inland Waters Directorate and Environment Canada, *Garrison Information Kit #1: Impact of the Garrison Diversion on Canada: An Overview*, 6.
[315] International Garrison Diversion Study Board and International Joint Committee, "Report," (Ottawa, ON; Washington, D.C.: International Joint Commission, 1976), 246.
[316] Inland Waters Directorate and Environment Canada, *Garrison Information Kit #1: Impact of the Garrison Diversion on Canada: An Overview*, 4.

the common interest" and to seek "win-win solutions" to complex disputes.[317] The IJC was seen as a neutral mediating body that the two governments could turn to for guidance and both governments had displayed increasing levels of confidence throughout the twentieth century in the IJC as an effective mediating body.[318]

The Canadian and American governments therefore agreed to jointly enlist the judiciary functions of the IJC on October 22, 1975, to "advise on the transboundary implications of the proposed completion and operation of the GDU."[319] The Manitoba government claimed that the GDU was in violation of Article IV of the Boundary Water Treaty (BWT) which stated: "the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other.[320] Canadians expressed concern over the leaching of GDU irrigation return flows into the Souris, Assiniboine, and Red Rivers and into Lakes Manitoba and Winnipeg that would degrade water quality and lead to increased flooding. Concerns were also raised about the technological interventions that would be used to transfer the water from the Missouri River to the Hudson Bay Drainage Basin, causing irreversible damage to the ecosystem, the aquatic environment, the fisheries, and recreational opportunities. Although the GDU was a small and seemingly irrelevant international water

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[317] International Joint Commission, *The I.J.C. and the 21st Century*, The International Joint Commission Canada-United States ([s.i.]: [s.n.], 1997), 8. 8; Clamen and Macfarlane, "Introduction," 8.
[318] Doemel, *The Garrison Diversion Unit: Science, Technology, Politics, and Values*, 61.Between 1912 and 1932 the IJC received 23 applications and 8 references. Between 1933 and 1952 the IJC received 23 applications and 14 references. Between 1953 and 1972 the IJC received 12 applications and 15 references. Carroll and Logan, *The Garrison Diversion Unit*, 7, 33.; Kim Richard Nossal, "A Square Peg: The Lessons of the Point Roberts Reference, 1971-1977," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen (Calgary, Alberta, Canada: University of Calgary Press, 2020), 195, 97. 195, 197; Brittany Luby, *Dammed: The Politics of Loss and Survival in Anishinaabe Territory*, Critical Studies in Native history, (Winnipeg, Manitoba: University of Manitoba Press, 2020), 50.
[319] International Garrison Diversion Study Board, *Investigation into the Transboundary Effects of the Proposed Project* (Ottawa, ON; Washington, D.C., 1976), 11.; International Garrison Diversion Study Board and International Joint Committee, "Report," 215.
[320] International Joint Commission, *The Boundary Waters Treaty of January 11, 1909 between the United States and Great Britain*, International Joint Commission (Ottawa, ON; Washington, D.C., 2016), 4, ijc.org/sites/default/files/2018-07/Boundary%20Water-ENGFR.pdf.

conflict compared to the Great Lakes dispute of the early 1970s, scientists and politicians alike were aware of the significant precedent setting implications of any decisions surrounding the approval or rejections of the GDU.

In response to the Reference from the Governments of Canada and the U.S., the IJC established the International Garrison Diversion Study Board (IGDSB) on October 30, 1975, to conduct the technical investigation for the IJC. The IGDSB consisted of sixteen board members half of whom from various government departments in Canada and the other half in the U.S. The Directive to the IGDSB included the appointing of five technical committees that were directed to undertake scientific investigations and studies and to advise the Commission on core considerations for its recommendations. The IJC requested that the IGDSB examine and report upon six key areas:

> The present water quality in the Souris and Red Rivers and their tributaries and the impacts of the proposed completion and operation of the GDU; the present uses of these waters and those predicted for the future; the effects of present water quality on these uses; the nature, extent, and location of impacts on both the quality and quantity of these waters to be anticipated as a result of the proposed completion and operation of the GDU; the nature, extent, and economic cost of the anticipated impacts of the GDU on future uses of these waters; the nature and extent of the impact on commercial and recreation fisheries in Manitoba of the introduction through the GDU of fish, fish diseases, and fish parasites from the Missouri River watershed.[321]

Due to the size and complexity of the IJC's six-fold referral, the IGDSB appointed five technical committees to lead the board's investigation: the Water Quality, Water Quantity, Biology, Uses, and Engineering Committees. The five technical committees consisted of fifty-three members representing fifteen organizations; the committees then consulted a further 155 experts from a wide variety of scientific disciplines. Although committee members hailed from a

[321] Committee on Government Operations, *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota*, 120.

variety of government agencies, academic institutions, and private organizations, the IJC stipulated that members of the Board and its committees were not acting as representatives of their individual employers but were meant to act and serve in autonomous professional capacities that reflected the directive of the commission.[322] A total of 224 individuals were formally invited to participate in the IJC's activities, of which fourteen percent were identified as engineers with the U.S. Army Corps and the Bureau, while the remaining eighty-six percent were scientists and experts recruited from a wide variety of institutions and agencies; the disciplines of environmental protection and management, agriculture, pollution control, ecology, conservation, fisheries and marine services, wildlife services, zoology, botany, and soils research representing Canadian and American universities, Federal, Provincial, and State government agencies, museums, private laboratories, and independent environmental advocacy groups.[323]

The five individual technical committees were expected to generate a plan of study for its investigations, a schedule of the expected timeline, and an estimate of its costs. While each of the five committees set individual plans of study and schedules to meet their commitments, travel to various locations was required for all committee members. The objectives of each committees dictated the requirements of its members: while the water quality and biology committees needed its members to physically travel to the GDU sites monthly to collect and analyze data, the uses and water quantity committee did not conduct site visits but met regularly in different locations throughout North Dakota to analyze the historic and projected data. The committees were directed to jointly carry out the investigations in both countries "as a coordinated and integrated

[322] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, The International Joint Commission Canada-United States (Ottawa, ON; Washington, D.C., 1977), 136.
[323] For the full list of members and consultants of the committees of the IGDSB see Annex 4 of the International Garrison Diversion Study Board and International Joint Committee, "Report," 225-39.

effort" and were free to enlist the expertise of federal, provincial, or state departments within the Governments of Canada or the U.S.[324]

As its title suggests, the Water Quality Committee was responsible for collecting the information and reporting on the existing water quality conditions in the study area. The Water Quantity Committee was tasked with collecting and reporting on the existing and projected quantity conditions both with and without the GDU. The Biology Committee was expected to compile the background and baseline data related to the biological and ecological factors and to evaluate the effects of water quality and quantity on living resources both with and without the GDU. The Uses Committee would describe and examine who was presently using water and how it was being used as well as the projected water uses into the future. The Engineering Committee was expected to provide any needed GDU project data to the other Committees and was to prepare alternative plans if needed based on the findings from the Biology and Uses Committees.

Since the referral mandated that the IJC present its findings no later than October 31, 1976, the Committees were expected to submit their comprehensive reports by July 1, 1976. The "severe time restraints" contributed to the IGDSB's decision not to collect new data, but to compile, analyze, and interpret the existing data that both engineers and environmental scientists had produced throughout the 1960s and 1970s on the GDU.[325] Although the IGDSB was expected to include in its plan of study opportunities for public participation in the form of meetings, seminars, and other means of disseminating information to and response from the public, the IJC directed the IGDSB not to conduct any public hearings as this was the sole

[324] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*.
[325] International Garrison Diversion Study Board and International Joint Committee, "Report," 5.

responsibility of the IJC.[326] The IGDSB was still, however, expected to observe the principles of the IJC's Public Relations Policy.

Based on the scientific analysis of the five technical committees, the IGDSB submitted its unpublished report to the IJC in December 1976. The IGDSB's investigation concluded that "the construction and operation of the GDU as envisaged would cause injury to health and property in Canada as a result of adverse impacts on the water quality and biological resources in Manitoba."[327] The IGDSB demonstrated that even if various modifications were made to the GDU or mitigation measures were implemented, the GDU would "still cause adverse impacts in Canada. Only the extent of the impacts is in question."[328] The IGDSB further argued in its final report that the possible impacts from biota transfers "are so threatening that the only acceptable policy at present is to delay construction of those features of the GDU which might result in such transfers."[329] The IGDSB made three primary recommendations to the IJC, the first of which was to terminate immediately the construction of any project features that could affect waters flowing into Canada. The second proviso stipulated that if the two governments could agree upon a proven method to eliminate all biota transfer, that construction on the GDU could continue if six specific construction qualifications were met. These six criteria were: that any agreed upon modifications be incorporated into the GDU's construction and future planning; that modifications to the Velva Canal be made to reduce the highly saline soils, to restore wetland habitat, and to line the canal; that a program be incorporated to verify the quality and quantity of return flows from the GDU; that more research be conducted to determine the impact of nitrogen transformations in the Souris River; that an agreement be made for the U.S. payment of capital

[326] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 138.
[327] Ibid., 3.
[328] Ibid., 114.
[329] Ibid.

and operation costs related to mitigation measures in Canada; and that an agreement be struck on existing or new regulations or laws ensuring that these best practices were followed. The third and final recommendation was that the two governments negotiate specific water quality agreements for the Souris and the Red Rivers to create preventative standards to measure and define 'injury,' 'pollution,' 'health,' or 'property' specific to those rivers for future issues that may arise.

The IGDSB had identified that the issues and the study process were more complex than it had anticipated, stating that the GDU reference was "one of the most difficult and intricate issues the Commission has ever been asked to consider."[330] Due to this, the IJC decided to extend its deadline to incorporate additional public participation into its investigative process. The IJC distributed the IGDSB's unpublished report in January 1977 to public libraries and to various interest groups, government agencies, and organizations for widespread consumption and review. The IJC believed that three months was a sufficient timeline for individuals to review the IGDSB's report. Following this review period, the IJC conducted a further five public hearings in March 1977 in Minot and Grand Forks, North Dakota, and in Souris, Portage la Prairie, and Winnipeg, Manitoba to "receive comment on the Board's report and the views of all those concerned with the transboundary implications of GDU."[331]

Following its extended investigation process, that included the work of the IGDSB and of the IJC's public hearings, the IJC published its final report in December 1977. The report reiterated the IGDSB's conclusion that the "construction and operation of the GDU as envisaged would cause injury to health and property in Canada as a result of adverse impacts on the water

[330] International Joint Commission, *The Annual Report 1977*, The International Joint Commission Canada-United States (Ottawa, ON; Washington, D.C., 1978), 1, 18.
[331] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 9.

quality and biological resources in Manitoba."[332] Further, the Commission determined that modifications to the GDU as envisaged would reduce but not eliminate the adverse impacts on Canada. The Commission therefore recommended that construction on the portion of the GDU affecting water flowing into Canada be halted.[333]

Reactions to the IJC's recommendations were swift and extremely diverse. To GDU advocates, the IJC's conclusions represented "a blow" to the completion of the project since construction was at a complete standstill.[334] To environmental scientists, the IJC's report proved the Bureau's environmental negligence and the need for stricter environmental guidelines surrounding the GDU. To the engineers at the Bureau, however, the IJC report was not reliable. The Bureau was quick to question the IJC's conclusions and highlighted the exorbitant costs associated with the IJC's recommendations arguing that these costs would lead to the termination of the project. To the State Department, the IJC's report was politically biased. American government officials were incensed with the wording in the report, that the GDU "would cause injury to health and property in Canada and would contravene Article IV of the BWT of 1909." To these government officials, the suggestion that the American Government knowingly disregarded and contravened the BWT was appalling.[335] Regardless of the responses the IJC received to its published report, the fate of the GDU, the debates amongst scientists, and the IJC itself were indelibly altered when the IJC entered the GDU debate to provide guidance for this complex conflict.

Voices that Influence? The Narratives of the IJC Public Consultations

[332] Ibid., 3.
[333] Ibid., 4.
[334] Carvell, "The North Dakota Garrison Diversion Project and International Environmental Law," 608.
[335] International Garrison Diversion Study Board and International Joint Commission, *International Garrison Diversion Study Board Appendix B: Water Quantity Committee Report-Information File to December 1976*, 1.

While the IGDSB set off to produce the required technical scientific reports, the IJC itself launched its campaign to mobilize and engage the interested public. The IJC held three initial public hearings in 1975: in Minot on November 18 and 19, in Grand Forks on November 19, and in Winnipeg on November 20. The IJC specified that these initial hearings were "to obtain opinions" from interested individuals, about the GDU and the IJC's directive, and to provide the IJC with "guidance in planning the investigation."[336] Once the IGDSB produced its unpublished report in December 1976 and following the public distribution of the report, the IJC held another five public hearings in 1977 including in Minot, North Dakota on March 8; in Souris, Manitoba on March 9; in Winnipeg, Manitoba on March 10 and 11; in Portage la Prairie, Manitoba on March 14; and in Grand Forks, North Dakota on March 15, 1977. The IJC outlined the scope and the limitations of its public hearings in the Minot, North Dakota meeting as two-fold: to hear from the public on the question raised in the reference to the IJC about how the GDU would affect Canadian waters and to receive any comments from the public about the IJC's directive to the Board for its final recommendations.[337]

The IJC had identified the powerful swell of public interest in environmental issues in the early 1970s and the increasing need to engage this increasingly active public into its investigative process. According to historian Daniel Macfarlane the IJC "wielded technocratic expertise" but was successful in framing its scientific information within its policy of applicability to the public.[338] The IJC therefore looked to develop a public engagement strategy that provided the public with "better opportunities to express its opinions on matters before the Commission"[339]

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[336] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 79.
[337] International Joint Commission, *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 7-8 (1975).
[338] Clamen and Macfarlane, "Introduction," 17.
[339] International Garrison Diversion Study Board and International Joint Committee, "Report," 219.

including public hearing education workshops, opening selected Board meetings to the public, the production and distribution of preliminary IGDSB reports to locals, eight public hearings, and the formation of special panels in the development of Board reports.[340]

The IJC had only first envisioned a public participation program in 1972, which meant that the IJC's public consultation process was still in its infancy in 1975 when the IJC sought to engage the public in its GDU investigation. A close examination of the IJC's public hearing transcripts and the IJC's public relations policy provide the basis for my analysis of the IJC's public participation program. Because I was unable to locate the verbatim transcripts of the 1977 public hearings, the verbatim testimonies from the 1975 public hearings provide the basis for this study.[341] Despite this evidentiary gap, given that the IGDSB final report produced in December 1976, prior to the March 1977 hearings, did not differ significantly from the IJC's final report submitted in 1977, the 1977 hearings failed to significantly impact or alter the IJC's overall narrative and recommendations in its final report.[342] The 1975 public hearings offer a rich window into how those whose lives and livelihoods would be most affected by the GDU viewed the project and their local environment. What can we learn from the IJC's public consultation process? Whose voices were recorded in the record and whose were absent? What do the narratives and diverse opinions teach us about the GDU, the IJC, and about the various types of knowledge offered by various stakeholders? How did the IJC evaluate the diversity of voices that participated in its hearings and what criteria did the IJC have for integrating public opinions into its decision-making process?

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[340] International Joint Commission, *The Annual Report 1977*, vi.
[341] The IJC heard from more than 90 witnesses at the 1977 public hearings of which approximately 23 were independent witnesses, 22 individuals represented local government agencies or departments, 11 represented miscellaneous organizations,[341] 10 represented university departments or research organizations,[341] eight represented activist groups,[341] and six represented water management organizations,[341] six individuals represented federal agencies. Of these witnesses, five were women and two represented an Indigenous organization.
[342] Makepeace, "The International Joint Commission: Determinants of Success," 67.

In a time when calls for public involvement in the GDU debate were increasing and when environmental activism was on the rise, the IJC's public consultations appeared to offer a new group of 'experts' the opportunity to engage in the dialogue. These lay witnesses did not necessarily have the scientific and academic training or credentials, as did the scientific experts, but offered instead a rich and extensive knowledge of the environment that was developed through their lived experiences. Witnesses included landowners who were relocated to make way for right of way passages, farmers whose land the McClusky canal divided, Indigenous communities forced to vacate riparian land, and communities located downstream from irrigation schemes that would receive irrigation runoff water. Having historically been excluded from the scientific discussions surrounding the GDU, these non-scientific actors have also been overlooked in the historical narrative surrounding the GDU. The 105 testimonies at the 1975 IJC hearings included thirty-one local government agencies or departments, twenty-one independent witnesses, sixteen university departments or research organizations,[343] fourteen environmental associations or activist groups,[344] eight water management organizations,[345] eight miscellaneous organizations,[346] and seven federal government agencies or departments. Of these 105 witnesses, twelve were women and one represented an Indigenous organization.

[343] The researchers represented the North Central Agriculture Experiment Station, North Dakota State University, University of North Dakota, The Institute of Ecology, Environment Canada, Manitoba Environmental Research Committee, Association of Manitoba Archeologists, Manitoba Environmental Council, University of Manitoba.
[344] Activist groups included the Dacotah Chapter Sierra Club, Friends of the Earth, National Audubon Society, United Family Farmers, Transcona Game & Fish Association, Manitoba Wildlife Federation, Souris Valley Flooded Farmers Association, Manitoba Naturalists Society, Prairie Environmental Defense League, United Nations Association in Canada, Mousse River Valley Landowners' Association, Northern Environmental Council, Committee to Save North Dakota, and Tri-County Park Board.
[345] Water management organizations included North Dakota Water Users Association, Dickey-Sargent Irrigation District, Upper Mississippi River Basin Committee, Upper Missouri Water Users Association, North Dakota State Water Commission, Souris River Water Commission.
[346] Miscellaneous organizations included Minot Chamber of Commerce, Basin Electric Power Cooperative, Minot Airforce Base, Verendrye Electric Cooperative, Minot Daily News, Central Power Electric Cooperative, Ojibway Tribal Council.

In her examination of the historical interplay between the assimilation of nature, culture, and economies, historian Liza Piper argued that the narratives of non-scientific voices provide historians with a window into how people viewed themselves in relation to their environment, to systems, and to spaces.[347] The IJC's public hearing records provide one such window and offer unique insights into the historical relationship between human and non-human nature. I hope to reintroduce these mostly silent, non-scientific voices, namely farmers, landowners, interested citizens, and members of Indigenous communities into the debate surrounding the GDU. The narratives of these individuals provide a valuable historical insight about how those most affected by the construction of a large-scale water management project perceived, understood, and experienced environmental changes that the introduction of technology caused. First, I look at the minority voices in the GDU debate who were given their first opportunity to share at the public hearings including the testimonies of women and Indigenous people. Second, I examine the three discourse themes that emerged from my review of the 105 testimonies in the 1975 hearings, including international neighborliness, David and Goliath imagery, and insiders versus outsiders. Third, I explore several questions that emerge from the narratives about the IJC purpose, vision, and goals for its public engagement strategy.

