TOWARDS A MORE-THAN-HUMAN GEOGRAPHY OF THE YELLOWSTONE RIVER

by

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DEDICATION

To my maternal grandparents Jean and Jack Ziemann for all their love and support through the years. I miss you.

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ABSTRACT

This dissertation conceptualizes the Yellowstone River, flowing more than 670 miles from its headwaters in the mountains of northwestern Wyoming to its confluence with the Missouri River in western North Dakota, as a more-than-human assemblage. Specifically, this dissertation asks the following overarching research question: How does a more-than-human approach to understanding the Yellowstone River further geographical conceptualizations of human-environment relationships? In order to answer this question, this dissertation investigates the more-than-human aspects of both historical and contemporary environmental conflicts within Montana's portion of the Yellowstone River Basin. Chapter 2 examines the relationship between instream flow water law, Montana Fish and Game, and the Yellowstone River Basin. Drawing from both critical legal geography and political ecology, it furthers understandings of instream flow water law as relationally co-constituted through both human and nonhuman forces. Chapter 2 also traces the influence of Montana Fish and Game's more-than-anthropocentric ethical position on interpretations of the 1973 Montana Water Use Act. Chapter 3 uses a more-than-human approach to examine the relationship between myth and the Yellowstone River. Specifically, this chapter combines existing geographical understandings of myth with theories of assemblage and affect in order to historicize and denaturalize mythic belief in the Yellowstone as the longest undammed or free-flowing river remaining in the United States. Chapter 4 advances more-than-human understandings of political agency through a reframing of human thought as a co-constitutional assemblage of human and nonhuman elements. Relying on a comparative case study approach and qualitative interview data from two Montana communities located along the lower Yellowstone River, this chapter supports its theoretical claims through an embodied and affective analysis of the communities' divergent flood risk perceptions. Chapter 5 closes this dissertation with reflections on the value of using a more-than-human geographical approach.

CHAPTER ONE

INTRODUCTION AND OVERVIEW

Introduction

The Yellowstone River is a complex socioenvironmental assemblage. Made up of things and ideas including religion, water, bridges, sand, social power, kinetic energy, memories, garbage, people, concrete, trees, boats, ducks, levees, nitrates, photographs, beaver, houses, laws, bugs, parasites, capital, islands, moose, automobiles, gravel bars, bullets, diversion dams, irrigation pumps, geese, death, suspended sediments, oil spills, myths, agates, dissolved oxygen, and even happiness, the Yellowstone River defies any simplistic classification as exclusively a human or nonhuman entity. In other words, the Yellowstone River is more-than-human (Cresswell 2013; Greenhough 2014).

Flowing more than 670 miles from its headwaters just southeast of Yellowstone National Park in northwestern Wyoming to its confluence with the Missouri River in western North Dakota, the Yellowstone River is a ribbon of energy that slices through the mountainous Northern Rockies as well as the badlands of eastern Montana (Figure 1.1). In its upper portions, the Yellowstone is a swift flowing, single channel mountain stream that powerfully erodes geologic substrate and famously provides cold water and ideal habitat for many species of trout. As the river enters the Paradise Valley, it branches out, forming multiple channels and islands. The water is still considered cool here, although climate change, floodplain mismanagement, incessant mining proposals, irrigation

demand, and rampant recreational tourism threaten the ecological and geomorphological viability of this world-famous trout fishery (Lang 1995; Herring 1999; French 2017).

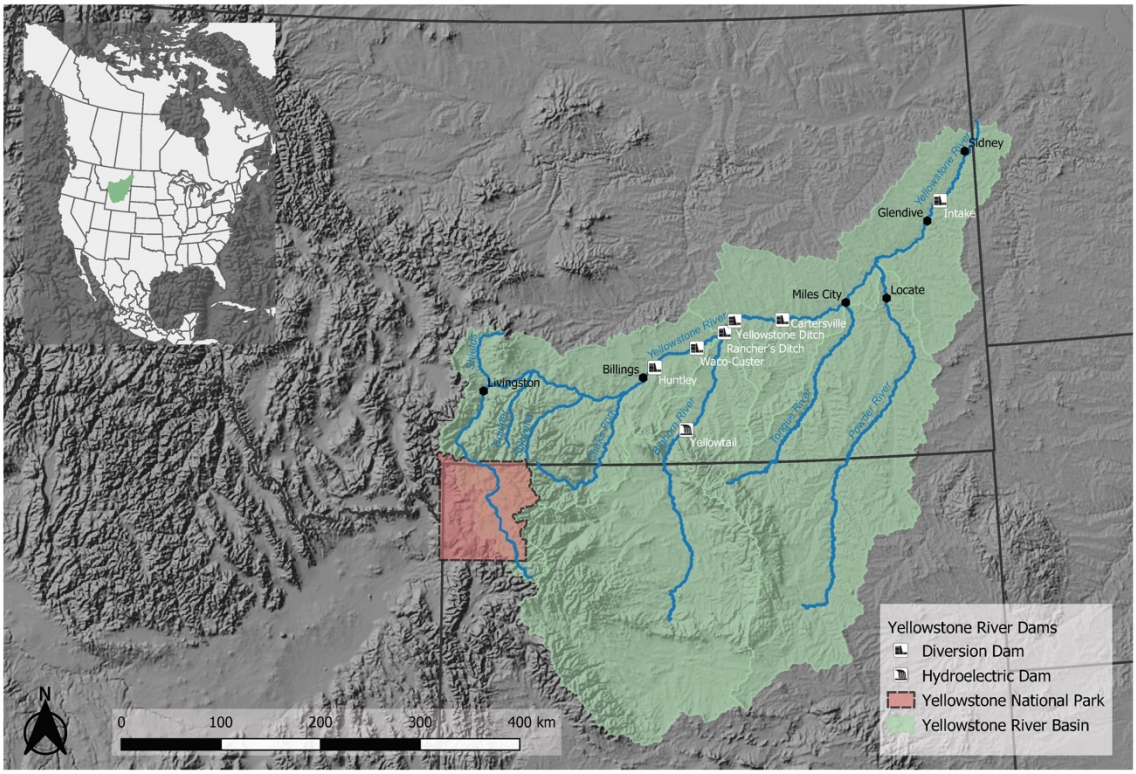


Figure 1.1 The Yellowstone River Basin. *Source:* Jackson Rose.

Passing Livingston, Montana the river picks up additional water from several important tributaries – the Shields, Boulder, and Stillwater. As the river approaches Billings, Montana it becomes even more braided and continues its transition from a cold to a warm water fishery. The presence of oil refineries in its floodplain and numerous pipelines drilled under its bed mark the river as an unmistakably utilitarian entity (Goldfarb 2016a). Here Hemingway's Clarks Fork also empties its return flows into the Yellowstone. Downstream of Billings, two irrigation diversion dams – Huntley and Waco-Custer – remove water for irrigation before the Bighorn joins the river. The Bureau

of Reclamation's Yellowtail Dam and Bighorn Lake (i.e. reservoir) dramatically changed the flow regime and sediment load not only of the Bighorn River but also the lower Yellowstone River beginning in the 1960s. Affecting everything from ice jam intensity to cottonwood regeneration, Yellowtail serves as a monument to the era of large dam building that swept the American West for much of the twentieth century (U.S. Army Corps of Engineers and Yellowstone River Conservation District Council 2015).

Downstream of the Bighorn River, the Yellowstone takes on the characteristics of a slow-moving, sediment-depositing river. Replete with sand bars, islands, multiple channels, and seasonal backwaters, the lower Yellowstone River is excellent habitat for many types of wildlife, including many species of birds and furbearing mammals. Although this portion of the river supports a productive warm water fishery, seasonal fluctuation often produces flood and drought conditions (Schneider 1985). While not limited only to the lower Yellowstone, ice jams in March and high water in June mean that the river's communities deal with two flood seasons each year. As high water recedes, the hot, dry late summer months make the Yellowstone's water scarcer for both humans and nonhumans. Three more irrigation diversions – Rancher's Ditch, Yellowstone Ditch, and Cartersville – affect the Yellowstone River's flow between its confluence with the Bighorn and Tongue Rivers. At Miles City, Montana, a levee system directs the flow of the Tongue and Yellowstone Rivers through the community (KLJ 2015). Past Miles City, the Powder River dumps its naturally occurring high sediment load into the Yellowstone and helps to make the Yellowstone at Glendive, Montana a

dangerous river with complex undercurrents and shifting sand and gravel bars (U.S. Army Corps of Engineers 2014).