Minority Voices

Applying a gendered approach to the construction of female authority enables us to better understand the construction of male authority. Of the twelve women who testified, nine women were interested citizens from rural communities, three represented environmental activist organizations or associations, five were residents of North Dakota and seven lived in Manitoba. Eleven out of the twelve women who spoke, expressed concerns about the GDU and requested

[347] Piper, *The Industrial Transformation of Subarctic Canada*, 12.

construction on the project be stopped. Of the five women who were citizens of North Dakota, only two spoke in opposition to the GDU, and of the other three only one was fully in favour of the project.[348] Neither citizenship nor geographical location seemed to determine whether women spoke for or against the GDU, whereas men's loyalties in the GDU debate were closely aligned with geo-political factors. Men who spoke at the hearings, living in North Dakota, generally stood in support of the GDU, while the men from Manitoba primarily spoke out against it.

Where women's testimonies about the GDU were not rooted in geopolitical allegiances, they were rooted in knowledge that transcended geographical borders. Women's narratives were consistently grounded in their experiential or relational expertise as family caregivers, community activists, and environmental caretakers. Rather than speaking about the water quality or quantity impacts of the project on their country or their farm, women predominantly spoke about how the GDU affected their communities at large or how it impacted their families. Two young and eager students from Manitoba, Ms. Steidinger and Ms. Repa, participated in the hearing as part of a school project. These two youth left an impression on the commissioners as Chairman Cohen began by commending Steidinger and Repa for patiently waiting all afternoon to speak at the Winnipeg hearing. Despite their youth the two young women did not hold back their observations, but boldly implored the Commissioners to consider fully the human costs of the GDU on youth and on the next generation. Steidinger and Repa stated that "our main reason for being concerned is if the GDU were to go through is that we the youth of Manitoba will have to face these problems in future years. We and those older than us will have to dig deep in our wallets and bank accounts just to pay to have a drink of pure water . . . We hope our speech will

[348] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 148-50.

have some impact on you."[349] In much the same way, farmer, and Director of the Dickey-Sargent Irrigation District in the southern region of the project areas, Betty Daniels did not expound on the GDU's impacts on her own farming operations but focused instead on detailing for Commissioners the project's impacts on her community. For Daniels, community building was her life's purpose and the GDU represented a significant disruption to this goal. Daniels stated, "you may think it is strange for a woman to be so interested in an irrigation project, but I assure you that the women in North Dakota are very much interested in building better communities."[350]

Women tended to focus on detailing for the commission issues relating to their personal or to the community's health and well-being. Aldarese Klain, a farmer from Turtle Lake, North Dakota shared about the devastating effects the construction of the McClusky Canal had on local education opportunities, church attendance, school bus and mail service, and family farming operations.[351] Klain's town was situated along the banks of the McClusky canal between Audubon Lake and the Lonetree Reservoir, between three lakes that offered the community many different recreational opportunities. The construction of the McClusky Canal had, however, cut off the town's connection to two of the three lakes and necessitated the reduction of the aquifer levels in the Turtle Lake area causing many local, private wells to dry up.[352] Mrs. Klain appealed to Commissioners on behalf of her children and the next generation, highlighting their "feelings of insecurity" about becoming farmers in the future and about living next to the

[349] International Joint Commission, *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 66-67 (1975).
[350] International Joint Commission, *Transcript of Hearing: Garrison Diversion Project, Grand Forks, North Dakota, November 19, 1975 - P.M.*, 101 (1975).
[351] International Joint Commission, *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 138 (1975).
[352] Renée Wyman and John Badan, "The Garrison File: Profile of a Pork Barrel," *Reason* (January 1985).

canal.[353] Klain recounted with deep sadness a conversation she had had with her children telling them that if the Bureau ever "decided to widen the canal they would just condemn the rest of our land and take it."[354]

Not only did women focus on the relational or social impacts of the GDU, but the basis of their knowledge claims also differed significantly from that of their male counterparts. Women clearly avoided making knowledge claims about the environment or about farming practises, even though in the 1970s both they and their daughters would have participated in the daily rhythm of farming life alongside their husbands and sons. The testimonies of women who identified as farmers or as spouses of farmers, did not claim their farming expertise as the basis for their authority as did their male counterparts. Rather than founding her testimony on her extensive lived experience and knowledge of the land as a local rancher, as did so many of her male counterparts, farmer Mrs. Charles Hawley simply testified to the health impacts that she and members of her community had experienced because of the seepage from the McClusky Canal. Despite her wealth of experience on her family's farm, Mrs. Hawley's testimony exemplified a wider reluctance amongst female farmers to emphasize their knowledge of and contributions to the operation and success of the family farm.

Ms. Brynhild Haugland, resident of Ward County near Minot, North Dakota was the longest serving incumbent state legislator in the nation with fifty-two years as a Republican in the North Dakota House of Representatives, earning her the state's highest honor, the Theodore Roosevelt Roughrider Award in 1995.[355] In her retirement from political life, Haugland owned and operated a farm on her own. Ms. Haugland shared at the outset of her testimony that she was

[353] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 140.
[354] Ibid., 139.
[355] State of North Dakota, *Brynhild Haugland* (Office of the Governor, 2023). www.governor.nd.gov/theodore-roosevelt-rough-rider-award/brynhild-haugland.

at the hearings to speak as a citizen in favour of the GDU. Haugland avoided elaborating in any way on her work as a farmer or on how the GDU would impact her farm. Instead, she expounded on her previous role as a government representative as the basis for her testimony.[356] Aldarese Klain identified herself as a housewife, former teacher, and mother, but not as a farmer even though she and her husband owned an impressive wheat and cattle farm.[357]

This reticence to assert farming expertise may have been borne of the difficulties women faced in the post-war period. This was a time when the plight of men and boys, whose livelihoods had disappeared as family farms across the nation faced financial crisis, were receiving national attention. The focus was fixed on the men who anxiously faced the grim prospects of losing their jobs, homes, and farms. According to historian Michael Stewart Foley, Americans sat on their front porches, evaluating the ever-changing world and "they felt duped, swindled, and in the parlance of the time, 'screwed' . . . and most Americans did not take this lying down."[358] Americans across the nation had mobilized and began actively fighting against the powerful forces in government and in industry to defend and hold their jobs, farms, and homes.[359] Women's failure to root their testimonies in their expertise as farmers revealed a gendered cultural ideology that saw women as contributors to their the family farms, but not as experts of farming practices. Male farmers, on the other hand, consistently claimed an exclusive type of knowledge founded upon their experience as farmers. For women, claiming this knowledge of the land did not bolster, but would have hindered their claims to authority before the IJC.

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[356] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 37.
[357] Ibid., 138.
[358] Michael Stewart Foley, "'Everyone Was Pounding on Us': Front Porch Politics and the American Farm Crisis of the 1970s and 1980s," *Journal of Historical Sociology* 28, no. 1 (2015): 105.
[359] Ibid., 107.

Women's narratives also consistently displayed a base level of knowledge about the scientific dialogue surrounding the GDU but avoided any direct engagement with the scientific data itself. Manitoba farmer Joyce Glendinning explained briefly her understanding of the scientific debates surrounding the GDU, but quickly stated that she was there to speak as a representative of her community and to express the views of her relatives in the Souris Valley who would be directly affected by the GDU.[360] When women did reference the scientific debate, they typically referred only to one feature of the dispute to avoid engaging in the definitions of good and bad science or of the correct and incorrect applications of science. Manitoba residents Helle Cosby and Gloria Joshi referred in their testimonies to the debates over water quality but did not attempt to offer an analysis of the water quality data. Cosby and Joshi spoke unapologetically about how degraded water quality would impact human rights including the destruction of the socio-economic livelihoods of Canadian market gardeners, fishermen, and farmers.[361] The women also described their roles in circulating a province-wide petition against the GDU that alerted Manitobans to the degradation of Canadian waters resulting from GDU irrigation run-off. Joshi highlighted the diverse group of people who had signed the petition including teachers, librarians, psychologists, nurses, managers, professors, engineers, and school principals.[362] Using unemotional, yet definitive language, Joshi used statements such as "we believe," "we demand," "we protest," and "we implore you" to compel the Commission to action. Joshi ended her testimony by boldly requesting "we ask you to halt construction immediately and to indicate in your report that no runoff from this scheme be directed to Canadian waters, but that this scheme be modified in such a way that USA will benefit from all

[360] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 67.
[361] Ibid., 71, 206.
[362] Ibid., 207.

this clear, clean, and wonderful water that the U.S. Bureau of Reclamation is so anxious to dump in Canada."[363]

Betty Daniels, an Oakes, North Dakota resident and director of the Dickey-Sargent Irrigation District, advocated for the rights of the people in her community to access potential GDU. While Daniels referred to the water quality issues associated with the GDU including evaporation, seepage, and salinity rates in the local lakes, her testimony focused on the positive impacts she believed the project would have on her community. For Daniels, the GDU represented the "promise of opportunities" for her small, rural community.[364] Daniels focused her testimony on highlighting the plight of the young men in her community hoping to become irrigation farmers and demonstrating their faith in the GDU by drilling wells and purchasing irrigation systems to get a head start. Even though it would have been expected that Daniels would have highlighted her scientific authority as director of the local irrigation office, women like Daniels saw themselves as community members and civic advocates. They demonstrated their awareness of the scientific debates, but focused on their communal, relational knowledge as the basis of their authority.

Seeking to establish their legitimacy and authority with IJC Commissioners, women expressed their concerns before the IJC objectively without employing highly emotional language. Mrs. Charles Hawley, from Coleharbor, North Dakota whose cattle ranch was located two kilometers from the head gate of the McClusky Canal near Audubon Lake, suffered from several health issues since the McClusky Canal was opened. Hawley spoke of her health issues using measured and direct language. She detailed that her doctor at the Memorial Hospital in

[363] Ibid.
[364] *Transcript of Hearing: Garrison Diversion Project, Grand Forks, North Dakota, November 19, 1975 - P.M.*, 100.

Coleharbor and that doctors in Seattle had analyzed her bloodwork and connected her numerous health issues to the contamination of her water supply. Hawley remarked that the Bureau had been seen to dig test holes in the area but noted that they were not required by law in North Dakota to seal them. When Mrs. Hawley had taken a sample of her water to the lab in Bismarck, Coliform bacteria had been found in her samples, suggesting that her water supply had been contaminated by sewage.[365] Mrs. Hawley recounted that she had been forced to pay to have a cistern dug forty kilometers away from her home to fetch her drinking water since her well had been contaminated. Although Mrs. Hawley stated that her "severe symptoms and discomfort" had caused her life to be at a "standstill due to the water situation and my health condition," her testimony was marked by a measured tone as she identified her significant health issues. While Mrs. Hawley avoided the use of inflammatory language to communicate the extent of her personal suffering to the IJC Commissioners, she spoke openly about her desperation to have her water supply issues addressed.[366]

Hawley's neighbour, Mrs. Herbert Nathan who was also located four kilometers from the headgate of the McClusky Canal, spoke about the rising illness in her community that occurred once the Canal had been opened. Nathan spoke of how she and others in the community had made requests of the Bureau to address the seepage that was occurring from the local sewage lagoons to the local aquifer through the McClusky Canal but had not received any replies. Despite living in such proximity to the canal and describing difficult personal experiences, both Mrs. Hawley and Mrs. Nathan spoke dispassionately about the issues at hand while also speaking

[365] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 87.
[366] Ibid., 87-88.

candidly about the ways they believed the canal had become "injurious to plants and to humans."[367]

While many testimonies highlighted the failures of the Bureau, unlike their male counterparts, women avoided disparaging the Bureau in their statements, but reserved their criticisms for the project itself. Although Mrs. Klain spoke about the Bureau as having "treated its own people badly," her critical comments were directed at the project itself: "the GDU is like a man made tornado which has no respect for people or the land."[368] Male witnesses, on the other hand, displayed high levels of anger and frustration in their emotional testimonies as they spoke of their losses and disparaged the Bureau unapologetically. Mr. Klain, Aldaresa Klain's husband, angrily expressed his fury at having been told by Bureau representatives on several occasions that "we think we are right." Mr. Klain emotionally stated that "the people who farm the land now in the path of the construction are treated as the native American Indian was."[369] Klain ended his testimony stating that he needed to "cool off" from his anger and finished by thanking the Commission for the opportunity to "express my views."[370] Hal S. Davies, former publisher of the Minot Daily also spoke fiercely in his testimony about anyone who would oppose the GDU plans: "I cannot believe that this contingent of Johnnies-come-lately bent on a course of irresponsible slander of this project can withstand any serious fact-finding investigation."[371] Mr. Klain urged Commissioners to lay blame with the Bureau for the areas issues and stating that "they have lied to us farmers along the canal many times and they will lie to you too, I am convinced that they will. They are a self-perpetuating organization. They will do whatever they

[367] Ibid., 91.
[368] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 140.
[369] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 96.
[370] Ibid., 98.
[371] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 68.

can to get their way and to get - to keep their little pet project going."[372] Male testimonies were rife with emotion and passion, where women's narratives were much more measured in tone.

Three women out of the twelve who spoke at the hearings were spokeswomen or representatives of environmental or human rights activist groups and possessed scientific backgrounds.[373] These three women spoke with a level of scientific confidence, assuming the role of knowledge synthesis, differing significantly from the narratives of women who did not possess scientific qualifications. Male scientists' claims to expertise were founded in their ability to debate and present the minutia of the scientific data, while the female scientists presented themselves as interpreters of that science. Paula Ward was the first female scientist to present at the hearings and spoke against the GDU on behalf of Friends of the Earth. Ward was also a citizen of North Dakota and member of the North Dakota Citizens Advisory Committee to the Upper Missouri River Basin Commission. Ward effectively translated the unclear and often difficult to understand scientific evidence that the Bureau had presented in its Environmental Impact Statement (EIS) into unambiguous descriptions and accessible categories. Without maligning the Bureau, Ward simply presented four areas that she argued the Bureau had miscalculated the evidence and then steadily built her case by engaging reasonable counter data that effectively deconstructed the Bureau's calculations.[374] Ward demonstrated an ability to synthesize the existing scientific knowledge and to present her arguments with control and composure and as a result was able to effectively challenge the Bureau's credibility.

Clearly Ward's testimony was well received by the commissioners, as they took time at the end of her lengthy speech to thank her for her presentation and to commend her on being "an

[372] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 98.
[373] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 148-50.
[374] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 147.

impressive witness" whose "presentation is an excellent one."[375] Following Ward's presentation, four commissioners took several minutes to ask questions and to engage with her about her findings. Commissioner Ross stated that since no other witnesses had yet addressed the issue of the use of fish screens to control the ecological contamination of undesirable fish species and other organisms, he wanted to ask Ward her opinion on the matter: "you seem to be quite familiar with a lot of these problems, I just thought I would ask you that." When Ward indicated that she did have information on the fish screens but did not have it directly in front of her, Ross again asked if she could at least "summarize your remarks or give us an idea of what you think are the problems, because our Board is going to be studying this and if they know of your concerns and if there are some objections that you could voice, they might be able to address their attention to it."[376] Ward was then asked to submit the information that the commissioner had requested, in writing, to their secretary.

A thorough examination of the 1975 public hearings did not reveal any other instances when the IJC responded to speakers in such an enthusiastic manner to solicit their opinion on a separate matter. While the reasons for the commissioner's exceptional interest in Ward's opinion is not known, Ward's measured presentation of her evidence seemed to effectively persuade the commissioners of her expertise and authority. Women at the hearings would have been acutely aware of the ways in which feminists passionately expressed their concerns within the women's movement that swept the U.S. and Canada in the 1960s and 1970s. Where feminists were focused on the critique of patriarchy, and among other things, challenging the male dominated institutions of society, these women knew that testifying at the hearings, using a provocative approach that aggressively or passionately called on the IJC to act, would not be fruitful. As

[375] Ibid., 153-54.
[376] Ibid., 154-55.

guardians of the local communities and environment, women's pragmatic approach allowed them to avoid the stereotype of the 'hysterical' woman. In the case of Ward's testimony, the Commission was clearly impressed with her ability to synthesize the scientific data and to communicate it using measured speech and rational thought. There was also a kind of chivalry evident in the IJC commissioner's responses. They seemed to be particularly courteous to women who spoke and were perhaps surprised and relieved that women did not behave in any distressing ways that might be perceived as overly emotional or even 'hysterical.'

Where women's authority was based on relational knowledge, the sole Indigenous witness at the 1975 hearing was focused on emphasizing Indigenous rights and their legal authority over the land. Jesse Rieber was an American Indigenous man whose conscientious objections to the Vietnam War brought him to live in Canada where he studied and consulted and advocated for the Manitoba Indian Brotherhood and was a researcher for the Dakota Ojibway Tribal Council of Manitoba. Rieber spoke at both the 1975 and 1977 hearings and was joined at the 1977 hearing by two other Indigenous voices, Miss Jocelyn Bruyere and Tony Walker representing the Manitoba Indian Brotherhood. Besides these three Indigenous voices, the IJC and the Bureau had not held any specific consultations with Indigenous communities to receive testimonies about the impacts of the GDU on their livelihoods and communities.

Rieber did not address the scientific aspects of the GDU but chose instead to use the IJC's public forum to highlight the struggles of his Indigenous community in an international setting where their objections to the GDU would be noted in an official record. Since only the transcripts of the 1975 hearing were available for exploration, the entire comments of Bruyere and Walker are not known, nor are any additional concerns that Rieber shared in 1977. The 1975 transcripts, however, reveal that Rieber argued that the GDU project would not only cause

irreparable damage to Indigenous people, but the project was being carried out in direct violation of Indigenous rights and treaties. Rieber stated that "we were appalled at the fact that our rights, the rights of native peoples of North Dakota and Manitoba, have never even been discussed let alone considered in any of the materials written on this project to date" and therefore requested "an immediate moratorium" on the GDU.[377] Rieber repeated several times that the Bureau, provincial, and federal governments in both Canada and the U.S. had ignored and violated the water and land rights of Indigenous communities and that "we will not let the U.S. Government or the state of North Dakota buy what they term progress at the expense of the future of our peoples."[378] For Rieber, the IJC public hearings permitted the creation of a documented, legal complaint against the GDU and of Indigenous public opposition to the project. Although Commissioners Cohen, Smith, and Henry together agreed that the subject of Indigenous rights had not been brought before the IJC at any point, and responded to Rieber politely, the IJC failed to correct this omission in its Final Report and maintained the status quo instead.[379]

Most presenters at the hearings, were neither indigenous nor female. Unlike the female presenters, the men seemed to divide their perspective along geopolitical lines with the American speakers supporting the GDU and Canadians remaining critical of it. Beyond this obvious division, though, an analysis of the discourses used by presenters reveals three themes which reflected the values, assumptions, and beliefs of the interested public.