Just down the river from Glendive, the Yellowstone's final diversion dam at Intake threatens the very existence of the endangered Pallid Sturgeon. This fish species, which has existed for approximately 70 million years and now faces the possibility of extinction, serves as a powerful symbol and material indicator for the environmental consequences of the Yellowstone's settler-colonial history (Goldfarb 2016b; U.S. Bureau of Reclamation and U.S. Army Corps of Engineers 2016). After Intake, the Yellowstone makes its way past the oil development affected community of Sidney, Montana before reaching its confluence with the Missouri River. The Yellowstone's journey – from its headwaters to its confluence – cannot be adequately captured in any one document. Consequently, this dissertation seeks only to partially explain this system's complex human-environment geography through a more-than-human geographical analysis.

More-Than-Human Geography

First emerging during the early 2000s, more-than-human geography is an umbrella term for (mostly) relational approaches within geography and its cognate fields that seek to reengage with the materiality of the physical world and move beyond the constructivist frameworks of postmodernism (Braun 2005; Whatmore 2006; Cresswell 2013; Greenhough 2014). Grounded deeply in philosophical developments metaphorically understood as rhizomes (Deleuze and Guattari 1987), cyborgs (Haraway 1991), actor-networks (Latour 1993), and assemblages (DeLanda 1997), much of this earlier thinking has coalesced under a new body of philosophy known as speculative

realism (Bryant, Srnicek, Harman 2011; Harman 2018). Within human geography and environmental history, more-than-human approaches have many trajectories, which include hybridity (White 1995; Swyngedouw 1999; Whatmore 2002; Sutter 2013), non-representation (Thrift 2008), posthumanism (Clark 2011; Pries 2018; Margulies and Bersaglio 2018), affective political ecology (Bennett 2010; Singh 2013; Singh 2018), and new materialism (Bakker and Bridge 2006; Coole and Frost 2010; Meehan 2014; LeCain 2017). Although representing a diverse body of thought, all of these approaches seek to move beyond the dualistic ontologies of modernity (Latour 1993) and create frameworks for understanding the world that better account for both its complex social relations and physical materiality.

Research Questions

Drawing widely from this more-than-human theoretical approach and using the Yellowstone River Basin as a place of inquiry, this dissertation asks the following overarching research question: **How does a more-than-human approach to understanding the Yellowstone River further geographical conceptualizations of human-environment relationships?** In order to answer this question, I investigate the more-than-human aspects associated with historical and contemporary environmental conflicts within Montana's portion of the Yellowstone River Basin.

Chapters 2 and 3 are grounded in analysis related to a major state-wide conservation push to protect the Yellowstone River water from large-scale energy development during the 1970s. In particular, Chapter 2 examines the leading role that Montana Fish and Game played in securing basin-wide water reservations for fish,

wildlife, recreation, and water quality. Specifically, it focuses on the more-than-anthropocentric ethical arguments that the agency used to help secure environmental protection for fish and wildlife. Thus, Chapter 2 seeks to answer the following questions: **How did more-than-human entities shape Montana Fish and Game's ethical position during the 1970s? In what ways did Montana Fish and Game's ethical position help constitute Montana's legal framework for instream flow protection?**

In the course of researching the 1970s Yellowstone conflict as well as more contemporary environmental problems such as the cumulative effects of bank stabilization and Intake Diversion Dam's effects on pallid sturgeon, I became curious of the commonly held belief that the Yellowstone is the longest undammed or free-flowing river in contiguous United States. Thus, Chapter 3 seeks to answer the following sub-questions: **How did the mythic perception of the Yellowstone as the longest undammed or free-flowing river in the contiguous United States originate and how has it transformed over time? In what ways did the more-than-human world influence its emergence and evolution?**

As a research assistant on a project looking at the affective power of narrative on flood-risk perceptions along the Yellowstone River, I helped conduct and analyze a set of semi-structured interviews from local participants in Miles City and Glendive, MT. In the course of this project, it became clear that despite living in very similar communities, the residents of Miles City and Glendive had very different understandings of the risk associated with flooding. Consequently, Chapter 4 attempts to answer the following

questions: **Why do divergent flood risk perceptions exist between Miles City and Glendive, MT? How can a more-than-human approach help explain this difference?**

In order to answer these questions, this dissertation draws from a combination of historical and contemporary sources. In particular, archival information – mainly from the Montana Department of Fish, Wildlife, and Parks' Fisheries Division Records in Helena, MT and the Merrill G. Burlingame Special Collections at the Montana State University Library in Bozeman, MT – provided invaluable primary source materials. Furthermore, I conducted nine formal oral history interviews (and had many more informal conversations) with key actors in order to better understand the workings of the agency during the 1970s water reservation process and beyond. Many of these participants also generously gave or allowed me to photocopy documents from their personal collections. This dissertation also uses a set of thirty-one semi-structured interviews conducted in Miles City and Glendive, MT to analyze flood risk perceptions in these communities. Lastly, I also rely on a rich set of media accounts, travel narratives, government documents, and a valuable secondary literature related to the Yellowstone River.

Chapter Overviews

Chapter 2: Beyond Anthropocentrism: Water Law and Montana Fish and Game's Ethical Approach to Environmental Management in the Yellowstone River Basin, USA

This chapter takes a more-than-human approach to examine the relationship between water law and the Yellowstone River. Drawing from recent cross-fertilizations

between critical legal geography and political ecology, it contributes to emerging understandings of water law as both a relational entity in the process of becoming and as a co-constitution of the human and nonhuman (Ojalammi and Blomley 2015; Cantor 2016; Cantor and Emel 2018; Braverman 2018). Relying on these theoretical understandings and using the Yellowstone River Basin water reservations as a case study, I argue that the 1973 Montana Water Use Act, although founded through the anthropocentric logic of utilitarian conservation (McEvoy et al. 2018), in practice created a pliable enough legal space to accommodate Montana Fish and Game's ethical approach to water management that included both anthropocentric and non-anthropocentric elements (i.e. more-than-anthropocentric). Specifically, the act's use of "minimum" in relation to instream flow protection allowed for interpretational flexibility. Montana Fish and Game took advantage of this pliability to help reconstitute the law through its more-than-anthropocentric argument for instream flow protection, which itself was partially grounded in the nonhuman power of the Yellowstone River's mobile nature (Fiege 2005; Haggerty and Travis 2006; Wilson 2010).

Drawing from primary and secondary sources associated with the quasi-judicial Yellowstone River Basin water reservations proceedings, I document Montana Fish and Game's more-than-anthropocentric ethical arguments for protecting fish and wildlife through instream flow reservations. In particular, evidence suggests that it was during the two-month long contested case hearing proceedings in August and September 1977 that Montana Fish and Game most clearly articulated its defense of the Yellowstone ecosystem's non-recreational value. After those hearings ended, Montana Fish and Game

again displayed its more-than-anthropocentric ethical approach during final arguments in August 1978. Specifically, the agency argued in favor of a liberal interpretation of minimum streamflow that would better protect the Yellowstone River Basin's ecosystem for both recreational and non-recreational fish and wildlife values. Ultimately, this chapter provides a valuable historical example regarding the Euro-American emergence of the "rights of nature" (Nash 1989) and contributes to growing understandings that view the law as a co-constitutive process made up of human and nonhuman components (Braverman et al. 2014).

Chapter 3: The Yellowstone as the Longest Undammed River: An Environmental Historical Geography of a Mythic Assemblage

This chapter takes a more-than-human approach to examine the relationship between myth and the Yellowstone River. In particular, it combines conceptualizations of assemblage and affect (Bennett 2010; Singh 2018; Pries 2018) with existing geographical analyses of myth (Sluyter 1999; Blake 2014; Margulies and Bersaglio 2018; Essebo 2019) in order to more fully account for the power of the nonhuman world in the constitution of myth. This chapter also uses Bowden's (1992) framework to help trace the emergence and evolution of mythic belief in the Yellowstone as the longest undammed or free-flowing river remaining in the contiguous United States. Specifically, I trace the myth from its nascent beginnings in the wild and scenic rivers movement to its current contradictions in the face of contemporary environmental crises. Thus, this chapter denaturalizes the Yellowstone River's mythic assemblage through a historicization of its

emergence and transformation, while at the same time accounting for the active role nonhumans play in the creation of myth.

I break the case study section of this chapter into four periods that correspond to different stages in the myth's development. The first period – The Rise of the Free-Flowing Yellowstone (1957-1976) – analyzes pre-mythic understandings of the Yellowstone as wild, free-flowing, and undammed. The second period – The Birth of the Longest Undammed River (1977-1980) – interrogates Montana Fish and Game's active role in creating the myth. Specifically, Montana Fish and Game used the myth as the centerpiece of its publicity campaign to help gain more permanent protection for the Yellowstone River. Importantly, the more-than-human world – through affective responses to visual imagery and film as well as embodied experiences of the Yellowstone River Basin – played an integral role in the myth's constitution. The third period – The River Inviolate (1981-1994) – examines the transformation of the Yellowstone myth from its specific use as a conservation tool during the late 1970s to its new associations as an untouched and saved landscape. The fourth period – A Dam Contradiction (1995-2019) – investigates how environmental conflicts, such as the cumulative effects of bank stabilization and the effects of Intake Diversion Dam on the endangered pallid sturgeon, expose the river as neither untouched nor saved. Ultimately, I argue that despite increased understanding of the myth's contradictions, it remains a powerful aspect of the Yellowstone River's contemporary landscape.

Chapter 4: Thinking Through Levees: How Political Agency Extends Beyond the Human Mind

This chapter takes a more-than-human approach to understanding the concept of agency. Although most often defined solely as a product of human intention (Gregory et al. 2009), a new materialism perspective conceptualizes agency as a distributive phenomenon composed of both human and nonhuman components (Knappett and Malafouris 2008; Roberts 2012). Furthermore, this understanding often relies on large-scale frameworks that completely remove agency from its association with human intention (Whatmore 2002; Bennett 2010; Anand 2017). In order to bring distributive approaches to agency back in conversation with human intention, this chapter combines hydrosocial relational approaches (Linton and Budds 2014; Swyngedouw 2015) with insights from embodied cognition (Shapiro 2011). Specifically, this chapter argues that human intention or agency is not exclusively a human product but instead comes from a co-constitutional process involving brain, body, and elements of the wider environment. In this way, risk perception can also be understood as a co-constitution of the more-than-human world.

This chapter supports this claim through a comparison of two communities in eastern Montana located along the lower Yellowstone River – Miles City and Glendive. Both of these communities are vulnerable to flooding and have levees that the Federal Emergency Management Agency (FEMA) no longer recognizes as adequate for protecting against a one-hundred-year flood event. Despite these similarities, the two communities have divergent perceptions related to flood risk. On one hand, Miles City residents generally view their levee system with a high level of trust and do not perceive

ice jam flooding as a substantial threat. On the other, Glendive residents generally have a low level of trust in their levee and perceive ice jam flooding as a significant threat. In order to explain this divergence, I analyzed each community's embodied experiences with its respective levee and river systems. I found that different embodied experiences did indeed help explain divergent flood risk perceptions. Specifically, Miles City residents had a significant embodied connection to its levee system through both construction, recreational, and high-water experiences, while Glendive residents did not have a similar embodied connection. Ultimately, this chapter furthers geographical understandings of more-than-human agency because it brings analysis back to the scale of the individual and conceptualizes human intention as a co-constitution of the brain, body, and certain aspects of the wider environment.

Chapter 5: Reflections

This chapter serves as the conclusion to this dissertation. It offers three parting reflections on the importance of fieldwork, the materiality of water, and on the relevance of more-than-human thinking in the Anthropocene. Collectively, these reflections not only further explore the importance of embodied experiences and the materiality of the nonhuman world but also provide a rationalization for the use of more-than-human approaches to help address socioenvironmental concerns present at the Anthropocene.

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CHAPTER TWO

BEYOND ANTHROPOCENTRISM: WATER LAW AND MONTANA FISH AND GAME'S ETHICAL APPROACH TO ENVIRONMENTAL MANAGEMNT IN THE YELLOWSTONE RIVER BASIN, USA

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Beyond Anthropocentrism: Water Law and Montana Fish and Game's Ethical Approach to Environmental Management in the Yellowstone River Basin, USA

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Abstract

This article examines a manifestation of non-anthropocentrism – defined here as an ethical position that elevates nonhumans' moral standing to that of humans – in Montana water law during the 1970s. Drawing from critical legal geography and political ecology's theorization of the law and the environment as co-constituted, this article argues that Montana Fish and Game's more-than-anthropocentric ethical position during the Yellowstone River Basin water reservation process reconstituted the Montana Water Use Act to include non-anthropocentric perspectives. Relying largely on legal records from the reservation process, this article illustrates how the agency sought to protect all parts of the river system, no matter how little instrumental value it provided to humans. This article then draws on the concept of mobile nature to argue that nonhuman entities, such as high flows of water, constrained field scientists' ability to quantify instream flow values and thus influenced the agency's use of less anthropocentric instream flow methodologies. Ultimately, the Montana Water Use Act's calls for the protection of *minimum* stream flow levels proved ambiguous, and legal interpretation of the term became contested. It is through this ambiguity, this article argues, that the Montana Fish and Game's more-than-anthropocentric ethical position affected the Act's constitution.

Keywords Legal geography; political ecology; water governance; more-than-human geography; environmental ethics; Yellowstone River

1 INTRODUCTION

> The law and your own individual circumstances have collaborated to place you seven Montana residents in a position where you virtually assume [a] God like or imposing role over the river. We are convinced that the decision you are about to make is important. There will be other boards that will make decisions in this regard, there will be other applications for water, there will be other defenders of rivers, but none will ever have the opportunity before this Board today, and that is the opportunity to preserve a free flowing Yellowstone River. If the decision in this matter is not made for the river at this time, it might well be lost, at least for the State of Montana in our conception of it. – F. Woodside Wright, Legal Counsel, Montana Fish and Game, August 18, 1978[1]

The recent emergence of critical legal geographies focused on the environment provides an exciting theoretical and empirical space for scholars to examine ethical perspectives that extend beyond humans (Cantor and Emel, 2018). With respect to the "rights of nature," recent scholarship has sought to better understand novel legal mechanisms that recognize the ability of more-than-human objects to possess both legal personhood and standing in court (Pecharroman, 2018; Braverman, 2018; Miller, 2019; Kinkaid, 2019). Significantly, much of this work has centred on the legal rights of rivers. Most famously, a dispute between indigenous Maori tribes and the New Zealand government resulted in the 2017 legal recognition of the Whanganui River as having both personhood and standing. Specifically, the river was recognized to have "its own legal identity" which included "the rights, duties, and liabilities of a legal person" (Pecharroman, 2018: 7). Moreover, this legal framework designated "two guardians to act on behalf of the river," which included one representative from the New Zealand government and one from the Whanganui iwi (Westerman, 2019). In a similar vein, a 2017 lawsuit filed by the Colorado River Ecosystem against the State of Colorado and its Governor John Hickenlooper sought legal recognition of the Colorado River's "'right to exist, flourish, regenerate, be restored, and naturally evolve'" as well as legal recognition "of the River's standing to appear in court to defend them" (Miller, 2019: 356). Although the lawsuit was abandoned only a few months after its filing, it remains suggestive of the potential for a radical shift across western water law. In particular, recognition of legal personhood and standing for more-than-human entities such as rivers is suggestive of a potentially less anthropocentric (i.e., human-centric) legal future.

These recent cases provide new precedents for legal geographers to analyse. However, it is important to remember that legal recognition of rivers' legal rights has a deeper historical context. Widespread federal and state legislative environmental reform during the 1960s and 1970s, grounded in novel Euro-American ethical perspectives, provided an earlier opportunity for Euro-American viewpoints transcending anthropocentrism to shape legal protection across the United States (Nash, 1989; Braverman, 2018). In particular, this article draws from legal geography, political ecology, and environmental ethics in order to investigate legal developments related to a major environmental conflict that occurred in Montana's portion of the Yellowstone River Basin during the 1970s (Figure 1). Relying on perspectives from both utilitarian conservation and ecological environmentalism, Montana Fish and Game [2] argued in favour of extending legal protection to the Yellowstone River and its ecosystem through the reservation of substantial instream flows. Specifically, key Fish and Game actors made both anthropocentric arguments (e.g. protection of existing water quality for human consumption, human recreation, protection of existing water rights) and non-anthropocentric arguments (e.g. protection of existing water quality for the environment, fish and wildlife habitat). Consequently, I argue for an understanding of Montana Fish and Game's overall position as more-than-anthropocentric because it includes both anthropocentric and non-anthropocentric elements.