'Why Don't You Trust Your Neighbour?'

The first theme that emerges in the public hearing testimonies centers on the narratives of trust, relationship, and neighbourliness. Interested citizens who spoke at the public hearings,

[377] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 61.
[378] Ibid., 64.
[379] Ibid., 65.

interpreted the GDU debate within the context of a binational relationship between Canada and the U.S. The function and value of this trusted and harmonious relationship between the two countries was employed both to justify the ongoing construction of the GDU and to substantiate the termination of the project. American witnesses questioned Canadian opposition to the construction of the GDU by emphasizing that neighbourly relationships were congenial, neighbourly, and mutually beneficial. Canadian witnesses, on the other hand, questioned their relationship with Americans, given that Americans seemed to support the construction of a project that would knowingly impact their downstream Canadian neighbours. American proponents of the GDU argued that if they had determined that their actions in constructing the GDU would be harmless to their Canadian neighbours, then Canadians needed to trust their assessments. Canadian opponents of the GDU, however, argued that since Americans had not demonstrated neighbourly consideration and trust in other water management conflicts, that they could not be trusted in their assertions about the GDU. For these Canadians, historical American self-interest, therefore, justified its distrust in American actions and therefore justified the termination of the GDU project in the present.

American witnesses employed deeply emotional language to draw attention to and to reinforce the mutual respect, trust, and goodwill that existed between the two nations. One of the first witnesses at the Minot hearing in 1975, North Dakota State representative and Minot resident Garry Bye, emphasized repeatedly that he was a "native North Dakotan" and therefore could speak authoritatively about the inherent goodness of the North Dakotan people in upholding their long-time friendship with their Canadian neighbours. Bye stated that "it is my belief" that North Dakotans "do not wish to impose undue hardships on our Canadian friends. Bye linked "neighborliness and friendship" to the "responsibilities" associated with that

relationship including that "it is my hope that the Canadian people will respond in kind and not take any actions that would deny the completion of the GDU and its many benefits to the people of our state."[380] Ward County Commissioner C.W. Baker also emphasized that North Dakotans and Canadians have "lived as friendly neighbors for so many years with a consistent mutual regard for the ambitions and aspirations of each other, that it seems certain that temporary or minor difficulties of the future can be adjusted satisfactorily, just as they have in the past."[381] Former North Dakota Governor, William L. Guy, cited the construction of the International Peace Gardens as an example of international, cross boundary cooperation and with time "the same international mutual respect and assistance will grow in water resource management."[382] U.S. Senator and Minot resident Rolland Redlin spoke about his own experience of living on a farm a mere eighteen miles from the border with Canada and of crossing the border regularly into Canada for his family vacations. Redlin stated "We believe we are developing a project on a sound basis with full recognition of the fact that we desire to continue to be good neighbors to our Canadian friends."[383] Redlin used his own personal experience to emphasize the need for mutual respect and trust to deepen between Americans and Canadians around environmental and border issues.

The narratives that heralded the relationship between Americans and Canadians, however, also revealed underlying anger and a muted resentment towards the other. While at first glance, national identities only minimally informed the narratives of those at the public hearings, on further inspection, the discourse surrounding the GDU was significantly influenced by people's commitments to their national identities. One witness, farmer Kenneth Emberley, exemplified

[380] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 24.
[381] Ibid., 49.
[382] Ibid., 54.
[383] Ibid., 29.

the submerged animosity and the distrust that existed beneath American and Canadian pleasantries. Emberley emphatically stated that "we have enough idiot projects to fight without having to watch for our friendly neighbor waiting to stab us in the back with a pail of dirty water."[384]

Several witnesses spoke of the relational "two-way street" that existed between the two countries regarding water resource development projects. Witnesses even hinted at the power that Americans had in vetoing other or future Canadian projects if Canadians continued to question the environmental integrity and intentions of their American neighbours. Chester Reiten, Mayor of the City of Minot, sited the construction of a thermal power plant in Canada on the upper watershed of the Souris River, as an example of how Americans had refrained from questioning the environmental integrity of the Canadian project. Reiten identified that in the past,

> North Dakotans had not complained about the declining quality of Souris River water reaching Minot, realizing that our good neighbors to the north in both Saskatchewan and North Dakota needed to utilize the water for necessities and growth. But now that our own needs are so seriously challenged, we must stand up and insist that this vital study be a two-way venture.[385]

Reiten added that Americans sought to "protect our Canadian neighbors from any possible threat to their quality of environment" and suggested strongly that this good intention should be unequivocally reciprocated in the case of the GDU. County Commissioner C.W. Baker concurred with Reiten that Canadian's upstream activity from Ward County along the Saskatchewan River, had contributed to the downgrading of the river's quality and drainage projects located downstream in North Dakota had interrupted the river's natural flow. Baker argued that "we have not complained" since these things happened as a result of upstream communities "trying to resolve their problems, just as we are trying to resolve some of ours

[384] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 96.
[385] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 39.

through Garrison Diversion."[386] Governor Arthur Link further argued that "the interests of the people on both sides of an international border could be developed simultaneously" if both sides were willing to extend grace to one another.[387] North Dakota State Engineer Vernon Fahy added that "we have not challenged Canada's opportunity to develop" the Great Plains area in Canada, suggesting that those projects as being "a probable violation of the BWT."[388] Fahy went on to state that "we are aware of the activities that are taking place up there, we respect their right to develop and to plan" and Fahy emphasized that Americans hoped that Canadians would "respect our right to plan" the GDU.[389] Witnesses highlighted the mutual capacity for both countries to negatively impact one another, but appealed to the goodness and the trust that existed between the two countries to elicit support for the GDU.

American witnesses hoping to convince the IJC and Canadians of the need to support the Bureau's GDU plans, were founded upon the value of relational credit and reciprocity, thereby prioritizing the power of relationship over the value of scientific inquiry. Former Governor William Guy expressed his concern over the decline in the water quality of the Souris River by emphasizing not the scientific debate, but the relational context surrounding the conflict. Guy argued that while North Dakotans had accepted a "reasonable change" in the quality and quantity of water in the Souris River when it passed from Canadian cities into American areas, Americans should also be able to reasonably affect Canadian water resources for consumptive reasons.[390] Minot Mayor Chester Reitman appealed to the IJC that the city's efforts to improve the water quality ought to "offset possible debits your estimates may charge to Garrison Diversion."[391]

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[386] Ibid., 49.
[387] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 22.
[388] Ibid., 34.
[389] Ibid.
[390] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 67.
[391] Ibid., 42.

Reitman further stated that his suggestion of permitting the offsetting of the GDU's adverse effects with positive efforts that the U.S. was making on account of their "great regard and admiration for our Canadian neighbours" with the intention of building "bridges to them, not fences."[392] According to American witnesses, unwavering trust in one another as nation state neighbours, rather than the presence or absence of good science or bad science, should determine the IJC's recommendations on the GDU.

David & Goliath

The second theme that emerged from the transcript narratives centered around ordinary people's reliance on courage, faith, and overcoming the impossible. Like the biblical account of a shepherd boy named David, who fought against and conquered the giant Goliath, citizens at the public hearings depicted themselves in their narratives as the powerless David, facing the all-powerful Goliath, in the GDU conflict. Farmers, local people, and ordinary citizens spoke of the government and academic scientists who were highly educated, widely informed, extremely powerful, and deeply influential as Goliath. In contrast, the local witnesses portrayed themselves as the 'Davids,' of the narrative, who were far less educated, possessed limited information, were politically and fiscally powerless, and held little influence in the GDU debate. Like David, however, who killed Goliath with a slingshot and one stone, these individuals believed that their small but powerful stone was their experiential knowledge and understanding of the environment being debated in the GDU conflict.

Local people consistently began their testimonies pointing to their ignorance of the scientific information surrounding the GDU and highlighting feelings of powerlessness in the

[392] Ibid.

GDU debate. Canadian Kenneth Emberley introduced himself as not possessing the same proficiency of the experts but recognizing the value of his testimony: "some of us making presentations are not professionals and you must not expect the same amount of excellence, but some of our ideas may be of value."[393] American Albert Klain, who along with his wife owned a 2,500 acre wheat and cattle farm in Turtle Lake, North Dakota began his statement with an apology for not having written out his statement for the hearing since "we were under the impression that this would be technical and scientific and being farmers, we figured that there was no use for us to come to try and bring any information to you."[394] Where men typically began their testimonies highlighting their lack of scientific knowledge and technical expertise, as demonstrated earlier, women with scientific knowledge tended to demonstrate a proficiency around the scientific information to bolster their testimonies and women without scientific knowledge focused on the relational implications of the GDU.

Having begun their testimonies by emphasizing their unpolished, simple perspectives, non-expert witnesses consistently transitioned to sharing their detailed understanding of the local environment as a way of reminding the IJC of the relevance and value of experiential knowledge in the GDU debate. Mr. Thompson, a member of the Transcona Game and Fish Association of Manitoba shared that he felt like "very small peanuts after listening to all the brass. . . I feel like I am just like the bullet at the far end of the barrel."[395] Instead of disqualifying themselves from the GDU process on account of their lack of resources and scientific knowledge when compared to the scientific Goliaths, these men strategically highlighted their insignificant and limited scientific knowledge while emphasizing their extensive local knowledge of the land. U.S.

[393] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 67.
[394] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 94.
[395] *Transcript of Hearing: Garrison Diversion Project, Grand Forks, North Dakota, November 19, 1975 - P.M.*, 68.

Senator Rolland Redlin stated in his testimony that beyond his role as a senator he was involved in banking and in farming and although he was "not a scientist who can speak with authority" on the questions pertaining to pesticides, nutrients, and other scientific aspects of the dispute, he was extensively familiar with and experienced in sprinkler irrigation.[396] Norman Moon, a farmer from Granville, North Dakota located forty kilometers east of Minot and within the GDU's proposed irrigable land, began his statement by highlighting that he did not have a "really prepared and organized report, I just wish to make a few remarks pertaining to my observations as a farmer."[397] Moon shared that he had gone door to door in his community asking famers if they had irrigable land and how they felt about receiving irrigation water from the GDU. Moon had received thirty-seven statements from his fellow farmers and found ninety percent did not support the GDU as "we are scared to death to finance this kind of operation."[398] Moon sought to expose several practical issues associated with the GDU that farmers faced including securing financing, managing weather patterns such as unexpected rainfall in the irrigation process, and product marketing issues, rather than debating the scientific gaps of the GDU. Moon ended his talk by highlighting that the Bureau had contradicted itself in two reports saying in one report that the project could not be built safely, while the second report said that it could be built safely. Moon asked the IJC "which report are we to believe? The surest guess is to not believe either."[399] Moon's testimony began with statements highlighting his insecurities as a lay witness in comparison to the elite experts who had also testified but ended with definitive and convincing statements urging the IJC to question the Bureau and its plans based solely on his experiential knowledge as a farmer.

[396] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 28.
[397] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 71.
[398] Ibid., 73.
[399] Ibid., 75.

Although the Bureau had produced a significant amount of information on the GDU, only a small number of its scientific reports had been made publicly available. Those that were available required that readers be familiar with the Bureau's use of technical terminology and scientific methodologies and concepts. Counsellor Clem Busby, from the Town of Souris, MB, began his testimony by emphasizing his ignorance despite his political appointment as town counsellor:

> We don't possess a great deal of technical knowledge, I have none myself on these particular points. We don't actually have the resources to interpret the great flow of paper which is available from all these sources. We are not a large town, and we just have to depend on our own common sense and perhaps a little native cunning to get something out of this great flow of paper and verbiage.[400]

Kenneth Emberley also argued that citizens had the right to know when rivers in their communities were going to be altered and had the right to information in a report "that ordinary humans can read and comprehend."[401]

Given the barriers that had existed throughout the GDU debate for interested citizens to access the scientific data about the GDU, member of the Manitoba Legislative Assembly Lloyd Axworthy had conducted a workshop in Manitoba in 1974 to educate interested citizens. It is noteworthy that Axworthy, a distinguished Canadian politician and Ph.D., sought to bridge the historical knowledge gap that had existed between ordinary citizens and the scientific discourse surrounding the GDU. According to Axworthy the experts at government agencies "can pick and choose what they want to tell about costs, and results of projects that have an environmental impact."[402] Outside of specific groups that could equip themselves with the skills and the knowledge to read and digest the technical scientific reports, interested citizens remained

[400] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 57.
[401] Ibid., 95.
[402] Axworthy, *Notes for an Address: Public Participation Workshop*, 13.

relatively uninformed and under-equipped to speak into the scientific components of the GDU debate. According to Axworthy decision makers sought to "limit the orbit of involvement" of citizens who did not possess the technical knowledge and of environmental advocacy groups who were considered "troublesome" who wanted to "busybody their way into issues." Axworthy argued that advocacy groups, and not citizens, possessed the necessary technical knowledge and skills to represent their cause and to effectively make their case.[403]

In addition to the knowledge deficits that locals emphasized, witnesses also underscored the unequal power dynamics that existed in the GDU debate between locals and large land developers, scientists, the Bureau, and the government. Emberley emphatically stated that "we now feel like the Sioux the week before the great slaughter removed them as an obstacle. You want our gas, our oil, our water, our nickel. Now, you want to dump your sewage in our backyard and give us $5 a month for the inconvenience."[404] Emberley appealed to the IJC for help in establishing "some real democratic control over these multimillion-dollar developers in and out of the government."[405] The struggle for Canadians, according to Emberley, was one of "life and death to retain our way of life both culturally and socially and retain some democratic control over it."[406]

Several local witnesses spoke of the need, like David's, to act as nature's representative, against the Goliaths at the Bureau. Carberry, Manitoba farmer Ralph Oliver painted a vivid picture for the Commission of the rhythms of community life including his summer canoeing trip through pastures and hayfields along the Souris River. Oliver indicated that he had not come to the hearing to represent "any frustrated golfers nor famers who had to sell their cattle because

[403] Ibid., 11.
[404] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 92-93.
[405] Ibid., 97.
[406] Ibid., 86-87.

they had neither summer pasture nor winter feed" rather Oliver came to give voice to non-human nature that had heretofore remained voiceless in the GDU debate:

> I wanted to speak for the blue herons that live along the shores of the Assiniboine River, carefully picking their way through the shallows in search of food; for the giant elm trees that grow close to the bank, close to the moisture they need to grow to those incredible heights; for the turtles that sun themselves sleepily along the banks, dropping noisily into the water as you approach; and for the children who swim at Spruce Woods Provincial Park. Who will represent their interests if the food of the blue heron is accidently destroyed, if the water rises and suffocates the roots of the elms, or if the water is polluted and those children can no longer swim there?[407]

Oliver pointed to the purpose of the Commission, to analyze if the proposed GDU would cause "injury to health or property" in Canada and questioned whether this parameter pertained to non-human nature as well as to humans. Oliver emphatically stated that if the phrase "injury to health or property" also extended to plants and animals, "then it seems you will be compelled to recognize contravention of the treaty."[408] Professor of public policy Brian Katz stated at the hearing that it was not his intention to present more scientific evidence as that had already been done. Instead, he expressed his hope that the Commission itself would exercise its "mandate as an environmental guardian" and to be "the savior of the transboundary environment." Katz urged the Commission that:

> Sixty-five years ago the Commission was simply a creature of the Governments of Canada and the U.S. and its constituency was those governments. The average citizen knew nothing of the Commission and probably cared less. Today the IJC is more highly visible and has developed a new constituency which it must serve – or lose. That constituency is the citizenry of both countries – not simply their national governments.[409]

Katz encouraged the Commissioners to remember their responsibility to represent the powerless citizens who, like David, faced a formidable opposition of Goliath in the form of governments,

[407] Ibid., 99-101.
[408] Ibid., 101.
[409] Ibid., 199.

scientists, and experts that seemed to hold the power. Katz cleverly reminded the IJC of its dependency upon the citizenry base for its survival and strength.

Even GDU proponents reinforced the widespread perspective that the land and its citizens needed protection from the Goliaths of the Bureau, the government, and big science. Gene Charron, a conservationist, speaking on behalf of the GDU, highlighted his concern that the GDU was merely a "smoke screen for the real culprits" that included the large pulp and paper mills and other big business' as well as the government who have "completely ruined" rivers only to place the blame on the GDU.[410] Witness Ralph Baker challenged the IJC directly when he asked the commissioners: "Where are the citizen participants, either Canadian or U.S, male or female or native persons on the task force make-up, the study group make up?" Chairman Cohen replied that the subject matter of the reference required the need for "certain scientific and engineering skills . . . and quite frankly the problems of choosing by way of a self-imposed system to satisfy other values in society did not seem to us in the process of selection to be relevant at this moment." Baker followed up this response with another hard-hitting questions about the power imbalance on the IJC: "Could I ask if the people who make up this task force are all government employees?" With an air of annoyance in Chairman Cohen's voice, he responded that indeed all the members of the Board were from various levels of government in Canada and the U.S. With a dramatic boldness, Baker confidently replied without hesitation, "Could I suggest to you then that there are citizen persons who are equally capable and technically trained to sit on a board of this kind too."[411] Despite standing before a panel of government representatives, these citizens were confident in the one stone they possessed in the war against Goliath: their practical, lived experience on the land and with the environment. The ordinary,

[410] Ibid., 216.
[411] Ibid., 86.

non-expert men and women who spoke on behalf of their communities demonstrated that they did not have an ulterior motive for boldly engaging in the debate with these high modernist experts. This demonstration of courage that citizens displayed within the context of significant power imbalances was noteworthy.

Historians Tina Loo and Meg Stanley analyzed the role of the development of 'high modernist' knowledge. Loo and Stanley examined the dam-building work of experts in British Columbia between the 1960s and 1980s and argued that the agents of high modernity such as engineers, geologists, and hydrologists engaged with the local space as they mapped, surveyed, and constructed mega-water projects. This interaction of the agents of high modernity from outside the local community with the local non-human nature generated a new type of hybrid knowledge called "high modernist local knowledge." According to Loo and Stanley traditional knowledge and scientific knowledge of the environment cannot be fully separated and polarized into distinct categories. Instead, agents of modernity made the local "environments legible and constituted them as sites of development both imaginatively and literally" and were not distinct from the creation of local perceptions of the environment. Loo and Stanley's framework does seem to apply to those North Dakotans who testified at the IJC in support of the GDU. For them, the Bureau's production of this high modernist local knowledge resulted in, or proposed, social and environmental changes that did or would not simply destroy locales but create new ones. But for other participants in IJC hearings including citizens, farmers, and users of the land, 'high modernist' knowledge was never accepted. Instead, locals sought to define themselves as David fighting against Goliath and to distinguish their 'insider,' experiential knowledge from the 'outsider' knowledge that the high modernist elites at the Bureau and the IJC applied to the land.

Insiders Versus Outsiders

The third discourse theme evident in the public hearing testimony was the narrative of 'insiders' and 'outsiders.' Interested citizens, locals, and farmers emphasized their 'insider,' intimate, first-hand, and lived, observed, and perceived experience of the rivers and of the land in question. They also actively disparaged the disconnected, theoretical, and distant knowledge that 'outsiders' including scientists, the Bureau, government officials possessed. Local voices emphasized the value of experiential knowledge as being equal to, and at times even superior to, the scientific expertise of the engineers and the political swagger of government officials. Albert Klain's 2,500-acre farm had been divided by the fifty-foot-wide canal that had begun to leak onto his farm. One of Klain's pastures was completely submerged on account of the leaky canal that directly dissected his property.[412] As an experienced local farmer Klain criticized the Bureau for its lack of knowledge of the local context and landscape. He explained that his property had been flooded by the opening of the McClusky Canal but when he applied for flood relief, the Bureau told him that his land was not eligible since it was not cropland, but swamp land. Klain told the Commission that he had been farming that land that the Bureau had deemed swamp land since 1952 and asked how one might farm swamp land. Klain angrily remarked that it "burned me up that they would do such a thing, to tell me I don't know what my farm is like."[413]

'Insider' statements were also characterized by sense of duty to speak on behalf of or to defend the land, the wildlife, the environment, and the next generation against the destructive visions of 'outsiders.' Unlike the cold and factual testimonies of politicians and scientists, the statements of local citizens were emotionally expressive and highly descriptive. Instead of figures, charts, or numbers these testimonies were meant to emotionally capture the hearts of their listeners rather than merely their intellectual understanding of the land. Speaking in support

[412] Wyman and Badan, "The Garrison File: Profile of a Pork Barrel."
[413] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 97.

of the GDU, Chairman of the Citizens Advisory Committee to the Upper Mississippi River Basin Committee and farmer Gordon Berg began his testimony with a detailed description of the difficulty his parents had homesteading in the Devil's Lake, North Dakota region at the turn of the century due to the extremely dry conditions. Over half of his testimony was spent recalling his personal experience of significant historical seasons when droughts and great floods had swept through the region. Having lived along the river for his whole life, Berg emphasized "we know what it is to be dry and what it is to be wet."[414] Town of Souris Counselor Clem Busby acknowledged that he did not possess a great deal of technical knowledge about the Souris River, but he emphasized the familiarity he had gained living near the river. Busby described his family home that was situated a few hundred meters from the river's edge where he and his family had come to know the river. For Busby this meant that he knew instinctively that the water quality of the river was abysmal and therefore never "had nerve enough to take a swim."[415] Busby's knowledge of a highly polluted river came not through scientific discovery, but through his lived experience along the river.[416] Busby used this knowledge to confidently advocate before the Commission for an increased water supply during dry times, while also criticizing any projects that produced any further pollution of the river.[417]

Albert Klain began his testimony by holding up and then describing two pictures that he had been carrying of the Bureau's work digging the McClusky Canal. He used these pictures to describe the Bureau's complete disregard for the people who farmed in the project's path and the agency's uninhibited destruction of the land. In a dramatic statement Klain urged the

[414] *Transcript of Hearing: Garrison Diversion Project, Grand Forks, North Dakota, November 19, 1975 - P.M.*, 136.
[415] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 57.
[416] Ibid.
[417] Ibid., 59.

Commissioners to consider the long-term effects of the GDU and to place human rights and dignity ahead of development. He stated that "life is like walking through new fallen snow, every step we take shows, it will show for the next generation. By continuing the GDU as proposed you will be bonding our children and possibly our children's children."[418] Farmer Monroe Raugust boldly told Commission members that they needed to "walk in the moccasins of those people where the project has already progressed," so that their experiences could be considered in the Commission's decision rather than simply listening "to promotioners, eloquent speakers that you probably heard tonight."[419] Raugust went on to describe the "heartache the people have suffered" due to land being taken out of production, power, transportation, and communication lines disrupted, aquifers bled out, school districts and bus routes partitioned.[420] It was evident that local witnesses perceived themselves as the 'insiders' whose proximity to and practical, lived experience with the land and water in question distinguished them from the 'outsiders' and privileged them as the true keepers of the local non-human environment.

Public Hearings: Public Consultation Process or Public Relations Endeavour?

Having identified several narrative themes from the testimonies of citizens at the public consultations, we turn to the IJC's administration of its public consultation process to gain a deeper understanding of the Commission's public engagement strategy and purpose. The IJC outlined in its directive to the IGDSB that it intended to engage interested citizens in its investigative process. Although the foundation for this objective of public participation was set out in 1909 in the BWT, the IJC did not fully begin to implement consultations with the public

[418] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 96.
[419] Ibid., 114.
[420] Ibid., 112.

until the second half of the twentieth century. The BWT stipulated in Article XII: "all parties interested therein shall be given convenient opportunity to be heard."[421]

In the case of the IJC's GDU investigations, the IJC demonstrated a solid commitment to its intentions to engage the public through its substantial financial and personnel investments required to host eight public hearings in different locations across North Dakota and Manitoba. Despite its clearly defined vision for soliciting public input, however, there are clues in the IJC's methodology, in its communications, and in its policies that its public engagement strategy served a different purpose from simply the intention to hear from ordinary citizens about the GDU. If the IJC was truly committed to integrating public feedback into its final recommendations, then its final report and the conclusions would have reflected this value. While the IJC consulted the public in its hearings, the results of the scientific inquiries that the IGDSB conducted filled the pages of the IJC's final report, rather than the concerns of interested citizens as expressed at the public hearings.

The increasing exposure to media coverage of the effects of pollution in the post war period contributed to growing concerns of environmental issues amongst Canadians and Americans. As a result, citizens became increasingly engaged in and responsive to environmental conflicts and to resource development projects such as the GDU. In the 1977 Annual Report the IJC stated that this increased public awareness of and engagement in environmental issues meant that its work had "come more and more under public scrutiny."[422] Citizens had become increasingly cynical and distrustful that their governments and decision-makers would act on their behalf.[423] Historians Daniel Macfarlane and Murry Clamen identified that as public distrust

[421] Article xii of the Boundary Water Treaty
[422] International Joint Commission, *The Annual Report 1977*, vi.
[423] Mimi Larsen Becker, "The International Joint Commission and Public Participation: Past Experiences, Present Challenges, Future Tasks," *Natural Resources Journal* 33, no. 2 (1993): 239.

of governments and of government intervention grew in the postwar period, gaining and retaining this public trust was of paramount importance for the organizations developing and implementing public policy. This goal of acquiring and preserving the public's trust, therefore, became a primary objective of the IJC in the postwar period.[424]

The successful acceptance and implementation of the IJC's recommendations in the second half of the twentieth century, would depend upon effective communication with and inclusion of the public in the Commission's methodological processes and policy decisions.[425] In September 1972 the IJC introduced a formal public relations policy as part of its directive in the Great Lakes Water Quality Agreement. As part of this process, the IJC created a Public Relations Policy to respond to the mounting public concerns over environmental matters that had significantly increased in the preceding decade. The Policy indicated that the IJC recognized that the "effective discharge of its duties requires public acceptance of the Commission's role and public confidence in the fairness of the Commission's procedures."[426] It also stated that the purpose of the IJC's public engagement strategy was to ensure that "the Commission's established credibility and influence must be maintained and hopefully increased."[427] Historian Murray Clamen demonstrated that the IJC's willingness to engage the public in its investigative process, revealed its institutional flexibility to adapt to significant societal changes.[428]

The IJC was not the only organization in the 1970s focused on increasing its public profile in the face of heavy opposition from environmentalists and activists. Even the Environmental

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[424] Clamen and Macfarlane, "Introduction," 8.
[425] Public participation in IJC decisions was guaranteed through the 1909 Boundary Water's Treaty in Article XII, which states that "all parties interested therein shall be given convenient opportunity to be heard . . . " The Rules of Procedure further clarify and define Interested parties' rights to information and access to Commission decision making. Becker, "The International Joint Commission and Public Participation: Past Experiences, Present Challenges, Future Tasks," 239.
[426] International Garrison Diversion Study Board and International Joint Committee, "Report," 221.
[427] Ibid., 219.
[428] Clamen, "The IJC and Transboundary Water Disputes: Past, Present, and Future," 70-71.

Protection Agency, that was a government agency with judicial powers, instituted a public relations policy in the early 1970s after recognizing its need for public acceptance to ensure that its decisions and rulings would be embraced and integrated. In a memo, Director of the Office of Public Affairs, Frank M. Corrado, shared the agency's "Cookbook" on public participation programs with his Project Officers and State Environmental Public Affairs stating that he hoped the creation of this policy document would create "a climate of acceptance within the community" of the agency's work.[429]

Unlike government agencies such as the Environmental Protection Agency, however, the IJC did not have the judicial powers or authority to enforce its recommendations. Given the Commission's mixed historical results and with the swelling popular environmentalist movement, the IJC recognized that its very existence and its effectiveness as a quasi-judicial agency depended on its ability to sell its authority to politicians, scientists, activists, and to the wider citizenry in both countries. The IJC depended entirely on public confidence and support to ensure public buy-in and the adoption of its recommendations at every level. In the hopes of increasing public trust in its decisions, the IJC opened a portion of the IGDSB Board meetings to the public, issued their unpublished reports to solicit feedback before publishing a final report, and held public consultations for interested parties to seek public acceptance, approval, and trust. Historians Murray Clamen and Daniel Macfarlane questioned whether the IJC was sustained in the postwar period by "a propaganda campaign aimed at bolstering the Commission's image, in which the IJC gradually acquired attributes and power it never really possessed?"[430]

[429] Frank M. Corrado, Cookbook on 208 Public Participation Programs, 1975, 208 Project Officers and State Environmental Public Affairs Officers Environmental Protection Agency Region V 208 Agencies, www.nepis.epa.gov.
[430] Clamen and Macfarlane, "Introduction," 15.

The IJC applied this public relations policy in 1975 to its investigation of the GDU stating in various public forums several times that it hoped the policy would facilitate the distribution of information surrounding the GDU to interested citizens, to keep the public informed of its work, to facilitate public participation in the proceedings, and to inform the public of the Commission's capacities and limitations.[431] The IJC reminded the IGDSB's five technical boards in its directive on the GDU that the objective of the IGDSB's public interfacing operation was for the "purpose of improving the Commission's position with respect to the public's knowledge of and trust in the Commission's work."[432] This goal was confirmed again in the IJC's final report where it stated that its purpose for the public hearings was to "provide convenient opportunity for all those interested in the potential transboundary effects of the GDU on Manitoba to present their views."[433]

The IJC was also clear in its communication of its commitment to the public at its first public hearing in Minot: "the purpose of today's hearing is two-fold: First, to receive testimony relating to the questions raised in the reference, that is what will be the effect of the GDU on Canadian waters resulting from return flows to the Souris and Red Rivers. . . Second, to receive any comments you might have concerning our directive to the Board."[434] The IJC guaranteed the public in attendance that "the statements received at this hearing and those submitted at a later date will assist our Board in understanding the concerns of the people who might be affected by the GDU and will help the Board in preparing their report to the commission."[435] Commission chairman again assured his captive audience at the 1975 Grand Forks hearing that the Board

[431] International Garrison Diversion Study Board and International Joint Committee, "Report," 221.
[432] Ibid., 219.
[433] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 79.
[434] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 7-8.
[435] Ibid., 8.

members were there "to hear your views" and assured the public in attendance that "your statements, both oral and written, will assist the Board in carrying out its technical investigation."[436] These repeated assurances to the public of its commitment to the public consultation process in its public relations policy, its published reports, and in statements made at the public hearings suggested that the IJC's final recommendations would be informed by the public's contributions. How did the IJC incorporate the public's input on the GDU that it received at the hearings?

Logistics Matter: The IJC's Administration of the Public Hearings

The IJC's public hearings throughout 1975 and 1977 were held in eight different locations in Canada and in the U.S. and over 200 individuals provided testimony at these hearings. All twelve board members and Commission administrative staff travelled to each of these different locations to attend the multi-day public consultations. It appeared that that the IJC was truly committed to the public consultation process by its willingness to arrange, host, and execute these public hearings in a variety of rural and urban locations. The complex administration of these hearings included the coordination of a dozen IJC Commissioner's schedules, the arrangement of the facilities and other travel logistics for fifteen to twenty individuals, the need for sweeping advertising campaigns across North Dakota and Manitoba inviting public contributions, and the creation of schedules for interested individuals for each of the hearings. Despite the strict and tight timeline that the IJC had been given to submit its final recommendations to the governments of Canada and the U.S., the IJC's decision to invest considerable time and money into hosting the public hearings suggested that the IJC was indeed dedicated to the process of soliciting the opinions of a wide range of interested citizens to inform

[436] *Transcript of Hearing: Garrison Diversion Project, Grand Forks, North Dakota, November 19, 1975 - P.M.*, 8.

its final recommendations. A closer look, however, at the details and logistics of the hearings, who had the opportunity to speak, and whose voices were prioritized indicate that the IJC had other goals behind its inclusion of the public.

Despite the IJC's publicized desire to engage all interested individuals in its process, this broad invitation to the hearings did not, however, translate into the participation of large numbers of ordinary citizens, farmers, or local activists. Of the combined 192 witnesses who spoke at the 1975 and 1977 public hearings, 125 witnesses represented federal government agencies, local municipal governments, university departments, and water user associations, while only forty individuals were listed as independents and twenty-seven represented environmental or activist groups.[437] Of the independent witnesses, three were listed as indigenous and only one was specifically introduced as a farmer, though the verbatim transcripts of the hearings provide evidence that several farmers testified despite not being listed as such.[438] Contextualizing the testimonies of these independent witnesses was extremely difficult, as the IJC did not record the details of most of the independent witnesses beyond simply recording their names; this, compared to the records' extensive documentation of the honours and positions held by the politicians and scientists who spoke.

Average citizens were largely absent from the hearings in part because of the locations and the timing of the hearings. According to Granville farmer Mr. Norman Moon, "I have noticed that at most of these meetings, Gentlemen, that we have in different areas, hearing, these farmers don't appear. Now, I don't see many of them here today."[439] It is not clear how the IJC determined where to hold the hearings, but the locations were not easily accessible to farmers.

[437] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 148-50.
[438] Ibid.
[439] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 71.

Six of the eight public hearings were held in the largest urban centers including Minot, Grand Forks, and Winnipeg while the GDU project areas, especially the Souris region that were most at risk for damage from the GDU, were far removed from these locations. The town of Souris, Manitoba was located 225 km from Minot, 245 km from Winnipeg, and 170 km from Portage la Prairie, where five of the eight public hearings had been held. Only one public hearing on March 9, 1977, was held in Souris, Manitoba and it was evidently the shortest hearing of all eight with only six witnesses who had the opportunity to speak, two of which were legislative officials.[440] The distances that farmers would have to travel would have required either access to a local train station or to an automobile driving up the cost of participating in a hearing. The tight timeline given to the IJC to produce its final report meant that hearings needed to be held in the winter months, making travel through rural North Dakota and Manitoba severely challenging at times. With the possibilities of unexpected winter storms blowing through North Dakota and Manitoba at any time, citizens may have been more hesitant to travel to the hearings than politicians and officials that were already located in urban centers.

The timing of the hearings represented another barrier to citizen participation. Several of the hearings only began hearing testimony at 8:00 p.m. These late nights would have required that witnesses spend a night or two in a local hotel if they lived a significant distance from the hearing site. The public hearings were all held on weekdays, and several were held during the day. This meant that individuals were required to sacrifice a day of work to participate in the hearings. When the Manitoba legislature was asked if it was willing to financially support individuals from the Souris region or environmental groups in Manitoba to travel to the hearing locations to bring their testimony before the IJC, the Provincial Environment Cabinet Minister

[440] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 151.

"refused any aid on the grounds that this was an issue between government, and any public concern would be voiced by government on behalf of the electorate."[441] It was evident that the IJC prioritized the schedules of elected officials rather than accommodating the needs of interested citizens and farmers by localizing the hearings in communities within the project areas rather than in urban centers and by scheduling the hearings on a weekend rather than on a weekday.

Interested citizens were also required to appear at the beginning of the hearing to secure their opportunity to testify, yet they were relegated to the end of the session to provide that testimony. This protocol meant that citizens would have to wait for several hours to receive their opportunity to speak. The IJC also specified that witnesses who had submitted letters ahead of the hearings requesting to make statements on the day of the hearings were given priority. Academics, politicians, and scientists appeared at the hearings having prepared and submitted their statements in advance, compared to that of the farmers and citizens who often arrived unannounced and even unprepared hoping simply to be given the opportunity to share their opinions. Anyone who arrived unannounced would only be provided with an opportunity to speak if there was extra time available at the close of the day. Most days, however, Commissioners stated in the transcript that proceedings were running overtime, leaving no extra time for additional statements. Rather than organizing the hearings on a first come first served basis which would have benefited citizens, the IJC prioritized the testimonies of elected officials. The IJC specified that politicians would speak first (first federal, then provincial or state, then municipal or county), then individuals, representatives of groups or organizations, or representatives of business and industry.[442] The structure and the procedures created obstacles

[441] Axworthy, *Notes for an Address: Public Participation Workshop*, 7.
[442] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 9-10.

for local farmers while providing politicians and government officials with opportunities to provide input into the GDU debate. Given the extended distances that interested citizens would have had to travel and the costs associated with that travel, it is not surprising that a small number of ordinary people made the trip to speak at the hearings.

In addition to the ways that the IJC prioritized elected officials in the administration of the hearings, the transcripts revealed significant differences in the way IJC Commissioners interacted with government officials versus the average, independent witness. Chairman Henry P. Smith highlighted that although the GDU was a multifaceted project with significantly complex issues, the Commission was not empowered to examine any issues outside of the Canadian impacts of the GDU: "I have emphasized this point because I don't want there to be any question about our primary purpose in being here today."[443] The IJC had clearly stated that it was not interested in hearing individual's remarks about the feasibility of the GDU or evidence presented for or against the GDU unless it directly addressed the IJC's specific referral question. Although the Commission identified its scope of reference at the outset of the hearings, the Commission was not equally tolerant of extraneous remarks from all witnesses.