Although a new state constitution – ratified in 1972 – and subsequent amendments to Montana's water law – known as the 1973 Montana Water Use Act – widened the legal scope for environmental protection within the state, these reforms did not explicitly diverge from a historical legal paradigm grounded in anthropocentrism. However, through a novel quasi-judicial process – known as the Yellowstone River Basin water reservations – Montana Fish and Game successfully advocated for instream flow water rights, using moral reasoning that transcended anthropocentrism. Relying primarily on documents associated with the Yellowstone River water reservation's case hearing process, I document how individuals within Montana Fish and Game leveraged this new, more pliable legal space in order to secure environmental protection for fish and wildlife, using an approach that included non-anthropocentrism. Consequently, I further argue that the instream flow water reservations granted for the Yellowstone River Basin became historically (and ontologically) inseparable from the agency's more-than-anthropocentric ethical position. In other words, non-anthropocentrism became embedded within the Montana Fish and Game's legal right to instream flow reservations in certain portions of the Yellowstone River Basin. Importantly, I also suggest that Montana Fish and Game's more-than-anthropocentric ethical stance was itself constrained by non-human elements within the Yellowstone River Basin.

This article's second section begins with a literature review of critical legal geographies' cross-fertilization with political ecology. In that section, I also provide a brief overview of Euro-American environmental ethics and the instream flow implications of Montana's 1973 Water Use Act. The third section traces the origin and evolution of the prior appropriation system in order to place the legal protection of instream flows in its proper historical context. It also briefly discusses the anthropocentric roots of Montana's first legislation protecting instream flows in 1969 and its inseparable relationship to the Blue Ribbon classification system. The fourth section focuses on the Yellowstone River Basin water reservations. I break the case study into six parts in order to chronologically follow the major steps in the quasi-judicial legal process. Lastly, I conclude with a detailed discussion of minimum instream flows and reiterate the case study's key theoretical contributions.

2 LITERATURE REVIEW

Legal geography is an interdisciplinary field of study that examines the relationship between law and spatiality. Importantly, scholars conceive the relationship between law and space as co-constituted (Braverman et al., 2014). In other words, law and space cannot be separated and thus must be studied together. The spatial dimensions of law are manifold; however, the recent emergence of more-than-human scholarship as a way to undermine the human-nature divide within legal frameworks has offered an exciting new direction for legal geography to account for nonhuman agency (Delaney, 2017). Specifically, Ojalammi and Blomley (2015) question understandings of the law as exclusively a human phenomenon. Adopting a post-structural framework, they believe "relations between humans and nonhumans … may be generative of legal territory, rather than simply produced through it" (53). Furthering this line of thinking, Braverman (2018) argues that more-than-human legal approaches can "highlight how both animality and humanness are deeply embedded in the construction of law and, reciprocally, how law is acutely relevant for constituting the animal" (128). In other words, more-than-human entities such as rivers and fish can have political agency through their influence on the constitution of law.

The recent cross-fertilization between legal geography and political ecology opens additional pathways for analysing power imbalances associated with environmental conflict (Andrews and McCarthy, 2014; Cantor, 2016; Cantor and Emel, 2018). In particular, Cantor (2016) notes that "The study of water has been a primary area of

bridging between legal studies and human-environment geography" (51). For example, this confluence allows for scholars to more rigorously examine water adjudication (Perramond, 2019), territoriality of water governance (Jepson, 2012), legal ambiguities of desalination (Campero and Harris, 2019), and human right to water (Wilder et al., 2020). Furthermore, Cantor and Emel (2018) view this intellectual space as a place to imagine "alternatives to entrenched systems of capitalist and anthropocentric water governance" (1). One such alternative includes an "Earth-centric" legal paradigm – a type of non-anthropocentric position – in which "the rights of humans do not clash with the rights of nature because they have the same objective: to live in harmony" (Pecharroman, 2018: 10).

An Earth-centric approach helps to better acknowledge not only the political agency of the more-than-human world but also to reconcile a knowledge gap between the twentieth century development of Euro-American environmental ethics and a much longer established indigenous ways of knowing that recognized the rights of more-than-human nature within customary law (Pecharroman, 2018: 1). Recent decolonial scholarship centred on water governance argues for multiple and flexible understandings of water that take seriously indigenous ontologies and epistemologies (Yates et al., 2017; Wilson, 2020). For example, Wilson and Inkster (2018) importantly bring to attention Yukon First Nations' respect for water. In particular, their conceptualization of water as "a living being" that is "characterized by reciprocal relations of responsibility between people and water as a 'more than human person'" (517). Whereas there is little doubt that settler-colonial violence installed a human-centric view of water in Euro-American dominated societies, indigenous water governance scholarship often overlooks contributions from within settler-colonial societies, such as Montana Fish and Game's more-than-anthropocentric perspective, that challenge these dominant anthropocentric understandings of water.

The Euro-American development of a non-anthropocentric ethical approach to nature emerged, in earnest, during the 1960s and 1970s. Couched as an alternative to environmental protection for economic reasons, this paradigm shunned utilitarian approaches to resource conservation in favour of an environmentalist approach acknowledging the intrinsic value of nature and thus its "right to exist" independent of its utility to humans (Nash, 1989). Furthermore, acknowledging the intrinsic value of more-than-human entities often meant extending them moral status. As Palmer et al. (2014) explain, adherents of anthropocentrism "maintain either that only human beings have moral status or that human beings are much more morally significant than other livings things" (423). However, they contrast this position to that of non-anthropocentrism which "maintains that at least some nonhuman beings or things, which may include animals, living organisms, ecosystems, populations, and species, have interests that should be taken into consideration in our moral decision making" (423). Importantly, adherents of non-anthropocentrism also typically eschew "the claim that human interests should always be considered more important than the interests of other things" (423). Deeply grounded in holistic thinking emerging from the science of ecology, environmentalists operating in the late 1960s and 1970s greatly influenced the American legal context within which environmental protection could occur (Nash, 1989). Specifically, passage of federal legislation such as the National Environmental Policy Act (1969) and the Endangered Species Act (1973) created a new legal framework more conducive to more-than-anthropocentric understandings.

Despite the influence of the environmental movement on federal law, McEvoy et al. (2018) argue, in the context of water law and drought planning in Montana, that anthropocentric approaches still predominate and fail to account for a diverse range of more-than-human water needs. Drawing from a rich set of drought planning documents within the Upper Missouri River Basin, they find that these plans rely on the same anthropocentric ethos that drives instream flow legal protection: utilitarian benefit.

Specifically, they find a predilection in water law and drought planning for protecting more-than-human entities that offer instrumental value to humans through recreation opportunities. For example, the health of sport fisheries serves as the dominant ecological concern within the drought plans. Furthermore, the authors argue that the bias towards the recreational utility of rivers for sport fishing is deeply ingrained in instream flow legislation throughout Montana and much of the western United States.

McEvoy et al. (2018) also argue that the 1973 Montana Water Use Act is fundamentally anthropocentric because of its focus on utilitarian water management. Although there is little doubt that the 1973 legislation is a product of a human-centric legal system, the Water Use Act did establish a legal process for designating instream flow reservations in Montana's four major river basins – including the Yellowstone – that, in practice, proved amenable to Montana Fish and Game's more-than-anthropocentric approach to river protection. In other words, the legal geography related to instream flow protection in Montana, although anthropocentric in legislative origin, was flexible enough to incorporate certain non-anthropocentric ethical approaches during its adoption process. In this way, a historical conflict over water in the Yellowstone River Basin enabled the constitution of instream flow legal protection that better accounted for rights of more-than-human entitles.

3 WESTERN WATER LAW AND MANAGEMENT

The emergence of Montana Fish and Game's more-than-anthropocentric approach to water management in the American West cannot be fully understood without a historical appreciation for the origins and evolutions of the prior appropriation doctrine. As the United States' settler-colonial project entered California and other parts of the western United States beginning in the mid-1800s, miners and irrigators flocked to secure claims on minerals, land, and water. Because mining claims often existed far from a water channel, miners diverted water from streams in order to process ore. They also simultaneously developed a priority system for determining the legitimacy of a water claim based on the idea of "first in time, first in right" (Wilkinson, 1992: 232-233). Importantly, this system did not attach any legal weight to the connection between riparian land ownership and water rights. Unlike the riparian doctrine of the eastern United States, which inherently favoured keeping water in the river channel and also required landowners bordering streams to share water, prior appropriation facilitated competition and conflict among water users and provided little protection for instream flows (Wilkinson, 1992). In fact, along with the importance of priority date and diversion, the concepts of abandonment and beneficial use formed the core of the prior appropriation doctrine. Abandonment meant that a water right holder needed to use the full amount of his/her appropriation or risk losing legal claim to the resource. It became synonymous with the phrase "use it or lose it." The concept of beneficial use, in the context of the extractive societies of the American West, meant that only anthropocentric consumptive uses such as mining, agricultural, municipal, or industrial qualified as worthy of legal water rights. Together, these four major principles – priority, diversion, beneficial use, and abandonment – coalesced into the prior appropriation doctrine, which came to govern "nearly all water usage in the West" (Wilkinson, 1992: 235).

Because of the American West's extractive Euro-American settler-colonial history and seasonal precipitation patterns, the riparian system, which better protected instream uses of water, did not take hold in an arid region reliant on off-stream water use for economic development (Gillilan and Brown, 1997). Thus, as the prior appropriation system became more widespread and developed, the amount of water left in streams across the American West diminished. As Wilkinson (1992) wrote, traditionally under the prior appropriation doctrine "in-stream uses could not qualify as appropriations. They were not diversions. Nor did using water—a stream, a lake, or a waterfall—to protect

wildlife, to swim in or boat on, or to enjoy for its beauty make for a beneficial use. Instream uses were doubly disqualified" (234). Although legal recognition and protection of instream flows under riparian doctrine should not be conflated with a non-anthropocentric ethical perspective, this approach to water management did offer water quantity protection to river systems not found in the American West.

As the volume of consumptive use increased, water became scarcer across the region, and the need to more efficiently capture and store spring run-off in large reservoirs behind dams became a significant focus of water management (Hays, 1959; Wilkinson, 1992). Collectively, federal agencies such as the Bureau of Reclamation and Army Corps of Engineers helped direct, finance, and construct enormous water projects across the region (Worster, 1985; Reisner, 1986; Schneiders, 2003). Although this attitude towards river management received some resistance, especially within the political boundaries of national parks, virtually all river basins across the region experienced construction of large dams and reservoirs (Wilkinson, 1992; Harvey, 1994; Righter, 2005). However, increased interest in wilderness recreation opportunities during the postwar era helped stimulate support for protecting the few remaining stretches of relatively undeveloped and undammed rivers (Gillilan and Brown, 1997; Palmer, 2004). For example, the wild and scenic rivers movement – founded in the late 1950s – focused on achieving federal protection for wild and free-flowing stretches of river with a dual purpose of both countering dam-building and limiting the amount of recreational development (Tarlock and Tippy, 1970). With its passage into law in 1968, the Wild and Scenic Rivers Act became the most significant federal mechanism for protecting certain stretches of river from development and depletion. Ultimately, the Wild and Scenic Rivers Act was indicative of a changing legislative framework that provided environmental advocates with a new set of legal mechanisms allowing for a more proactive approach to riparian protection.

Although the wild and scenic rivers movement had deep roots in Montana,[3] another type of river classification scheme provided the conceptual foundation for the state's first legislative action protecting instream flows for environmental reasons. In 1955 the Montana Stream Rating Committee – comprised of fisheries experts from Montana State College, Bureau of Sport Fisheries and Wildlife, and Montana Department of Fish and Game – formed in order to create a method for classifying Montana's rivers and streams according to their recreational fishing value. In particular, federal fisheries biologist Joe Halterman served as the driving force behind the classification scheme and viewed it as a key tool for helping to protect Montana's best fishing streams (Holton, 1984). As Halterman (1958) wrote, "There is little prospect for improving fishery's position in comprehensive planning until we ... inventory and classify our waters from the standpoint of recreational fishing" (1). Although Halterman and other members of the committee recognized the challenges of creating "a satisfactory method for measuring the total social and economic worth of a recreational fishery" because "unlike other water uses, [it] does not lend itself to material measurement," they ultimately published the Montana Stream-Fishery Classification Map (Figure 2a) in 1959 (Halterman, 1960: 1).

Based on a largely utilitarian and human-centric view of classifying and protecting the most valuable recreational sport fisheries in Montana, the stream rating committee created a classification scheme that assigned a ranking to all of Montana's freshwater streams. Specifically, it placed each stream into one of five classes (Figure 2b), based on utilitarian values of availability (to anglers), aesthetics (for anglers), use (by anglers), and productivity (as a recreational fishery) (Halterman, 1958). The authors used the colour blue for Class 1 streams because blue represented the traditional colour of first-place ribbons at county fairs (Holton, 1984). Despite initially classifying only 410 miles as Class 1 (streams of national and state-wide value), this instrumentalist "Blue Ribbon" classification system soon became nearly synonymous with the most famous and desirable locations for trout fishing within Montana and well-known as "a designation of

excellence familiar to fishermen, conservationists, chambers of commerce, and developers" (Holton, 1984: 3).

Although it quickly became a popular way to promote Montana's recreational fisheries, the Blue Ribbon classification system did not provide any sort of legal protection for the environment (Decker-Hess, 1990). Its influence on the legal designation of instream flow protection, however, would prove significant. In 1969, the Montana legislature passed Chapter 345, Laws of 1969 (89-801 R.C.M. 1947). This legislation – more commonly known as Murphy Rights – enabled Fish and Game "to appropriate unappropriated waters on twelve streams designated by State law and in amounts necessary to maintain instream flows for the preservation of fish and wildlife habitat" (Sweetman, 1980). Importantly, Murphy Rights focused exclusively on protecting streams with valuable trout habitat, including seven streams officially designated as Blue Ribbon (Montana Fish and Game Commission, 1976). In accordance with the legislation, Fish and Game regional fisheries managers filed notices of instream flow appropriation for the twelve designated rivers – including the upper Yellowstone – between December 1970 and January 1971 (Posewitz to Brown, 1975). Whereas the Murphy Rights legislation provided only a limited anthropocentric framework for instream flow protection, it foreshadowed later changes to Montana water law that would expand the definition of beneficial use and further legitimize the concept of instream flows within the prior appropriation doctrine.

4 Case Study: The Yellowstone River Basin Water Reservations

In 1973 the Montana legislature established a new legal framework to reserve surface water for both consumptive and non-consumptive uses. Because the Yellowstone River Basin still had a large amount of unappropriated surface water and faced dewatering threats from the energy industry, this new mechanism provided an important opportunity for agricultural, municipal, and environmental interests to secure future access to water. With respect to instream flows, the water reservation processes provided a rare opportunity for basin-wide protection. Historically, instream flow water rights were almost always limited to small geographical areas and offered piecemeal protection. The reservation process in Montana, however, provided a mechanism to protect instream flows on a large scale. The Yellowstone River Basin Water Reservation process, which lasted in earnest from July 1973 to December 1978, also created a legal space for Montana Fish and Game to use more-than-anthropocentric ethical reasoning to help gain widespread environmental protection for instream flow values.