Despite being advised of the tight parameters of the scope of the hearings, the IJC heard testimonies of many witnesses, including elected officials, that often did not meet the narrow scope for testimonies that the IJC had set. The Committee to Save North Dakota criticized the IJC for opening the Minot hearings "with a parade of public officials reciting the familiar but undocumented claims, testimonials and endorsements of the project promoters" which it reminded the commission, fell outside of the IJC's stated purpose for the hearing.[444] The

[443] Ibid., 7-8.
[444] Committee to Save North Dakota, "Newsletter," (Fargo, North Dakota: Grand Forks Chapter of the North Dakota Audubon Society, November-December 1975), 2.

Committee further disapproved of how the IJC allowed witnesses at the Grand Forks hearing to present "largely irrelevant promotional statements" for the GDU which again fell outside of the IJC's stated purpose.[445]

Testimonies of government representatives often drifted into providing evidence that did not fall within the narrow parameters that the IJC outlined. Officials spoke for and against the GDU, argued for the irrigation benefits of the GDU, and highlighted the many economic spin off benefits of the GDU, but these testimonies were rarely interrupted.[446] Following the lengthy testimony of a retired judge Kelsch and a short recess at the Minot hearing, Chairman Smith stated that the Commission needed to still travel to Grand Forks that day, so "if you would like to talk about whether this is a good project or a bad project without having in mind the transboundary implications of it in which this Commission is interested by our Reference then I would say that you are expending energies in a forum where you should not be."[447] Although Chairman Smith advised Kelsch that his testimony was not relevant to the Commission's work, Smith only made this statement after permitting Kelsch to speak at length.

The IJC did not outline the specified amount of time that each witness was given to speak, but clearly experts and officials were allotted significantly more time to speak than ordinary citizens. The Commission had opened each of the public hearings with a generalized caution about the quantity and scope of people's testimonies. Although Chairman Smith urged witnesses at the hearings to keep their "extemporaneous remarks" to no more than five minutes as the Commission wanted to "give everyone a chance if we possibly can" to share their thoughts, elected officials were consistently given more than five minutes to speak.[448] Following North

[445] Ibid.
[446] *Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M.*, 66.
[447] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 64.
[448] *Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M.*, 2.

Dakota Judge Kelsch's lengthy eleven-page speech, IJC Chairman Smith complimented and commended Kelsch profusely: "I would say that your many years of experience on the bench when added to your knowledge of the law and the practice of law have made you a great advocate . . . I would say that we will be happy to receive a brief from you and the Attorney General."[449] The transcript documented four more pages of interactions between commissioners and the judge, after which Commissioner Henry requested Kelsch's personal input on the IJC's forthcoming report: "we will be more than pleased to hear what you think of the evidence we have presented."[450]

On the other hand, Commissioners frequently and abruptly interrupted and even cut short the testimonies of citizens. Scrapyard owner and farmer of twenty-five years, Valdemar Hovde, from Minot, North Dakota, spanned a mere four pages compared to Kelsch's eleven pages, was abruptly interrupted by Chairman Smith: "excuse me, Mr. Hovde, you have had ten minutes and are there any questions?"[451] Without waiting for any response, Chairman Smith thanked Hovde and invited the next witness on the list, citizen Jerome Saab, to speak. Saab was also interrupted after only two pages of testimony and was also told "Mr. Saab, you have gone for seven minutes now." While Chairman Smith was prepared to move on, Chairman Ross interjected that he was interested in hearing more of Mr. Saab's testimony as "he's made several I think interesting points that others have not made."[452] How did the Commission decide which witnesses it would cut short and which it would allow to proceed without restraint? Was the Commission truly

[449] *Transcript of Hearing: Garrison Diversion Project, Grand Forks, North Dakota, November 19, 1975 - P.M.*, 49.
[450] Ibid., 52.
[451] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 159.
[452] Ibid., 162.

interested in the content of citizen's testimonies or was providing citizens an opportunity to speak merely a public relations exercise for the Commission?

Privileged Knowledge: The IJC's Endorsements of Scientific Knowledge and of Scientific Expertise

Despite the many statements the IJC had made about the purpose of its public engagement strategy, the IJC's final report reveals something of the Commission's true priorities. Having received the IGDSB's final technical report and having heard the testimonies of over 200 individuals, the IJC created its final report. The IJC stated in this report that all the "concerns that were thought to be within the Terms of Reference of the study were considered."[453] The IJC specified that any concerns it deemed as having fallen outside of the Terms of Reference of the study were not considered, but "provided useful background information" for its investigation.[454] Which evidence and what concerns did the IJC determine were "within the Terms of Reference of the study" and which concerns were outside and therefore excluded in development of its final recommendations? The IJC stated that its reference should be "viewed as embracing all of the foreseeable implications involved in the Project from water-quality and water-use viewpoints as well as from the social and environmental aspects."[455] Despite the Commission's declared intention to investigate the social and environmental aspects of the GDU, its final report failed to reflect this target.

The body of the IJC's final report spanned ninety-three pages, of which seventy-eight were focused on the information garnered from each of the IGDSB scientific technical committees while only fourteen pages were dedicated to the concerns of over 200 public hearing participants.

[453] International Garrison Diversion Study Board and International Joint Committee, "Report," 17.
[454] Ibid.
[455] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 97.

The fourteen pages summarized the public hearings by categorizing the public testimony into four broad categories including "the adequacy of the data, the impact on Canada of the return flows from the GDU, the possibility of the transfer of fish and other biota from the Missouri River basin to Canadian waters, and for other impacts of the GDU on the people of Manitoba."[456] The four categories suggested that the substance of the public testimonies was focused on the scientific debates not the social implications of the project. These four themes were indeed representative of the substance of the testimonies of the politicians, academics, and scientists, but did not represent the content or themes, as identified earlier in the chapter, of the testimonies of interested citizens. Instead, the verbatim testimony of interested citizens revealed narrative themes that were largely experiential in nature and highlighted the hesitancy of ordinary citizens to engage in the scientific debates surrounding the GDU.[457]

The disparity between the substance of the verbatim testimony and the IJC's interpretation of the essence of public concerns demonstrated the IJC's commitment to the knowledge that experts produced and to the scientific data that these professionals presented. This commitment was reinforced in a statement that Chairman Smith made during the hearings: "the real investigation for us is made up of six Canadians and six United States citizens, they are all scientists and engineers and technical people" and they are the people "who are really going to find what the facts of the matter are, to report to us so that we can report to the governments."[458] Despite the Commission's many investments to engage ordinary citizens in its investigative process, the IJC prioritized the knowledge and authority that scientists and politicians presented

[456] International Garrison Diversion Study Board and International Joint Committee, "Report," 17.
[457] Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône*, 75.
[458] *Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M.*, 51.

over that of citizens; these claims to expert knowledge ultimately defined and shaped the Commission's final recommendations.

In its focus on expert knowledge, the Commission also elevated and legitimized one type of science over another in its investigation of the GDU. The Directive from American and Canadian governments had specified that the IJC investigate the 'transboundary implications' of the GDU. Historically the IJC had narrowly interpreted 'transboundary implications' as an engineering or water quality issue resulting directly from the project that gave rise to the Reference. The IJC acknowledged that a broader understanding of this concept would include an evaluation of the total environmental and ecological consequences of the project as well as of the many activities in the region related to it.[459] Therefore the IJC sought to widen the scope of its evaluation of the GDU to include not only the direct engineering issues, but also the indirect and ecological considerations of a project.[460] This unprecedented ideological shift from an engineering to an ecological evaluation was a dramatic departure for the IJC from its historical reliance on the traditional sciences.

The IJC's adoption of this "extremely forward-looking" progressive ecological approach signaled its desire to reflect and align with the values of the increasingly prominent environmental movement more closely. With this shift, the IJC began to see itself as an "extremely forward-looking" agency possessing significant political influence. The IJC's embrace of the emerging ecological sciences was meant to be an example that "hopefully the Governments [of Canada and the U.S.] would continue to follow."[461] The IJC had begun to see

[459] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 96-97.
[460] Richard Moy and Jonathan O'Riordan, "The International Joint Commission's Unique and Colourful Role in Three Projects in the Pacific Northwest," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen (Calgary, Alberta: University of Calgary Press, 2020), 247.
[461] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*, 97. 97

itself as an influential and active agent for political and scientific change rather than simply as a quasi-judicial organization that lacked influence and power. Historians of the IJC have even argued that on account of the Commission's ideological transformation in the 1970s, as demonstrated in its GDU referral, both federal governments believed that the IJC had taken on too much of an activist role and that it had "engaged in policy overreach."[462]

As the IJC sought to widen its evaluation of the GDU to include its direct and indirect social and ecological consequences in Canada, it became necessary for the Commission to extend its IGDSB membership and list of consultants to those who embodied this new category of expert. While the IJC still appointed its board members from the traditional scientific disciplines of chemistry, geology, hydrology, agriculture, and engineering, seventy-nine percent of the IGDSB were specialists from the rapidly emerging sciences including the environmental and natural sciences, conservation biology, ecology, and wildlife biology.[463] Many of these specialists were independent scientists from the private sector, making it only the second time in its history that the IJC had appointed a significant number of non-government scientific experts to its boards.[464] Members were appointed to the IGDSB's five technical committees based on the technical expertise required to complete the research and the investigation of the focus of that committee. The Water Quantity and Engineering Committees recruited the greatest number of engineers at forty and thirty-two percent respectively, while the Water Quality, Biology, and Uses Committees enlisted engineers at only eighteen, seven, and three percent.[465]

[462] Clamen and Macfarlane, "Introduction," 17.
[463] International Garrison Diversion Study Board and International Joint Committee, "Report," 211-12, 23-39.
[464] The IJC appointed independent, private sector scientists for the first time in its Great Lakes Water Quality Agreement in 1972. Becker, "The International Joint Commission and Public Participation: Past Experiences, Present Challenges, Future Tasks," 244.
[465] International Garrison Diversion Study Board and International Joint Committee, "Report," 223-39.

Although the IJC appointed a similar number of members to its five IGDSB committees, the number of consultants it hired for each committee varied significantly. The two committees that were dedicated to studying the ecological and social implications of the GDU were the Biology and Uses Committees. The Biology Committee was responsible to report on the ecological and the biological factors related to the construction of the GDU and to predict how water quality and quantity outcomes both with and without the GDU would affect the living ecosystems. The Uses Committee was required to outline the present and projected water uses and how those uses would be affected both with and without the GDU. Unlike the Water Quality, Water Quantity, and Engineering Committees that were focused on collecting and examining traditional scientific data, the Biology and Uses Committees were meant to explore the impact of resource developments from a total system and biosystem concept. It is noteworthy that compared to the other three committees, the Biology and Uses committees disproportionately relied upon the help of consultants from the private sector, calling upon 108 consultants, representing seventy percent of the 155 total consultants who were brought in to work with all five committees. Of the sixty-two consultants for the Biology Committee only four were engineers and of the forty-six consultants recruited for the Uses Committee, none were engineers. The IJC's heavy investment into the two technical committees with a focus on the ecological and social implications of the GDU demonstrated a significant ideological shift within the Commission.

The IJC's move to engage a new generation of environmental experts signaled a shift in the Commission's scientific allegiances. Where it had historically depended upon the expertise of traditional scientists including engineers and geologists, the IJC indicated in its GDU investigation that it was ready to engage the rapidly rising non-traditional, environmental, and

ecological science professionals in its work. The IJC's final report conformed to the strengths of environmental scientists and aligned with the goals of the popular environmental movement, confirming this ideological shift at the IJC. Not only did this shift undercut the historically unquestioned authority of the technocratic modernist engineers at the Bureau but it also privileged one type of science over another and served to legitimize the professional authority of environmental scientists in the water management sector.

The IJC's investigation of the GDU exhibited several notable features. Firstly, it confirmed that the ideological shift that the IJC experienced in the 1970s was indeed a messy and complex transition for the Commission.[466] The IJC's pioneering attempt to engage the public in its investigation created an influx of multiple voices representing a variety of perspectives. This move substantially complicated rather than simplified the IJC's process. Secondly, while the Commission seemed to implement public consultations to solicit popular perceptions about the GDU, the Commission's primary objective behind its public engagement strategy was the development of trust amongst its stakeholders. The IJC had held fast to a modernist, technocratic perspective on the commodification and control of the environment in the first half of the twentieth century.[467] By the 1960s the IJC recognized that its role, behaviour, and function needed to evolve to remain relevant within the cultural, environmental, and political movements of the 1960s and 1970s. The IJC recognized that its influence was directly connected to the public's perception of its authority and led the Commission to strategically posture itself as a culturally relevant and scientifically knowledgeable institution. The IJC hoped to demonstrate to

[466] David Whorley, "From IWC to BWT: Canada-U.S. Institution Building, 1902-1909," in *The First Century of the International Joint Commission*, ed. Daniel Macfarlane and Murray Clamen (Calgary, Alberta: University of Calgary Press, 2020), 36.
[467] Macfarlane and Clamen, *The First Century of the International Joint Commission*, 22.

the public and federal officials in Canada and the U.S. that it was an adaptable organization able to evolve to meet the demands of an ever-changing world. The Commission hoped to prove in its GDU investigation that it was not an outdated institution but was a current and dynamic organization ready to embrace the new environmental ethic.

Thirdly, although the IJC appeared to broaden its investigative scope beyond the scientific evidence to include the experiential knowledge of ordinary citizens, farmers, and activists, it was ultimately committed to its scientific and expertise driven legacy. While the IJC intended to include the voices of non-experts in the finalizing of its recommendations, in the end scientific knowledge, not experiential knowledge, provided the basis of its final report. The Commission did not yet possess the organizational mechanisms to factor this non-scientific evidence into its process. This finding confirms what historians Macfarlane and Murray found in their work on the IJC, that "without the science-based judgement" of commissioners, the IJC would have "little on which to base their findings, conclusions, and recommendations."[468] Fourthly, although the IJC had a reputation for its impartiality, it adjusted its scientific allegiances from the modern technocratic scientific disciplines to the emerging environmental and ecological sciences to align more closely with the values of the popular environmental movement. The IJC thereby appeared to legitimize one group of scientists over another and to endorse the authority of this emerging group of experts who were seeking to gain professional status within the water management sector.

The IJC's participation in the GDU debate revealed that although the Commission was established in theory as a neutral institution, it was not the silent and impartial mediator in the GDU debate that it was assumed to be. As a transnational commission that had been historically

[468] Clamen and Macfarlane, "Conclusion," 533-34.

mired in partisan politics and whose recommendations at times had been ignored by Canadian and American governments in the first half of the twentieth century, the IJC sought to remake itself by building a public relations strategy that fostered public confidence and political trust.[469] In the same way that environmental scientists sold their authority to generate trust in their particular type of scientific knowledge, so too the IJC sought to sell its authority and legitimacy to an increasingly engaged citizenry. As this case of the IJC's investigation of the GDU illustrates, the IJC's very existence, its authority, and its efficacy depended upon its ability to masterfully maintain the support of a diversity of groups including the public, politicians, and a deeply divided scientific community.

[469] Clamen and Macfarlane, "Introduction," 16.

Conclusion

I will end this dissertation with the question that prompted this study of the Garrison Diversion Unit (GDU): who gets to decide how water is used or not used? I have explored the way that men and women, experts and non-experts talked about the GDU including those who advocated for the project and those who opposed it. I have explored various debates about diverse visions of technology and of the environment and the ways in which these visions were promoted at different scales. How did experts of various stripes express, mobilize, and contest knowledge of rivers, dams, the environment, and technology?

This dissertation has analyzed how 'experts' and 'users' talked about different types of scientific knowledge of rivers, dams, irrigation systems and their environmental effects in North Dakota and Manitoba between 1944 and 1977. In 1944, the GDU was an engineering project meant to divert water from the Missouri River to northeastern North Dakota for the purposes of irrigation, municipal water supply, recreation, and wildlife enhancement. The project plans, its goals, and budgets were re-evaluated and altered several times during that period. Rather than analyzing the success or failure of each of the project's iterations over the years, I have focused on the debates that existed around the GDU and on the actors who formed those debates. I have explored the various layers of the narratives and of the debates of multiple stakeholders involved in the GDU debate. This is a story of how knowledge was contested, what kinds of scientific expertise was mobilized and what other types of knowledge were presented. The GDU and the reports it generated were not merely representative of an engineering system that altered the physical environment in North Dakota but was an envirotechnical system through which ideas about technology were translated. I trace the narrative of the Bureau's technocratic vision for the

GDU during a period when North American perspectives on the environment were being fundamentally altered.

I thought that I would find definitive and objective scientific data influencing the production of a specific type of knowledge, the mobilization of that knowledge, and the creation of public policy. The story of this water diversion project, however, is much more complex and nuanced in its conversation about the science of water. When I initially discovered the scientific reports that became one of the foundational primary sources for this dissertation, I thought I would need to acquire a certain level of fluency in a multiplicity of scientific languages to effectively interpret the engineering, biology, chemistry, hydrology, geology, and environmental science reports. To my surprise, however, I found that the dialogue in these reports was focused more on the social aspects surrounding the scientific data than on the scientific data itself. According to historian Ted Porter, to understand our society's demands for quantitative objectivity, we need to look at the professionalization of expertise and the social basis for that authority.[470] I found many groups of scientists and experts mobilizing their knowledge, but little of the narratives I found were scientifically based; their speeches and reports centered on their authority and on their expertise, and focused more on social consequences, economic outcomes, fears about the future, or political gain. This emphasis in the reports on expertise and authority rather than on quantitative objectivity permitted both experts and non-experts to contest the knowledge presented.

I found three sites of discussion where the science was contested: an influential individual, the Bureau and its EIA report and its critiques, and an international jurisdictional body. These three sites of debate and types of rhetoric have been the basis for my study of the GDU.

[470] Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (New Jersey: Princeton University Press, 1995), 6.

Hoisveen was focused on convincing a variety of audiences of the economic and social value of the GDU. The Bureau was focused on economic and social modelling to sidestep the environmental assessment process. The International Joint Commission (IJC) was focused on legitimizing itself as a quasi-judicial organization that relied on its public approval and acceptance. The science shifted according to its audience. Rather than finding evidence of the mobilization of scientific data that was reliable, definitive, and widely agreed upon, I found emotional persuasion, gendered language, professional investment, and moving targets. Is it surprising then that farmers, citizens, and communities exhibited a distrust of the experts and of the science being presented about the GDU on both sides of the border in Canada and in the U.S.?