4.1 The Environmental Conflict

The Yellowstone River Basin, especially its tributary basins of the Tongue and Powder Rivers, is extremely rich in coal and coal-based fossil fuels. Beginning in the late 1960s, coal extraction through large-scale surface strip mining techniques rapidly increased within Montana's portion of the Yellowstone Basin (Malone et al., 1991). For example, coal extraction in the state increased from 364,509 tons in 1967 to 22,087,188 tons in 1975, with almost all of this increase occurring within the Yellowstone region (Montana Department of Natural Resources and Conservation, 1976: 97-98). When it became clear that visions for large-scale energy extraction and production existed, grassroots resistance sprung up across the basin. Ranchers in the Bull Mountains formed the Northern Plains Resource Council in October 1972 to oppose large-scale industrial strip mining, which they perceived as threatening their livelihood (Toole, 1976). In the upper Yellowstone, Park County residents sought to prevent the proposed damming of the Yellowstone's mainstem and formed the Allenspur Committee to Save the Upper Yellowstone (Anderson, 1974). The release of the 1971 *North Central Power Study* and the Bureau of Reclamation's 1972 *Appraisal Report* on *Montana-Wyoming Aqueducts* provided the impetus for local resistance. These reports created widespread concern

across Montana that private and public utilities along with the assistance of the federal government sought to turn the Yellowstone River Basin into an export-oriented industrial wasteland (Toole, 1976; Malone et al., 1991). Specifically, the studies proposed to build 42 mine-mouth coal fired power plants across the Northern Great Plains, including 21 in Montana, that would require an estimated 2.6 million acre-feet of Yellowstone River Basin water annually. This potential development not only facilitated grassroots resistance but also a rush from the energy industry to secure permit applications for water rights (Posewitz, 1985; Malone et al., 1991).

At the state-level, Montana Fish and Game initially became concerned with the Bureau of Reclamation's proposal to build a 380-foot high dam at Allenspur (Posewitz, 1985).[4] If built, the dam would impound approximately 1.5 million acre-feet of water and destroy more than 30 miles of Blue Ribbon trout habitat (Anderson, 1974). It would also eliminate a major portion of the upper Yellowstone River from its status as a free-flowing river. Thus, Montana Fish and Game worked cooperatively with the Allenspur Committee to Save the Upper Yellowstone and other supporting organizations to gain environmental protection through the Wild and Scenic Rivers Act of 1968 (Anderson, 1974; Posewitz, 1985). Although legal protection under the Wild and Scenic Rivers Act failed to materialize because of unwillingness from landowners to cede power to the federal government, the newly created state-level water reservation process gave fish and wildlife advocates another mechanism to proactively protect the Yellowstone River from a mainstem impoundment (Posewitz, 1985). Ultimately, Montana Fish and Game would use the water reservation process as a strategy to not only gain (indirect) legal protection for keeping a large impoundment off the river's mainstem but also to protect the existing quality of aquatic and terrestrial ecological habitat through securing instream flow protection across for entire Yellowstone River Basin and not just its widely renowned trout fisheries.

4.2 The Legal Framework

In the early 1970s, Montana drafted and ratified a new state constitution progressively stating that "The state and each person shall maintain a clean and healthful environment in Montana for present and future generations" (Montana Constitution 1972, Article IX Section 1). The constitution also mandated the legislature to create a centralized water rights system for the entire state. In response, the legislature quickly passed the Water Use Act of 1973, which established Montana's new water management framework (Posewitz, 1985). This framework not only attempted to standardize the administration of surface water – through the creation of a permit system – but also provided a new mechanism for reserving unappropriated waters for designated future use – through water reservations. With respect to environmental protection, the 1973 Montana Water Use Act extended the beneficial use of water to include fish and wildlife as well as recreation and created a reservation system in which

> The State or any political subdivision or agency thereof or the United States or any agency thereof may apply to the board [of Natural Resources and Conservation] to reserve waters for existing or future beneficial uses or to maintain a minimum flow, level, or quality of water throughout the year or at such periods or for such length of time as the board designates (Montana Code Annotated 2019, 85-2-316 (1)).

Importantly, this framework provided an avenue for protecting riparian environmental values through the reservation of minimum stream flows. In this way, the Montana Fish and Game became eligible to apply for instream flow water reservations aimed at protecting the beneficial uses of both recreation and fish and wildlife.

The energy industry's interest in using the Yellowstone River Basin sparked widespread concern across Montana. Moving to regulate this development, the Montana legislature

passed a slew of legislation. Specifically, the Montana Major Facility Siting Act, the Montana Resources Indemnity Trust Act, the Strip Mining and Underground Mine Siting Act, and the Mined Land Reclamation Act all sought to protect Montana's environment through careful regulation and planning of the energy industry (Malone et al., 1991). With respect to water, the 1973 Water Use Act and the 1974 Yellowstone Moratorium Act proved crucial. The 1974 Yellowstone Moratorium temporarily suspended existing industrial applications that included diversions greater than 20 cfs or storage greater than 14,000 acre-feet (Montana Fish and Game Commission, 1976: 270-271). This allowed for the water reservation process to occur in the Yellowstone River Basin before the Montana Department of Natural Resources and Conservation made a decision pending industrial water rights permits. Because industrial energy interests threatened to deplete water supplies, policy makers and the state legislature wanted to make sure that municipalities, agriculturalists, and environmental interests had the first chance to reserve unappropriated water (Sweetman, 1980).

4.3 The Application Process

When the Montana Department of Natural Resources and Conservation set November 1, 1976 as the application deadline, it gave potential applicants more than two years to put together the required material. Specifically, this allowed Montana Fish and Game additional time to quantify and collect scientific evidence supporting its reservation request. In order for the Board to grant a water reservation, all applicants needed to successfully establish: 1) the purpose of the reservation; 2) the need for the reservation; 3) the amount of water necessary for the purpose of the reservation; and 4) [proof] that the reservation is in the public interest (Montana Code Annotated 2019, 85-2-316(4a)). In total, the DNRC received water reservation applications from thirty state and federal entities (Sweetman, 1980).

The 1973 Water Use Act also instructed the Department of Natural Resources and Conservation to adopt rules "to determine whether or not an application is correct and complete" (Montana Code Annotated 2019, 85-2-316-3(a)). Thus, the Department of Natural Resources and Conservation decided that instream flow reservation applicants needed to be "based on state-of-the-art evaluations of water" that "demonstrate how the requested level or minimum flow was determined, and why that level of flow is necessary" (Montana Administrative Code 36—2.14R(1)—s1430(2e)). [5] DNRC's determination to require "state-of-the-art evaluations of water" meant that scientists' methodological choices would be a very important part of the application. Following these guidelines, Montana Fish and Game put together a scientifically complex instream water reservation application that included a request for 8,206,723 acre-feet annually at Sidney, MT. It also included one 24-hour bank-full (i.e. dominant discharge) flow at 52,000 cfs between June 8-30 and a total of 80 stream and stream reach reservation requests (Montana Fish and Game Commission, 1976; Boris and Krutilla, 1980).

In order to calculate these amounts, Montana Fish and Game relied largely on scientific evidence it collected from the many studies it conducted along the river from 1972 to 1976 along with a variety of instream flow methodologies. Specifically, Fish and Game biologists conducted field-based scientific studies on the Yellowstone's aquatic and terrestrial ecology, geomorphology, and hydrology in order to gain the necessary information for conducting analysis on the quantity of stream flow needed to sustain the river's environmental functions (Posewitz, 1985). Despite this aggressive approach to quickly collect baseline data for the Yellowstone River system, scientists in the field struggled to deal with the sheer size and force of the river as well as the incessant movement of water, sediment, fish, birds, and mammals (Hinz, 1977; Peterman, 1978). As legal geographers Ojalammi and Blomley (2015) suggest, "Plants, animals, winds and water behave in unpredictable ways, according to their own logics, complicating human geographies" (52-53). For example, Liter Spence, Montana Fish and Game's Water

Resources Supervisor, described the Yellowstone River's constraining effects on creating standardized processes related to instream flow science: "The standard is whenever you can make a reliable measurement. It's very difficult to make a reliable measurement during a flood, for instance, or even a high flow, because you physically cannot collect the proper data" (Board of Natural Resources and Conservation, 1977b: 98). Furthermore, he stated that "in any kind of field situation, you have to make your measurements at the most appropriate time... that is usually during the low water period when you can physically enter the stream channel and make those measurements" (Board of Natural Resources and Conservation, 1977b: 96) In other words, mobile nature defied the boundaries of scientific studies and thus constrained the ability of scientists to conduct their research and made it challenging to quantify minimum streamflow needs, even if using scientifically accepted methods (Fiege, 2005; Haggerty and Travis, 2006; Wilson, 2010). In this way, the Yellowstone river and its various more-than-human actors gained political agency through the water reservation process.