Beginning in chapter one, I looked at the rhetoric of North Dakota State Engineer and GDU front man, Milo Hoisveen as the first site of debate. Hoisveen's technocratic vision for the GDU was evident in the way he marketed and promoted the project in a cross-country campaign throughout the 1960s. His speeches provided significant insights into his methodology for translating the science and engineering of water management to the project's various stakeholders. This exploration of Hoisveen's contributions to the GDU debate demonstrated that even the knowledge of one man was multifaceted and fluid according to what he believed his audiences needed to hear. While Hoisveen's talk was birthed from an engineering perspective, his rhetoric was not limited by the scientific data and the engineering technology he represented. Rather, he relied upon a variety of narratives, persuasive speech, and novel marketing tactics to sway his audiences; Hoisveen's narrative ebbed and flowed like the river he was hoping to reshape. The stories that Hoisveen told his audiences revealed not only one man's ideas, but also highlighted evolving understandings of nature, environmental policies, and Cold War politics.

Next, I explored the Bureau's rhetoric in the post National Environmental Protection Act (NEPA) era and its attempts to engage with its critics from the rising environmental sciences through its production of an Environmental Impact Statement (EIS). The environmental scientists of the 1970s promoted an environmental ethic as the basis for the management of the nation's rivers, compared to the engineering design approach of the Bureau and the Army Corps through the early- to mid-twentieth century to water resource management. These rising environmental experts looked not only to defend and to advocate for non-human nature, but to forge a new professional authority for themselves and for the particular scientific knowledge they espoused. The engineers at the Bureau and the environmental scientists did not agree on how to define, measure, and mitigate the adverse environmental impacts of technological interventions. The Bureau's EIS and the many response reports provide a snapshot into the contest that existed between scientists over the meaning of 'environmental impact.' An analysis of this disputed knowledge highlights the murky waters that surrounded the development and application of environmental policies in the 1970s. By 1975, it was clear that scientific experts could not agree on key definitions of environmental impacts and therefore could not provide a clear direction for the GDU.

Finally, in chapter three I analyzed the involvement of the IJC in the GDU debate and the many voices that were mobilized through its investigative process. Where both engineers and environmental experts suggested that they had prioritized scientific knowledge, the IJC took a different approach, indicating its intention to provide a platform for interested citizens to speak into its investigation of the GDU. An examination of the 1975 and 1976 IJC public hearing transcripts, however, revealed that the opinions and concerns of ordinary people that were shared at the IJC's public hearings did not, in the end, reshape or redefine the Commission's final

recommendations. The IJC's public consultation process was arguably a public relations exercise meant to legitimize the commission not to prioritize the voices of those who would be most impacted by the project. Despite the IJC's good intentions, citizens living in the GDU project areas continued to be divided about the costs and benefits of the project and their marginalized voices continued to receive only cursory attention within the debate.

This dissertation has explored how experts and users debated the environmental impacts of the GDU. This dispute occurred at a critical time in North American environmental science and activism. In particular, the 1960s and 1970s were decades when the political and cultural dominance of engineers was challenged by biologists, ecologists, and other environmental scientists who themselves were often supporters of and supported by a growing environmental activist movement and cultural concern. Debates over the GDU serve as a fascinating lens through which to see this transformation of whose expertise was deemed most valuable. And yet, as the IJC process revealed, although new kinds of expertise and new kinds of expert credentials displaced engineers as the only, or even the most important, source of environmental knowledge, other forms of knowledge fit less easily into debates over the GDU. They were there, though. Farmers, members of Indigenous communities, rural citizens, local activist groups, and mothers all articulated their vision, anger, and fear – yet tended to be defined outside of the boundary of expert knowledge.

Although this is a study of one project and the talk surrounding that project, it has brought together and has contributed to several key historiographical approaches. These include the history of the GDU, the impact of environmental activism on federal water management, the struggle for professional authority in the water management sector, the power of federal and

international policy on the ability of experts to be heard, the history of the IJC's public input mechanism, and the place of the 'non-expert' voices in IJC debates.

From its inception, the GDU has been studied in terms of its engineering viability, cost-benefit analysis, specific environmental impacts, and the bureaucratic and political dynamics surrounding the project. This study approaches the GDU from an historical perspective, placing the GDU in the contexts of scientific and technological debates over environmental management in the water resource sector in late-twentieth century America. In tracing the historical transformation of the GDU, this dissertation builds on scholarship which analyzes the histories of envirotechnical systems. The GDU was much more than an engineering edifice; it brought together ideas of nature, technology, politics, and culture. It was a project that revealed how various actors involved with the GDU interpreted and communicated their understandings and cultural representations of the environment and of technology. Pulling back the layers of this unfinished project have revealed a fascinating, complex, and evolving dialogue that existed between scientists, politicians, and ordinary people about water, the control of water, the environment, and the application of environmental policy during a particularly volatile period in American environmental history. Much like Pritchard's study on the Rhône River, this dissertation has examined how various ideas and meanings of water, resource management, and technology were translated at the local and community levels. It also builds on the foundations that environmental historians Worster, White, Reisner, and Schneiders have provided on the environmental histories of individual rivers and of the organizations and individuals who have attempted to reshape these rivers. It adds to this rich history through its exploration of the way that people talked about water and the environment and about their attempts to control them, while also providing valuable insights into the development of environmental policy at a critical

time in North American history. As such, this dissertation adds to the scholarship on late-twentieth century environmental history by exploring the impact of environmental activism and the rise of the new environmental sciences on older technocratic approaches.

This dissertation also contributes to the scholarly literature which explores the contestation of professional expertise.[471] Christopher Hamlin's pathbreaking study *The Science of Impurity* traced the growth of scientific expertise and scientific professionalism in the nineteenth century; this dissertation explores the struggle for professional authority in twentieth century America. The implementation of new environmental policies and the rise of the environmental ethic of the 1970s permitted the entry of a new kind of expert into the GDU debate and into the federal water management sector. As such the dissertation explores the power of federal and international policy to influence the rise of professional authority and expertise. The ability for new kinds of experts to be heard in the water management sector was enhanced first by the introduction of NEPA and then by the fact that international water governance agency – the IJC – had to be invoked.

The GDU debates provide a window into how scientists of various disciplines actively vied for scientific and professional authority within the water management sector. Through the introduction of NEPA a new group of scientists, whose proficiencies lay not in engineering design but in the environmental and ecological sciences, challenged the engineering experts at the Bureau who had initiated the GDU's original plans. The entry of these experts into the GDU debate changed not only the trajectory of this project, but also challenged the scientific authority that the Bureau had historically held in the water management sector. This contest for scientific

[471] Agusti Nieto-Galan, *Science in the Public Sphere: A History of Lay Knowledge and Expertise* (London: Routledge, 2016), 8. H.M. Collins and Robert Evans, *Rethinking Expertise* (Chicago: University of Chicago Press, 2007).

authority and professional expertise was not always fought using quantitative science alone. In addition to employing new scientific approaches to the study of the environment, these environmental scientists also used economic, political, and social rhetoric to wage war on the traditional engineering sciences that had dominated the water management sector. Environmental scientists contested the Bureau's knowledge using new ecological messaging that they hoped would resonate with politicians and with an increasingly environmentally conscious public.

This research also explores the history of the IJC and the development of its public input mechanism. This dissertation responds to historian Daniel Macfarlane's call for more study of the IJC and its public consultation process. Not only did the IJC investigations of the GDU provide a space for environmental scientists to strengthen their authority, but they also permitted ordinary, local people to speak to the international scientific debates. The experiences and perspectives that local users expressed during the GDU public hearings broadens our understanding of the ways in which local users actively contested the implementation of large-scale engineering water projects and interacted with the development of environmental policy. In the case of the GDU, it does not appear that public consultations significantly impacted the IJC's final report. Further analysis of IJC activities is needed to know if the IJC's public engagement apparatus incorporated the voices that have historically been avoided, overlooked, or ignored in its decision-making process around water resource management.

Even though the IJC placed little weight on the public consultation results, IJC documents do hint at what 'non-experts' thought about the GDU. The lay people and the farmers who spoke at the hearings demonstrated a practical, hardworking, and gritty spirit. These men and women made their day-to-day decisions based less on scientific data, than on lived experiences, intuition, hands-on practical knowledge of the land, and communal relationships.

Throughout the twentieth century the family farmers of northwest and southeast North Dakota had been approached by many salesmen peddling various technologies ranging from advanced farm implements to household labour-saving devices to expensive irrigation solutions.[472] Many farm families had, in the past, made the mistake of accepting these technologies that promised to fundamentally alter their future. So, while we do not know how Hoisveen's audiences responded to his speeches, I can easily picture these tired farmers listening politely but rejecting his promotion of the GDU irrigation benefits outright. Indigenous people knew firsthand that technological mega-projects held no benefits for them. Years later, a selection of those same farmers and Indigenous people were given the opportunity to speak at the IJC's public hearings to allow their voices to be heard. Given that scientists themselves were unable to agree on the definition of, or the tools used to, measure environmental impacts, the non-experts expressed a growing distrust in the science behind the GDU and in the leadership of these scientists. Further research into public responses to the GDU and other large engineering projects provides windows into the proliferation of current day societal cynicism and doubt around scientific expertise and authority.

What happened to the GDU?

For all the talk that occurred around this diversion project between a wide variety of experts, including local, national, and international actors, one would assume that the project was either cancelled and forgotten or finished and opened. The GDU, however, is currently still being debated in the halls of academia, Congress and state legislatures, local media outlets, and in community centers, all without a firm plan for the project's future. Current day iterations of the

[472] Robinson, *History of North Dakota*, 372.

prospective GDU plans look nothing like what its original designers envisioned for the people of North Dakota.

Colonel Lewis A. Pick and William G. Sloan originally designed the GDU as a diversion project that would provide flood control, hydroelectric power, irrigation water for farmers, improved navigation of the Missouri and Mississippi Rivers, increased recreational opportunities and enhanced wildlife areas in North Dakota. By the time the IJC had produced its final recommendations for the Canadian and American governments in 1977, the GDU had been analyzed, revised, and reauthorized several times over the thirty years since its first approval in 1944. Its parameters and budgets were amended in 1965 and again in 1986, and its scope and vision reduced significantly. The public release of the IJC's final report in 1977 coincided with the issuance of the National Audubon Society's suit seeking injunctive relief for the alleged violations of federal statutes as well as with President Carter's economic and ecological review of all reclamation water projects. The National Audubon Society filed suit in July 1976 against the GDU and in May 1981 the US District Court Judge acted on the appeal by the National Audubon Society and ordered all GDU project design and construction to cease.

The U.S.-Canada Consultative Group of senior officials was created in 1981 in order to identify the conditions that would satisfy the IJC's second recommendation that "if and when the governments of Canada and the United States agree that methods have been proven that will eliminate the risk of biota transfer, or if the question of biota transfer is agreed to be no longer a matter of concern" then the portion of the GDU that would affect Canadian waters can be constructed.[473] In 1983 a Joint Technical Committee was established in order to provide support to the Consultative Group. Despite their collective efforts, these committees were unable to come

[473] International Joint Commission, *Transboundary Implications of the Garrison Diversion Unit*. 121

to a consensus around the variables that could satisfy Canadian concerns.[474] In 1983 the GDU was able to secure $22 million towards completing Phase I of the project that did not have any connected discharges or runoff from the Missouri River into the Red River Basin.[475] Between the publication of the IJC final report in 1977 up to the present various attempts have been made to deauthorize and re-authorize the GDU with parameters that would fall within the IJC's recommendations. Advocacy for the GDU continues to the present. The GDU's final report was issued December 20, 1984, in which recommendations were made to re-authorize the project once again. The GDU Reformulation Act was therefore signed in 1986 authorizing these recommendations. Construction on the reformulated features including municipal, rural, and industrial water supply, wildlife habitats, and water treatment facilities commenced in 1986 and continued until the project's funding was once again terminated in 1990.

In 1997 another attempt was made to resurrect the GDU which led in 2000 to the reintroduction of the GDU into the United States House and Senate in the form of the Dakota Water Resources Act. This act authorized the Red River Valley Water Supply Project to provide drinking water for the Red River Valley, to uphold the Boundary Water Treaty of 1909, and to "offset the loss of North Dakota farmland" that had resulted from the construction of the GDU's major features.[476] Using the original McClusky Canal and a new series of buried pipelines, the project would supply drinking water to central and eastern North Dakota. While this latest iteration of the GDU has defined vastly different goals than those of the original project, it seems that its designers continue to rely upon old techniques to obtain federal authorization for the

[474] Brandson and Olsen, "The International Joint Commission and Mid-Continent Water Issues: The Garrison Diversion, Red River, Devils Lake, and the Northwest Area Water Supply Project." 219
[475] Caldwell, "Garrison Diversion: Constraints on Conflict Resolution." 842
[476] U.S. Bureau of Reclamation, *History and Federal Legislation: The Pick-Sloan Missouri Basin Program* (2023). http://www.garrisondiv.org/about/HistoryFederalLegislation/.

project. While water from the Missouri River was already flowing through the Garrison Dam's hydro system, for the first time in the dam's almost seventy-year history the dam was opened to pass floodwaters through its spillway in 2011. The Red River Valley Water Supply Project continues to market its technological interventions to stakeholders as the most reliable solution to the state's water needs by holding more public hearings and producing another EIS. Even though the concrete is not yet dry in 2023 on the project's newest features, the economic, environmental, social, and political debates on both sides of the border continue to rage on amongst engineers, environmental scientists, citizens, activists, and politicians.[477]

Plans to manipulate water in North Dakota are not unique. Demands on the world's water from population growth are at an all-time high, the expansion of the municipal and agricultural sectors are creating demand for clean water across the globe, regional availability of water is becoming increasingly inequitable, water scarcity due to water stress is endemic, and water pollution is rampant.[478] Conflicts over issues relating to water sovereignty, quality, quantity, use, and pollution continue to erupt on every continent, amongst low, middle, and high income countries. Human interventions have continued to indelibly alter the world's lakes, rivers, and watersheds. Thousands of infrastructure developments, irrigation, hydropower, diversion, water supply, and water purification projects are currently being built; in Tajikistan, China, Saudi Arabia, Turkey, Cameroon, Ethiopia, El Salvador, to the U.S., and Canada and many other countries construction is happening and is being planned. How can we respond to the world's water needs more responsibly? As anthropologist Luisa Cortesi has argued, water conflict is an

[477] Red River Valley Water Supply Project, *Construction Updates*. http://www.rrvwsp.com/updates/.
[478] Scientific and Cultural Organization The United Nations Educational, *The United Nations World Water Development Report 2023*, UNESCO (Paris, France, 2023), 12-18.

idea that lives a life of its own, is interpreted, and intersects with other ideologies.[479] As this dissertation has demonstrated, however, water conflict is both an idea that is translated and transmuted by individuals, organizations, and politicians to other stakeholders and it is a lived experience that affects human and non-human nature. Perhaps another way of saying this comes from historian Donald Worster who asserts that the history of water is best understood as "the history of the control of water."[480]

We return at the end of this story to the questions that led to this study of the GDU, and we return to the women I found perched along the Nile prohibited from taking a jerrycan of this water home to their families. Are we content to live in a world where a woman living along the Nile River is forbidden to access the life-giving water in her backyard so that she can cook, clean, and care for herself and her community? The treaty that was enacted into law governing the Nile River's use in the mid-twentieth century was not written to limit these women at the water's edge from taking a few buckets of water each day to meet their family's needs. Rather these laws were created to prevent large and possibly devastating extractions of water through the construction of hydro dams and irrigation diversion projects. Regardless of the larger-scale intentions of countries to set in place self-protectionist policies, in practice, it is the women and their families living along the river, who will ultimately bear the burden of these restrictive policies.

In the story of the GDU, Indigenous communities were forced off their productive, riparian land and relocated to fallow ground to make way for project features; and farmers lost productive farmland to the canal. Furthermore, had the final phases of the GDU moved forward farmers

[479] Luisa Cortesi and K.J. Joy, eds., *Split Waters: The Idea of Water Conflicts* (London and New York: Routledge, 2021), 21.
[480] Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West*, 1st ed. (New York: Pantheon Books, 1985), 60.

would have been asked to bear the exorbitant price tag of an irrigation scheme they did not ask for and the Red River and Souris River basins would have had to assume the ecological cost of the artificial integration of diverse river basin ecosystems. In some sense, then, control of water was challenged by the environmental movement and its pressure on federal and international agencies.

This dissertation has shown that even the mechanisms intended to fairly represent the full spectrum of river users and experts are fraught with limitations and that balancing these various needs is a tricky business. Public consultations do not carry much weight. Whose voices are privileged? Whose voices are silenced? Certain kinds of expertise have limited popular engagement in water resource management. Although claims of expertise are widening, they have not yet been passed down. Therefore, evaluations of the past successes and failures of water management projects, environmental assessment processes, and public consultations could lead us to a healthier balance between users and experts in water governance in the future. What policies and systems need to change to intentionally make space for these populist voices to speak into the debates? Rather than attempting to exclude voices that speak out in opposition to a project, what if we reframed our thinking? What if the challenges, questions, and needs of users and of experts whose knowledge falls outside of the traditional boundary of expert knowledge and whose voices have historically been silent in the narrative, could provide the missing piece to improving the way humans interact with and consume the world's most precious resource?

Bibliography

Primary Sources

Axworthy, Lloyd. *Notes for an Address: Public Participation Workshop.* University of Winnipeg - Institute of Urban Studies (Winnipeg, Manitoba: 1975).

Bard, Dean F., and Robert E. Beck. "An Institutional Overview of the North Dakota State Water Conservation Commission: Its Operation and Setting." *North Dakota Law Review* 46, no. 1 (1969): 31-82.

Berkman, Richard L., W. Kip Viscusi, and Ralph Nader. *Damming the West: The Nader Task Force Report on the Bureau of Reclamation.* Washington, D.C.: Center for Study of Responsive Law, 1971.

Blake, Hazel Driver. "The Effects of Garrison Dam on the Peoples of the Fort Berthold Reservation." By Corene Geffre. *On the Road with North Dakota Studies*. State Historical Society of North Dakota. June 23, 1999.

Board, International Garrison Diversion Study. *Investigation into the Transboundary Effects of the Proposed Project.* (Ottawa, ON; Washington, D.C.: 1976).