Because of the complexity of rivers, no singular method existed for calculating instream flow requirements. In fact, most established approaches to quantifying instream flows relied fundamentally on field-based data collection and individual expertise (Gillilan and Brown, 1997). Thus, Montana Fish and Game's methods for determining the amount for each of its requested flows relied heavily on both fieldwork and the scientific expertise of its employees. For its application agency scientists used methods such as the Bureau of Reclamation's computerized Water Surface Profile (WSP), dominant discharge, various types of physical, chemical, and biological indicator data, flow duration hydrographs, and – most controversially – the Blue Ribbon concept (Montana Fish and Game Commission 1976).[6]

Originally developed as an anthropocentric stream-classification scheme to help protect valuable sport fisheries, Montana Fish and Game adapted the Blue Ribbon classification system into a novel instream flow methodology. Interestingly, Fish and Game's use of the "Blue Ribbon concept" to determine minimum instream flow levels actually took on more-than-anthropocentric qualities. Specifically, it justified the agency's reservation request for almost all the unallocated water in the upper Yellowstone and its tributaries and did so in a way that critiqued the quantification of streamflow itself as a potential cause of environmental degradation. As the agency stated in its application,

> Thus in view of the importance of this famous river, it was felt the establishment of streamflow "numbers" as flow recommendations during the low water months, would be the first step in degrading this high quality fishery. Fish populations exist there now due to a wide range of flow conditions. Assigning flow "numbers" to this part of the river would eventually place limitations on the fishery which do not exist today, and ultimately alter the existing status of those aquatic resources. Thus we elected to request the "instantaneous streamflow, subject to existing, lawfully appropriated water rights in the stream reach" to protect the fishery resources. ... Additionally, we cannot separate the tributary streams from the main river in this portion of the basin, since they influence water quantity, water quality and are biologically connected in many cases. Thus "the instantaneous streamflow ..." was also requested for these streams (Montana Fish and Game Commission, 1976: 292-293).

Although Montana Fish and Game was still largely concerned about the upper Yellowstone for its value as a recreational fisheries resource, its adaption of the original Blue Ribbon classification system into an instream flow methodology cannot be fully separated from the agency's emerging more-than-anthropocentric ethic.

Montana Fish and Game's water reservation application audaciously requested more than 93 percent of the existing average annual amount that reached Sidney. Unsurprisingly, its water reservation application became the most hotly contested (and legally objected

to) part of the water reservation process (Posewitz, 1985). This became widely evident during the Summer of 1977, when cross examination of Montana Fish and Game witnesses predominated the contested case hearing proceedings. Furthermore, it was during this quasi-judicial hearing process that Montana Fish and Game's more-than-anthropocentric position towards the Yellowstone River Basin became more fully embedded within the water reservation process.

4.4 The Contested Case Hearing

Once the Montana Department of Natural Resources and Conservation received the water reservation applications, the Water Use Act charged it and the Board with a variety of tasks related to the facilitation and completion of the reservation process. Importantly, they needed to provide proper notice of the applications, allow objections to be filed against applications, and hold hearings for the presentation of arguments against requested reservation amounts (Sweetman, 1980). The Board appointed attorney James Driscoll as hearing examiner, and the contested case hearing occurred first at the Eastern Montana College's Library Auditorium in Billings, MT and later at the Senate legislative chambers in Helena, MT. It was during this contested case hearing process that Montana Fish and Game articulated its more-than-anthropocentric ethical arguments.

The contested case hearings for Montana Fish and Game witnesses involved both submitted written testimony and intensive cross examination. Montana-based attorneys Urban Roth and Henry Loble – representing Utah International, Inc. (a subsidiary of General Electric) and Intake Water Company (a subsidiary of Tenneco) respectively – provided a formidable challenge to the credibility of the agency's witnesses. Jim Posewitz served as Montana Fish and Game's lead witness. Having submitted his written testimony to the hearing examiner on June 21, 1977, Posewitz defended the logic and evidence presented in support of Montana Fish and Game's water reservation application on both August 17 and 18, 1977. As a charismatic and passionate conservationist in charge of Montana Fish and Game's Environment and Information Division, Posewitz served as leading force behind not only the agency's application for water reservations in the Yellowstone River Basin but behind its deeper quest to keep a large impoundment off the upper Yellowstone in order to preserve the river's free-flowing quality (Peterman, 1979). As Posewitz (1977) noted in his written testimony, the majority of scientific studies Montana Fish and Game conducted for its water reservation application focused on the lower portion of the Yellowstone River Basin, which had previously received very little scientific attention. Using a compilation of public and private external grants – including from Utah International, Intake Water, Old West Regional Commission, and the United States Geological Survey – Fish and Game gathered evidence that supported its conviction of reserving large flows of Yellowstone River water.

Because of Posewitz's emphasis on the water reservation application's role in diminishing the future need for a mainstem impoundment on the Yellowstone, a significant portion of his cross examination featured a discussion related to the positives and negatives associated with dam building. Utah International's Urban Roth questioned Posewitz about potential economic benefits associated with increased recreational visitation from dam and reservoir construction. In this exchange, Posewitz gave the first glance of Montana Fish and Game's more-than-anthropocentric position towards fish and wildlife management during the contested case hearing proceedings. Specifically, Posewitz responded:

> But the core – the heart of the preservation of a natural river system is for fish and wildlife habitat. And granted, we also have the recreational responsibility. We view – at least I view and in the functions that I serve the department in, the preservation of habitat as being clearly dominant over providing recreation places (Board of Natural Resources and Conservation, 1977a: 22-23).

After this initial exchange, Roth quickly moved to position the Bighorn River's Yellowtail Dam as unequivocally a positive benefit for recreational sport fishing. Although Posewitz did admit that the Yellowtail Dam improved the Bighorn's trout fishery, he again downplayed the value of recreational fishing to Montana Fish and Game's water reservation application. For example, he responded to Roth's line of questioning on the Yellowtail Dam's benefit to trout fishing:

> Well, except in our review of the river, we looked not only at the effect on the aquatic habitat but also the riparian habitat type, and while trout certainly did prosper, we found that some other features, such as the islands, the habitat preferred by Canada geese which we have submitted some testimony, did deteriorate – was lost (Board of Natural Resources and Conservation, 1977a: 23-24).

In other words, Posewitz illustrated some of the negative downstream effects of the Bureau of Reclamation's Yellowtail Dam on river channel geomorphology as well as some of its detrimental ecological effects.

Hoping to have Montana Fish and Game show a narrow preference to recreational sport fishing instead of its more holistic approach to protecting all fish and wildlife, Urban Roth next questioned Posewitz about Montana's famous Blue Ribbon classification system. Specifically, Roth asked Posewitz to rank his and the agency's preference for streams within the basin. In a very telling response, Posewitz refused to unequivocally endorse the Blue Ribbon system, which in its adapted form served not only as the methodological justification for the agency's reservation request for the upper Yellowstone Basin but also for the passage of the 1969 Murphy Rights legislation. Instead, Posewitz responded:

> The blue ribbon concept was developed – oriented on trout, salmonid and ... in an abbreviated fashion what that designation said is "This area or this stream is of national significance to the trout fisherman" ... and I think I'd have to be honest to say that most people related to us would probably give that some higher value, maybe over all other resources that we're responsible for. But I do think there is ... a changing responsibility of our Department to protect fishery resource, not solely for the, you know, the quality that a certain group would assign to [it]. In other words, we feel a responsibility towards species in that lower river just as strongly as we feel a responsibility towards the cutthroat trout in the Yellowstone. And granted, that's easier to sell and I wouldn't debate that for an instant (Board of Natural Resources and Conservation, 1977a: 26-27).

This passage illustrates how Jim Posewitz and Montana Fish and Game ethically approached its water reservation request. However, it should be noted that when the Montana legislature passed the Nongame and Endangered Species Conservation Act in 1973, it became "state policy to perpetuate nongame as well as game species" (Holton, 1980).

The more-than-anthropocentric position of Montana Fish and Game's water reservation application was made even clearer in the context of the Powder River. As an important tributary of the lower Yellowstone River, the Powder River runs roughly south to north through some of the world's largest coal reserves in northern Wyoming and south-eastern Montana (Figure 3). Coming from a region characterized by its richness in natural resources such as coal as well as its lack of rainfall and its general aridity, Powder River water was extremely sought after and important for energy development. In fact, Utah International, Inc. and Intake Water Co. – two major objectors to Montana Fish and Game's water reservation application – both had significant interests related to surface water development for coal energy production on the Powder River. Thus, cross examination of Montana Fish and Game witnesses included a substantial focus on the Powder River's value (or lack thereof) for fish, wildlife, recreation, and water quality.