Boyd, D. H., University of Manitoba (Agassiz Centre for Water Studies), and Garrison Diversion Unit. *The Impacts of the Garrison Diversion Unit on Canada: Volume 2 of a Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit.* Winnipeg: Manitoba Environmental Council, 1975.

Campbell, Laureen Ann, Garry Gorge Haacke, Josephine Chai-Ying, Philip Kam-Ming Ngai, Gloria Heather Simpson, Isaak Thau, and Robert Wayne Urbonas. *University S.T.E.P. Programme: The Garrison Diversion Study.* University of Winnipeg (Winnipeg, Manitoba: 1974).

Carroll, John E., and Roderick M. Logan. *The Garrison Diversion Unit.* Canada-U.S. Prospects. Vol. 7, Montreal, QC; Washington, D.C.: C.D. Howe Research Institute, National Planning Association, 1980.

Committee on Government Operations. *A Review of the Environmental, Economic and International Aspects of the Garrison Diversion Unit, North Dakota.* U.S Government Printing Office (Washington: 1976).

Committee to Save North Dakota. "Newsletter." Fargo, North Dakota: Grand Forks Chapter of the North Dakota Audubon Society, April 1976.

———. "Newsletter." Fargo, North Dakota: Grand Forks Chapter of the North Dakota Audubon Society, November-December 1975.

Corrado, Frank M. . Cookbook on 208 Public Participation Programs. www.nepis.epa.gov.

Cross Jr., Martin. "The Effects of Garrison Dam on the Peoples of the Fort Berthold Reservation." By Mike Schatz. *On the Road with North Dakota Studies*. State Historical Society of North Dakota. June 23, 1999.

Department of Mines, Resources and Environmental Management. *Garrison Diversion Project: Concerns of the Province of Manitoba.* (Winnipeg, Manitoba: November 20 1975).

Ehrlich, Paul R. *The Population Bomb.* New York: Ballantine Books, 1968.

Environment Canada. Garrison Information. University of Winnipeg Library, Ottawa, ON.

Franklin, Ben A. "The Bureau of Reclamation and Its Many Critics." *The New York Times*, June 13, 1976.

Harza Engineering Company, and U.S. Bureau of Reclamation. *Garrison Diversion Unit Effects of Return Flows on Receiving Waters.* [s.i.]: Harza Engineering Co., 1976.
Hine, Alison. *The Garrison Diversion: An Overview*. University of Manitoba (Winnipeg, Manitoba: May 1974 1974).
Hoisveen, Milo W. Activities in the Field of Water Management in the North Dakota Portion of the Red River Basin. Milo Hoisveen Papers. North Dakota Archives, Bismark, North Dakota.
———. Activities in the Field of Water Resources Is Now Paying Dividens. Milo Hoisveen Papers. North Dakota Archives, Bismark, North Dakota.
———. Address to the County Commissioners' Association of North Dakota. Milo Hoisveen Papers. North Dakota Archives.
———. Bank's Stabilization on the Missouri River Segment in North Dakota. Milo Hoisveen Papers. North Dakota Archives, Bismarck, North Dakota.
———. Commemorating Conservation Week. Milo Hoisveen Papers. North Dakota Archives, Valley City, North Dakota.
———. A Cooperative Water Resources Program. North Dakota Archives, Speech to the U.S. Geological Survey District Conference.
———. Dependency on Water Resources in the United States. Milo Hoisveen Papers. North Dakota Archives.
———. Discussion: Soil Conservation Committee Annual Meeting. Milo Hoisveen Papers. North Dakota Archives, Bismark, North Dakota.
———. Erosion on the Missouri River, 1968. Milo Hoisveen Papers. North Dakota Archives.
———. Fourth of July Speech at Brush Lake, North Dakota. Milo Hoisveen Papers. North Dakota Archives.
———. The Garrison Diversion Unit and Its Influence on Southwest North Dakota. Milo Hoisveen Papers. North Dakota Archives.
———. Irrigation Districts Activities in North Dakota. Milo Hoisveen Papers. North Dakota Archives.
———. Is This the Way to Run a River Basin? Milo Hoisveen Papers. North Dakota Archives.
———. "Missouri Diversion in North Dakota in Retrospect to the Central Power Electric Cooperative Inc.". Speech given by Milo Hoisveen to the Central Power Electric Cooperative, Inc. Carrington, North Dakota: North Dakota Archives, January 14, 1970.
———. "The Need for Added Support for Reclamation at the Grass Roots." In *Milo Hoisveen Papers*. Speech to the Upper Missouri Basin Water Users AssociationNorth Dakota Archives, December 7, 1967.
———. North Dakota Water Problems Presented to the National Water Commission. Milo Hoisveen Papers. North Dakota Archives, Denver, Colorado.
———. North Dakota's Water Resources Development Program: A Report to the Association of Western State Engineers in Jackson Lodge, Wyoming. Milo Hoisveen Papers. North Dakota Archives.
———. Objectives of State Water Commission Presented to North Dakota Natural Resources Council. Milo Hoisveen Papers. North Dakota Archives.
———. The Outlook for Irrigation in North Dakota: Presented at the Third Annual Meeting of the Greater North Dakota Association, Grand Forks. Milo Hoisveen Papers. North Dakota Archives, Bismark, North Dakota.

———. Presentation to Water Users Convention in Minot, N.D. Milo Hoisveen Papers. North Dakota Archives, Minot, North Dakota.
———. Progress in the North Dakota Water Resources Program. Milo Hoisveen Papers. North Dakota Archives, Bismark, North Dakota.
———. Statement at Public Hearing for Flood Control. Milo Hoisveen Papers. North Dakota Archives, Bismark, North Dakota.
———. Statement before House Committee on Public Works. Milo Hoisveen Papers. North Dakota Archives, Washington, D.C.
———. Statement before Interstate Commerce Commission Regarding Discontinuance of the Northern Pacific Railroad-Mott Line. Milo Hoisveen Papers. North Dakota Archives.
———. Statement before the International Joint Commission for Development of the Water Resources of the Pembina River Basin Manitoba and North Dakota. Milo Hoisveen Papers. North Dakota Archives, Bismark, North Dakota.
———. Statement by Milo Hoisveen before the House Subcommittee on Flood-Control Rivers and Harbors. Milso Hoisveen Papers. North Dakota Archives, Washington, D.C.
———. Statement for Swc Project #1344. Milo Hoisveen Papers. North Dakota Archives, Bismarck, North Dakota.
———. Statement of Milo W. Hoisveen State Engineer and Chief Engineer North Dakota State Water Commission before House Subcommittee on Public Works Appropriations, Eighty Fifth Congress, First Session. Milo Hoisveen Papers. North Dakota Archives, Bismarck.
———. Statement of Milo W. Hoisveen, on Pipestem Dam and Reservoir on Pipestem Creek, a Tributary of James River, North Dakota. Milo Hoisveen Papers. North Dakota Archives.
———. Water for the Future. Milo Hoisveen Papers. North Dakota Archives, Speech, County Commissioner Association of North Dakota, Williston, North Dakota.
———. Water Programs Are Bringing Added Prosperity to North Dakota. Milo Hoisveen Papers. North Dakota Archives.
———. Water Programs in the Nodak Area. North Dakota Archives, Grand Forks, North Dakota.
———. Water Resources. Milo Hoisveen Papers. North Dakota Archives, Minot, North Dakota.
———. Water Resources and Planning in North Dakota. Milo Hoisveen Papers. North Dakota Archives, Fargo, North Dakota.
———. Water Resources of Southwestern North Dakota. Milo Hoisveen Papers. North Dakota Archives, Dickinson, North Dakota.
———. “Water, a Source of Beauty” a Presentation to North Dakota State Beauty Conference. Milo Hoisveen Papers. North Dakota Archives, North Dakota Economic Development Commission in Bismark, North Dakota.
Inland Waters Directorate, and Environment Canada. *Garrison Information Kit #1: Impact of the Garrison Diversion on Canada: An Overview.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #2: The Current Status of the Garrison Project.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #3: Text of the Canada - U.S. Garrison Diversion Unit Reference to the International Joint Commission.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #4: Impacts on Water Quality in Canada.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #5: Flooding Potential Increased.* (Ottawa, ON; Winnipeg, MB: 1975).

———. *Garrison Information Kit #6: Foreign Species.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #7: Federal and Provincial Activities.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #8: Canada - U.S. Environmental Relations: An Important Precedent.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #9: Other Sources of Information.* (Ottawa, ON; Winnipeg, MB: 1975).
———. *Garrison Information Kit #10: Canadian Position on the Garrison Diversion Unit.* (Ottawa, ON; Winnipeg, MB: 1975).
Inland Waters Directorate, Environment Canada, and Manitoba Department of Mines Resources and Environmental Management. *Some Effects of the Garrison Diversion Unit on the Souris River in Canada.* Environment Canada (Ottawa, ON; Winnipeg, MB: 1974).
International Garrison Diversion Study Board, and International Joint Commission. *International Garrison Diversion Study Board Appendix B: Water Quantity Committee Report-Information File to December 1976.* International Joint Commission (Ottawa, ON; Washington, D.C.: 1976).
International Garrison Diversion Study Board, and International Joint Committee. "Report." Ottawa, ON; Washington, D.C.: International Joint Commission, 1976.
International Joint Commission. *The Annual Report 1977.* The International Joint Commission Canada-United States (Ottawa, ON; Washington, D.C.: 1978).
———. *Transboundary Implications of the Garrison Diversion Unit.* The International Joint Commission Canada-United States (Ottawa, ON; Washington, D.C.: 1977).
Jameson, Dave. *Hoisveen Earns a Rocking Chair.* The Bismarck Tribune. Bismarck, North Dakota, October 19, 1972.
Johnson, Janice Benson. "Time and a River Diverted: A Planning Evaluation of the Garrison Diversion Project."M.C.R.P., North Dakota State University, 1977.
Manitoba Environmental Council. *Submission to International Joint Commission on the Hearings of the Garrison Diversion Unit.* University of Winnipeg (Winnipeg, Manitoba: November 20 1975).
Miller, James Nathan. "Half a Billion Dollars Down the Drain." *Readers Digest* (November 1976).
North Dakota State Water Commission. *1969-1971 Budget Report to Appropriations Committees - 41st Legislative Assembly S.B. 23.* North Dakota State (Bismarck, North Dakota: January 20, 1969 1969).
Nossal, Kim Richard. "The Unmaking of Garrison: United States Politics and the Management of Canadian-American Boundary Waters." *Behind the Headlines* 37, no. 1 (1978): 30 pp.
Owen, John B., Dean S. Elsen, Gordon W. Russell, and University of North Dakota. Fisheries Research Unit. *Distribution of Fishes in North and South Dakota Basins Affected by the Garrison Diversion Unit.* Grand Forks: Fisheries Research Unit [Distributed by] Dept. of Biology, University of North Dakota, 1981.
Pearson, Gary L., Walter L. Pomeroy, Glen A. Sherwood, and John S. Winder Jr. *A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota).* Environmental Impact Assessment Project of The Institute of Ecology (January, 1975).
Red River Valley Water Supply Project. *Construction Updates.* http://www.rrvwsp.com/updates/.

State Historical Society of North Dakota. "Milo Hoisveen Papers - Biographical Sketch." North Dakota: State Historical Society of North Dakota. www.history.nd.gov/archives/manuscripts/inventory/10463.html.

The Institute of Ecology. "A Scientific and Policy Review of the Final Environmental Statement for the Initial Stage, Garrison Diversion Unit (North Dakota)." edited by Gary L. Pearson, Walter L. Pomeroy, Glen A. Sherwood and John S. Jr. Winder. Washington: Bureau of Reclamation and U.S. Department of the Interior, 1975.

Transcript of Hearing: Garrison Diversion Project Minot, North Dakota, November 18, 1975 - P.M. (1975).

Transcript of Hearing: Garrison Diversion Project, Grand Forks, North Dakota, November 19, 1975 - P.M. (1975).

Transcript of Hearing: Garrison Diversion Project, Minot, North Dakota, November 19, 1975 - A.M. (1975).

Transcript of Hearing: Garrison Diversion Project, Winnipeg, Manitoba, November 20, 1975 - P.M. (1975).

U.S Bureau of Reclamation. *Initial Stage of the Garrison Diversion Unit: Final Environmental Statement.* (Washington, D.C.: Bureau of Reclamation, 1974).

U.S. Bureau of Reclamation. *Final Environmental Statement: Initial Stage of the Garrison Diversion Unit. Pick-Sloan Missouri Basin Program, North Dakota.* Washington: U.S. Department of the Interior, 1974.

———. *Response to 'a Scientific and Policy Review of the Final Environmental Statement for the Initial State, Garrison Diversion Unit (North Dakota) by the Environmental Impact Assessment Project of the Institute of Ecology'.* (Washington: 1975).

———. *Statement on Environmental Impact. Garrison Diversion Unit - Missouri River Basin Project - North Dakota Pursuant to Section 102(2)(C) of National Environmental Policy Act 1969.* (Washington, D.C.: 1973).

———. *Statement on Environmental Impact. Garrison Diversion Unit - Missouri River Basin Project - North Dakota Pursuant to Section 102(2)(C) of National Environmental Policy Act 1969* Washington, D.C., 1973.

U.S. Senate. *Department of the Interior and Related Agencies Appropriations for Fiscal Year 1982: Hearings before a Subcommittee of the Committee on Appropriations, United States Senate, Ninety-Seventh Congress, First Session, on H.R. 4035.* U.S. Senate. 1004 (1981).

U.S. Fish and Wildlife Service. *An Evaluation of the Impacts Caused by the Garrison Diversion Unit on National Wildlife Refuges in North Dakota.* U.S. Fish and Wildlife Service Bismarck Area Office (Bismarck, North Dakota: March 1976 1976).

Unknown. "Milo Hoisveen to Receive Award." *The Bismark Tribune* (Bismark, North Dakota), November 25, 1970, 23.

———. "Milo Hoisveen: Obituary." *The Bismark Tribune* (Bismark, North Dakota), October 21 1990.

———. "North Dakota's 'Mr. Water'." *The Bismark Tribune* (Bismark, North Dakota), June 28, 1973, 4.

Walsh County Historical Society. *Walsh Heritage: A Story of Walsh County and Its Pioneers.* Vol. 1, Grafton, North Dakota: Associated Printers, 1976.

Welsh, Matthew E. "Role of the International Joint Commission." Paper presented at the 12th Conference on the Great Lakes Research, Ann Arbor, Michigan, 1969.

Wyman, Renée, and John Badan. "The Garrison File: Profile of a Pork Barrel." *Reason* (January 1985).

Secondary Sources

Andrews, Richard N. L. *Managing the Environment, Managing Ourselves: A History of American Environmental Policy.* 2nd ed. New Haven: Yale University Press, 2006.

Bakker, Karen J. *Eau Canada: The Future of Canada's Water.* Vancouver: UBC Press, 2007.

Bartlett, Robert V. "Adapt or Get Out: The Garrison Diversion Project and Controversy." *Environmental Review* 12, no. 3 (1988): 57-74.

Bear, Dinah. "The National Environmental Policy Act: Its Origins and Evolutions." *Natural Resources & Environment* 10, no. 2 (1995): 3-6, 69-73.

Becker, Mimi Larsen. "The International Joint Commission and Public Participation: Past Experiences, Present Challenges, Future Tasks." *Natural Resources Journal* 33, no. 2 (1993): 235-74.

Benidickson, Jamie. *Levelling the Lake: Transboundary Resource Management in the Lake of the Woods Watershed.* Vancouver: University of British Columbia Press, 2019.

Billington, David P., Donald C. Jackson, and Martin V. Melosi. *The History of Large Federal Dams Planning, Design, and Construction in the Era of Big Dams*. Denver, Colorado: U.S. Department of the Interior, Bureau of Reclamation, 2005. http://purl.access.gpo.gov/GPO/LPS102089.

Blackbourn, David. *The Conquest of Nature: Water, Landscape, and the Making of Modern Germany.* 1st American ed. New York: Norton, 2006.

Bloomfield, L.M., and Gerald F. Fitzgerald. *Boundary Water Problems of Canada and the United States: The International Joint Commission, 1912-1958.* Toronto: Carswell, 1958.

Bossert, Patricia. "An Analysis of the Scope of the Final Environmental Impact Statement of the Garrison Diversion Unit Project: Applying a Totality of Circumstances Test." *North Dakota Law Review* 53, no. 3 (1976): 427-48.

Bourne, C. B. *Development of the Columbia River: Its International Legal Aspects.* [s.i.]: International Law Committee, 1956.

Brandson, Norman, and Allen Olsen. "The International Joint Commission and Mid-Continent Water Issues: The Garrison Diversion, Red River, Devils Lake, and the Northwest Area Water Supply Project." In *The First Century of the International Joint Commission*, edited by Daniel Macfarlane and Murray Clamen. Canadian History and Evnironment Series, 215-37. Calgary, Alberta: University of Calgary Press, 2020.

Braun, Bruce. "Producing Vertical Territory: Geology and Governmentality in Late Victorian Canada." *Ecumene* 7, no. 1 (2000): 7-46.

Bukowczyk, John J., Nora Faires, David Smith, and Randy Widdis. *Permeable Border: The Great Lakes Basin as Transnational Region, 1650-1990.* Pittsburgh: University of Pittsburgh Press, 2005.

Caldwell, Lynton K. "Garrison Diversion: Constraints on Conflict Resolution." *Natural Resources Journal* 24, no. 4 (1984): 839-63.

Campbell, David C. "The Pick-Sloan Program: A Case of Bureaucratic Economic Power." *Journal of Economic Issues* 18, no. 2 (1984): 449-56.

Carson, Rachel. *Silent Spring.* New York: Fawcett Crest, 1964.

Carvell, Charles M. "The North Dakota Garrison Diversion Project and International Environmental Law." *North Dakota Law Review* 60, no. 4 (1984): 603-57.

Chacko, Chirakaikaran Joseph. *The International Joint Commission Between the United States of America and the Dominion of Canada.* New York: AMS Press, 1968.
Clamen, Murray. "The IJC and Transboundary Water Disputes: Past, Present, and Future." In *Water Without Borders?: Canada, the United States and Shared Waters*, edited by Emma S. Norman, Alice Cohen and Karen J. Bakker, 70-87. Toronto, ON: University of Toronto Press, 2013.
Clamen, Murray, and Daniel Macfarlane. "Conclusion." In *The First Century of the International Joint Commission*, edited by Daniel Macfarlane and Murray Clamen. Canadian History and Environment Series. Calgary, Alberta: University of Calgary Press, 2020.
———. "Introduction." In *The First Century of the International Joint Commission*, edited by Daniel Macfarlane and Murray Clamen. Canadian History and Environment Series. Calgary, Alberta: University of Calgary Press, 2020.
Cohen, Alice, and Seanna Davidson. "An Examination of the Watershed Approach: Challenges, Antecedents, and the Transition from Technical Tool to Governance Unit." *Water Alternatives* 4, no. 1 (2011): 1-14.
Collins, H.M., and Robert Evans. *Rethinking Expertise.* Chicago: University of Chicago Press, 2007.
Correll, Helen Hoehn. "Until the Old Men Die: A Case Study of the Garrison Diversion Project in North Dakota." Doctor of Philosophy, Michigan Technological University, 2000.
Cortesi, Luisa, and K.J. Joy, eds. *Split Waters: The Idea of Water Conflicts*. London and New York: Routledge, 2021.
Cronon, William. "The Trouble with Wilderness: Or, Getting Back to the Wrong Nature." *Environmental History* 1, no. 1 (1996): 7-28.
———. *Uncommon Ground: Rethinking the Human Place in Nature.* New York: W.W. Norton & Co., 1996.
Dakota, State Historical Society of North. *U. S. Army Corps of Engineers Garrison Dam Construction Films.* https://www.history.nd.gov/archives/manuscripts/inventory/11084.html.
Dakota, State of North. *Brynhild Haugland.* Office of the Governor, 2023. www.governor.nd.gov/theodore-roosevelt-rough-rider-award/brynhild-haugland.
Davidson, John H., and Tomas Earl Geu. "The Missouri River and Adaptive Management: Protecting Ecological Function and Legal Process." *Nebraska Law Review* 80, no. 4 (2001): 816-90.
Desrochers, Pierre, and Christine Hoffbauer. "The Post War Intellectual Roots of the Population Bomb." *The Electronic Journal of Sustainable Development* 1, no. 3 (2010): 73-97.
Doemel, Nancy J. *The Garrison Diversion Unit: Science, Technology, Politics, and Values.* Bloomington: Advanced Studies in Science, Technology and Public Policy, Indiana University, 1980.
Doherty, Josephine, and Arthur W. Cooper. "The Short Life and Early Death of the Institute of Ecology: A Case Study in Institution Building." *Bulletin of the Ecological Society of America* 71, no. 1 (1990): 6-17.
Eastman, Adam R. "Hit List: President Carter's Review of Reclamation Water Projects and His Impact on Federal Water Policy." Doctor of Philosophy, University of Oklahoma, 2013.
Engineers, U.S. Army Corps of. *Garrison Project Statistics.* 2012. https://www.nwo.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487634/garrison-project-statistics/.

Feldman, David L. "The Great Plains Garrison Diversion Unit and the Search for an Environmental Ethic." *Policy Sciences* 24, no. 1 (1991): 41-64.
Foley, Michael Stewart. "'Everyone Was Pounding on Us': Front Porch Politics and the American Farm Crisis of the 1970s and 1980s." *Journal of Historical Sociology* 28, no. 1 (2015): 104-24.
Forest, Benjamin, and Patrick Forest. "Engineering the North American Waterscape: The High Modernist Mapping of Continental Water Transfer Projects." *Political Geography* 31, no. 3 (2012): 167-83.
Goodman, Doug, and Daniel McCool. *Contested Landscape: The Politics of Wilderness in Utah and the West.* Salt Lake City: University of Utah Press, 1999.
Griffin, C.B. "Watershed Councils: An Emerging Form of Public Participation in Natural Resource Management." *Journal of the American Water Resources Association* 35, no. 3 (1999): 505-18.
Hafermehl, Louis N. "To Make the Desert Bloom: The Politics and Promotion of Early Irrigation Schemes in North Dakota." *North Dakota History: Journal of the Northern Plains* 59, no. 3 (1992): 13-27.
Hall, Noah D., Dan A. Tarlock, and Marcia Valiante. "The Boundary Waters Treaty, the International Joint Commission, and the Evolution of Transboundary Environmental Law and Governance." In *The First Century of the International Joint Commission*, edited by Daniel Macfarlane and Murray Clamen. Canadian History and Environment Series. Calgary, Alberta: University of Calgary Press, 2020.
Hamlin, Christopher. *Science of Impurity: Water Analysis in Nineteenth Century Britain.* Bristol: Adam Hilger/Oxford University Press, 1990.
Heasley, Lynne, Daniel Macfarlane, and Noah D. Hall. *Border Flows: A Century of the Canadian-American Water Relationship*. Calgary, Alberta: University of Calgary Press, 2016.
Hulme, Mike. *Why We Disagree About Climate Change: Understanding Controversy, Inaction, and Opportunity.* Cambridge, U.K.; New York: Cambridge University Press, 2009.
Hundley Jr., Norris. *Water and the West: The Colorado River Compact and the Politics of Water in the American West.* 2nd ed. Berkeley, California: University of California Press, 2009.
International Joint Commission. *The Boundary Waters Treaty of January 11, 1909 between the United States and Great Britain.* International Joint Commission (Ottawa, ON; Washington, D.C.: 2016). ijc.org/sites/default/files/2018-07/Boundary%20Water-ENGFR.pdf.
———. *The I.J.C. And the 21st Century.* The International Joint Commission Canada-United States ([s.i.]: [s.n.], 1997).
Isenberg, Andrew C. *The Oxford Handbook of Environmental History.* Oxford Handbooks. Oxford; New York: Oxford University Press, 2014.
Jones-Imhotep, Edward, and Tina Adcock, eds. *Made Modern: Science and Technology in Canadian History*. Vancouver, British Columbia: University of British Columbia Press, 2018.
Jørgensen, Dolly. "Environmentalists on Both Sides: Enactments in the California Rigs-to-Reefs Debate." Chap. 4 In *New Natures: Joining Environmental History with Science and Technology Studies*, edited by Dolly Jørgensen, Finn Arne Jørgensen and Sara B. Pritchard, 51-68. Pittsburgh: University of Pittsburgh Press, 2013.

Jørgensen, Dolly, Finn Arne Jørgensen, and Sara B. Pritchard. *New Natures: Joining Environmental History with Science and Technology Studies.* Pittsburgh: University of Pittsburgh Press, 2013.
Kelly, Paul Edward. "Under the Ditch: Irrigation and the Garrison Diversion Controversy."M.S., North Dakota State University, 1989.
Keys, David Lee. "North Dakota's Garrison Diversion Unit: A Case Study of Domestic and International Environmental Values Conflict."PhD, Indiana University, 1984.
Kirk, Andrew G. "From Wilderness Prophets to Tool Freaks: Post-World War II Environmentalism." In *A Companion to American Environmental History*, edited by Douglas Cazaux Sackman, 285-303. Chichester, West Sussex; Malden, MA: Wiley-Blackwell, 2010.
Kurian, Priya A., and Robert V. Bartlett. "The Garrison Diversion Dream and the Politics of Landscape Engineering." *North Dakota History* 59, no. 2 (1992): 40-51.
Ladner, Leon J., and Canadian Bar Association. *International Legal Implications of the Columbia River Development.* [s.i.]: [s.n.], 1957.
Lawson, Michael L. *Dammed Indians Revisited: The Continuing History of the Pick-Sloan Plan and the Missouri River Sioux.* Pierre, South Dakota: South Dakota State Historical Society Press, 2009.
Le Prestre, Philippe, and Peter Stoett, eds. *Bilateral Ecopolitics: Continuity and Change in Canadian-American Environmental Relations*. New York: Routledge, 2016.
Lear, Linda J. *Rachel Carson: Witness for Nature.* 1st Mariner Books ed. Boston: Mariner Books, 2009.
Leitch, Jay A., and Donald E. Anderson. *Impact of Inundation and Changes in Garrison Diversion Project Plans on the North Dakota Economy.* Agricultural Economics. Vol. 127, Fargo: Department of Agricultural Economics, North Dakota Agricultural Experiment Station, North Dakota State University, 1978.
Lekan, Thomas, and Thomas Zeller, eds. *Germany's Nature: Cultural Landscapes and Environmental History*. Ithaca, New York: Rutgers University Press, 2005.
Loo, Tina, and Meg Stanley. "An Environmental History of Progress: Damming the Peace and Columbia Rivers." *The Canadian Historical Review* 92, no. 3. (2011): 399-427.
Luby, Brittany. *Dammed: The Politics of Loss and Survival in Anishinaabe Territory.* Critical Studies in Native History. Winnipeg, Manitoba: University of Manitoba Press, 2020.
Luther, Linda. *The National Environmental Policy Act: Background and Implementation.* Science Resources, and Industry Division, CRS Report for Congress (February 29, 2008 2008). https://fas.org/sgp/crs/misc/RL33152.pdf.
Macfarlane, Daniel. *Negotiating a River: Canada, the U.S., and the Creation of the St. Lawrence Seaway.* Vancouver, British Columbia: University of British Columbia Press, 2014.
Macfarlane, Daniel, and Murray Clamen, eds. *The First Century of the International Joint Commission*, vol. no 10. Calgary, Alberta: University of Calgary Press, 2020.
Macfarlane, Daniel, and Andrea Olive. "Whither Wintego: Environmental Impact Assessment and Indigenous Opposition in Saskatchewan's Churchill River Hydropower Project in the 1970s." *Canadian Historical Review* 102, no. 4 (2021): 620-46.
Makepeace, Garth O. "The International Joint Commission: Determinants of Success." Masters of Arts, University of British Columbia, 1980.
Marcus, Alan I., and Amy Sue Bix. *The Future Is Now: Science and Technology Policy in America since 1950.* Amherst, N.Y.: Humanity Books, 2007.

Mauch, Christof, and Thomas Zeller. *Rivers in History: Perspectives on Waterways in Europe and North America.* History of the Urban Environment. Pittsburgh, Pa.: University of Pittsburgh Press, 2008.
May, Elaine Tyler. *Homeward Bound: American Families in the Cold War Era.* Revised edition. ed. New York: Basic Books, 2017.
Mayhall Sherr, Elizabeth. "Understanding the International Joint Commission: A Comparative Case Study Approach." Doctor of Philosophy, Colorado State University, 2005.
McCool, Daniel. *River Republic: The Fall and Rise of America's Rivers.* New York: Columbia University Press, 2012.
McNeill, John Robert, and Corinna R. Unger, eds. *Environmental Histories of the Cold War*, Publications of the German Historical Institute. Washington, D.C.: German Historical Institute, 2010.
Mitman, Gregg. *The State of Nature: Ecology, Community, and American Social Thought, 1900-1950.* Science and Its Conceptual Foundations. Chicago: University of Chicago Press, 1992.
Morris, Christopher. "The Big Muddy: An Environmental History of the Mississippi and Its Peoples from Hernando De Soto to Hurricane Katrina." Oxford, U.K.: Oxford University Press, 2012.
Moy, Richard, and Jonathan O'Riordan. "The International Joint Commission's Unique and Colourful Role in Three Projects in the Pacific Northwest." In *The First Century of the International Joint Commission*, edited by Daniel Macfarlane and Murray Clamen, 239-81. Calgary, Alberta: University of Calgary Press, 2020.
Nieto-Galan, Agusti. *Science in the Public Sphere: A History of Lay Knowledge and Expertise.* London: Routledge, 2016.
Norman, Emma S., Alice Cohen, and Karen J. Bakker. *Water Without Borders?: Canada, the United States and Shared Waters.* Toronto: University of Toronto Press, 2013.
Nye, David E. *America as Second Creation: Technology and Narratives of New Beginnings.* Cambridge: MIT Press, 2003.
Oreskes, Naomi. "The Fact of Uncertainty, the Uncertainty of Facts and the Cultural Resonance of Doubt." *Philosophical Transactions Royal Society* 373 (2015).
———. "How Earth Science Has Become a Social Science." *Historical Social Research/ Historische Sozialforschung* 40, 152, no. 2 (2015): 246-70.
Otstot, Roger S. *An Overview of the Pick-Sloan Missouri Basin Program.* U.S. Department of the Interior (Great Plains Region: 2022).
Parker, Angela W. "Taken Lands: Territory and Sovereignty on the Fort Berthold Indian Reservation, 1934-1960." Doctor of Philosophy, The University of Michigan, 2011.
Parr, Joy. *Sensing Changes: Technologies, Environments, and the Everyday, 1953-2003.* Vancouver; Seattle, WA: UBC Press; University of Washington Press, 2010.
Piper, Liza. *The Industrial Transformation of Subarctic Canada.* Vancouver, British Columbia: University of British Columbia Press, 2009.
Pisani, Donald J. "Federal Reclamation and the American West in the Twentieth Century." *Agricultural History* 77, no. 3 (2003): 391-419.
Porter, Theodore M. *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life.* New Jersey: Princeton University Press, 1995.
Pritchard, Sara B. *Confluence: The Nature of Technology and the Remaking of the Rhône.* Cambridge, Massachusetts: Harvard University Press, 2011.

———. "Recreating the Rhône: Nature and Technology in France since World War II." Doctor of Philosophy, Stanford University, 2001.
Reisner, Marc. *Cadillac Desert: The American West and Its Disappearing Water*. Rev. and updated. ed. Vancouver: Douglas & McIntyre, 1993.
Richard Nossal, Kim. "A Square Peg: The Lessons of the Point Roberts Reference, 1971-1977." In *The First Century of the International Joint Commission*, edited by Daniel Macfarlane and Murray Clamen, 195-214. Calgary, Alberta, Canada: University of Calgary Press, 2020.
Robinson, Elwyn B. *History of North Dakota*. Grand Forks, North Dakota: University of North Dakota, 2017. https://commons.und.edu/oers/1.
Robinson, Sheila C. *Taming the Big Muddy: The Story of the Garrison Dam.* Garrison, North Dakota: BHG Inc., 1997.
Rowley, William D. *Reclaiming the Arid West: The Career of Francis G. Newlands.* Indiana: Indiana University Press, 1996.
Russel, Brian K. "Flooded Lifeways: A Study of the Garrison Dam and Its Environmental Impact Upon the Three Affiliated Tribes of the Fort Berthold Indian Reservation." Master of Arts, University of North Dakota, 2000.
Sackman, Douglas Cazaux. *A Companion to American Environmental History.* Blackwell Companions to American History. Chichester, West Sussex; Malden, MA: Wiley-Blackwell, 2010.
Sando, Paul R. "Water and Political Relations Between the Upper Plains States and the Prairie Provinces: What Works, What Doesn't, and What's All Wet." In *Beyond the Border: Tensions across the Forty-Ninth Parallel in the Great Plains and Prairies*, edited by Timothy Pasch and Kyle Conway, 133-50. Montreal: McGill-Queen's University Press, 2013.
Schneiders, Robert Kelley. *Big Sky Rivers: The Yellowstone and Upper Missouri.* Lawrence, Kansas: University Press of Kansas, 2003.
Schrepfer, Susan R., and Douglas Cazaux Sackman. "Gender." In *A Companion to American Environmental History*, edited by Douglas Cazaux Sackman, 116-45. Chichester, West Sussex; Malden, MA: Wiley-Blackwell, 2010.
Schwartz, Alan M. "The Management of Shared Waters: Watershed Boards Past and Future." In *Bilateral Ecopolitics: Continuity and Change in Canadian-American Environmental Relations*, edited by Philippe Le Prestre and Peter Stoett, 133-44. New York: Routledge, 2016.
Spencer, Robert, Johan Kirton, and Kim Richard Nossal, eds. *The International Joint Commission Seventy Years On*. Toronto, Canada: The Centre for International Studies, University of Toronto, 1981.
Squatriti, Paolo. *Natures Past: The Environment and Human History.* The Comparative Studies in Society and History Book Series. Ann Arbor: University of Michigan Press, 2007.
The United Nations Educational, Scientific and Cultural Organization. *The United Nations World Water Development Report 2023.* UNESCO (Paris, France: 2023).
Thorson, John E. *River of Promise, River of Peril: The Politics of Managing the Missouri River.* Development of Western Resources. Lawrence, Kansas: University Press of Kansas, 1994.

U.S. Army Corps of Engineers. *Garrison Dam/Lake Sakakawea.* 2023. http://www.web.archive.org/web/20041024154045/https://www.nwo.usace.army.mil/html/Lake_Proj/garrison/dam.html.
———. *The U.S. Army Corps of Engineers: A History*. Washington: U.S. Department of the Interior, 2008.
U.S. Bureau of Reclamation. *Delivering Water and Power for the West.* Department of the Interior, Motion Picture Division, 2010. https://www.youtube.com/watch?v=lIYrQWFvdSo.
———. *History and Federal Legislation: The Pick-Sloan Missouri Basin Program.* 2023. http://www.garrisondiv.org/about/HistoryFederalLegislation/.
U.S. Environmental Protection Agency. *What Is the National Environmental Policy Act?* : U.S. Environmental Protection Agency, 2023. https://www.epa.gov/nepa/what-national-environmental-policy-act#:~:text=The%20National%20Environmental%20Policy%20Act%20(NEPA)%20was%20signed%20into%20law,actions%20prior%20to%20making%20decisions. .
Walker Q.C., Gordon. "The Boundary Water Treaty 1909 — a Peace Treaty?". *Canada-United States Law Journal* 39, no. 14 (2014): 170-86.
Ward, Evan R. *Border Oasis: Water and the Political Ecology of the Colorado River Delta, 1940-1975.* Environmental History of the Borderlands. Tucson: University of Arizona Press, 2003.
Welsted, John. "The Garrison Diversion Unit - an Update." *Canadian Water Resources Journal* 8, no. 1 (1983): 51-59.
White, Richard. *The Organic Machine: The Remaking of the Columbia River.* New York: Hill and Wang, 1995.
Whorley, David. "From IWC to BWT: Canada-U.S. Institution Building, 1902-1909." In *The First Century of the International Joint Commission*, edited by Daniel Macfarlane and Murray Clamen, 35-70. Calgary, Alberta: University of Calgary Press, 2020.
Wilson, J. W. *People in the Way: The Human Aspects of the Columbia River Project.* Toronto; Buffalo: University of Toronto Press, 1973.
Wilson, Robert M. *Seeking Refuge: Birds and Landscapes of the Pacific Flyway.* Weyerhaeuser Environmental Books. Seattle: University of Washington Press, 2010.
Winner, Langdon. *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought.* Cambridge, MA: MIT Press, 1977.
Worster, Donald. *A River Running West: The Life of John Wesley Powell.* Oxford; New York: Oxford University Press, 2001.
———. *Rivers of Empire: Water, Aridity, and the Growth of the American West.* 1st ed. New York: Pantheon Books, 1985.
———. *Under Western Skies: Nature and History in the American West.* New York; Oxford: Oxford University Press, 1992.