With respect to Montana Fish and Game's more-than-anthropocentric position, the cross examinations of both Jim Posewitz and Bruce Rehwinkel were the most important. When under cross-examination from Urban Roth, Posewitz defended the existing fish and wildlife in the river. Although he acknowledged that the Powder River had a very high salinity content, he rebutted Roth's characterization of the Powder as "inhospitable" to fish. As Posewitz replied,

> I wouldn't go that far. I think we have to make a distinction here and this is in my opinion, over a stream like the Powder River which we're talking about that has ... through modern geologic times [carried] those constituents, and we have documented ... the fact that that stream is being used by a certain segment of the fish population in the Yellowstone River (Board of Natural Resources and Conservation, 1977a: 37).

While under cross examination from Intake Water Company's hired attorney Henry Loble, Posewitz made this point even more clearly:

> I'm trying to think of some way to communicate to the record the fact that because the Powder is perhaps low in total aquatic production, that doesn't mean it's insignificant to us or that we don't care about the resource that struggles on down there (Board of Natural Resources and Conservation, 1977a: 59).

Posewitz's refusal to dismiss the Powder River in spite of its characterization as "an ugly duckling" illustrated an ethical position towards environmental protection that transcended simplistic human-centric calculation (Board of Natural Resources and Conservation, 1977a: 59).

More than any other Montana Fish and Game witness, it was Bruce Rehwinkel that bore the brunt of Urban Roth and Henry Loble's cunning arguments to diminish the environmental value of the Powder River. As the lead Montana Fish and Game scientist for the Powder River Aquatic Ecology Project funded largely by Utah International, Rehwinkel faced the greatest amount of scrutiny when defending Fish and Game's application requesting an annual 198,350 acre-feet instream flow reservation. Both Urban Roth and Henry Loble repeatedly attempted to make Bruce Rehwinkel admit that the Powder River had little environmental value. For example, during Henry Loble's re-cross examination, he directly asked Rehwinkel:

> The Powder River in Montana is poor in fisheries, is it not, compared to other Montana streams, even the other tributaries of the Yellowstone (Board of Natural Resources and Conservation, 1977c: 70)?

Rehwinkel responded:

> I can't make the assessment of whether it's poor or it's good or it's bad. I can say that there is possibly less diversity, there is less abundance. But it is different; I'm not going to say that it's better or worse (Board of Natural Resources and Conservation, 1977c: 70).

When Loble again pushed Rehwinkel into a comparison between the productivity of the fishery in the Tongue and Powder Rivers, Rehwinkel responded:

> There again you're asking for a value judgement. It does have a better, say, water quality and resident game fish populations, and if that's the only thing that you're interest in – my job is to defend and understand the resource that exists, not to

compare it with some other stream (Board of Natural Resources and Conservation, 1977c: 73).

During the contested case study hearing, both Rehwinkel and Posewitz sought to move beyond the anthropocentric and utilitarian logic associated with the 1959 Montana stream classification system.

However, the limitations of the Blue Ribbon stream classification system as a comparative way to determine instream flow reservations came to the fore again during Urban Roth's questioning of Rehwinkel. When Roth once again framed the Powder River as a river with a very poor recreational fishery, Rehwinkel replied that the agency was not attempting to make the Powder's fishery equivalent to that of the Madison River. After Roth confirmed that he was "not trying to create an inference that this is really a blue ribbon stream in disguise", Rehwinkel replied that "It's starting to look like a black and blue ribbon stream to me" (Board of Natural Resources and Conservation, 1977c: 35). Rehwinkel's line generated not only a moment of laughter during the tense hearing process but also became a widely remembered moment for Montana Fish and Game witnesses (Posewitz, 1985). However, evidence suggests that Jim Posewitz had actually brainstormed the line the previous night while prepping Rehwinkel for the interview (Rehwinkel, 2017). Regardless of whether Posewitz developed the black and blue ribbon response, Bruce Rehwinkel's self-proclaimed defence of the Powder River's aquatic resources was indicative of Montana Fish and Game's attempt to move beyond the limits of the Blue Ribbon classification system's original anthropocentric rationale.

4.5 Final Arguments

The cross-examination portion of the contested case hearing finished on September 30, 1977. After nearly two months of legal testimony and questioning, the hearings had produced 36 volumes of transcripts (~4700 pages). The next part of the process involved having each applicant and objector put together their respective proposed findings of fact and conclusions of law. The Department of Natural Resources and Conservation, however, tossed a wrench into this process – much to the consternation of Fish and Game – when it provided its own instream flow recommendation without having submitted an instream flow reservation request (Montana Department of Fish and Game, 1978). Emanating from DNRC's animosity towards Fish and Game for its perceived uncompromising "all or nothing" attitude and its objection to DNRC's introduction of the "Instream Flow Methodology report" as an exhibit during the contest case hearing (Doney to Posewitz, 1978), DNRC created an internal "compromise group … to develop a set of findings and a proposed order for the Board of Natural Resources" that did not include representation from Fish and Game (Posewitz to Doney, 1978).

This group ultimately decided to interpret the 1973 Water Use Act's language regarding the protection of minimum streamflow through the lens of "survival flow." As the DNRC's proposed opinion states, "The minimum-flow instream reservations have been ordered adopted in amounts that will maintain instream flows at levels sufficient to allow survival of at least minimum levels of the aquatic resource" (Department of Natural Resources and Conservation, 1978: 8-9). Importantly, the DNRC based its "survival flow" interpretation on the concept of historical minimum monthly flows. In other words, DNRC generally recommended to the Board that it should only grant Fish and Game the average of the lowest flows historically recorded for each month. To put this into perspective, Fish and Game requested approximately 8.2 million acre-feet annually be reserved instream at Sidney, MT, while the DNRC recommended an instream flow reservation equal to approximately 3.4 million acre-feet annually.

Montana Fish and Game directly contested DNRC's argument that the Board should adopt a survival interpretation of the Water Use Act's minimum instream flow language during

final arguments held at the Senate chambers in Helena on August 18, 1978. Specifically, Fish and Game's legal counsel F. Woodside Wright stated:

> It has been suggested by the Department of Natural and Resources in its Proposed Findings of Fact and Conclusions of Law that you allocate to the river a survival flow. That is a proposal that seeks the worst possible condition of the river to be the goal of the water allocation process. It is somehow rationalized that because the river survived these flows in one extreme year, it can accept them as an average or permanent condition. This concept, if adopted by economic planners, would select the [Great Depression] as our economic goal since somehow our economic system survived it (Board of Natural Resources and Conservation, 1978a: 299-300).

Furthermore, Fish and Game grounded its application in a more-than-anthropocentric approach to environmental protection that eschewed DNRC's anthropocentric survival flow logic. Specifically, it used an approach that favoured a more liberal reading of the minimum flow language included in the Water Use Act. As F. Woodside Wright also stated during his final argument:

> The Water Use Act instructs that water be allocated with the least possible degradation to the natural aquatic ecosystems. ... It would appear the Department of Natural Resources and Conservation is saying "survive." The Department of Fish and Game reservation is asking that the fish and wildlife be allowed to "thrive" and not merely "survive" (Board of Natural Resources and Conservation, 1978a: 301).

Thus, the Board of Natural Resources and Conservation was confronted with two very different interpretations of the Water Use Act's use of *minimum* to describe instream flow reservations.

There is no question that Fish and Game grounded its more-than-anthropocentric position in the emerging environmentalist ethos that favoured more holistic ecological thinking as well as expanded moral consideration for nonhumans. However, it is also essential to understand that critiques of its scientific approach, such as DNRC's characterization of the "Blue Ribbon Concept" as "not an instream-flow methodology", fail to account for the inherent constraints that mobile nature posed to the quantification of instream flows (Montana Department of Natural Resources and Conservation 1978, 170). Instream flow science is not grounded solely in mathematical models or a self-contained scientific laboratory. It fundamentally requires its practitioners to go into the field, deal with environmental constraints, and gather imperfect measurements. Thus, when Montana Fish and Game responded to attacks regarding its methodological approach during final arguments, it stressed the importance of fieldwork to instream flow determination. As its legal counsel F. Woodside Wright stated:

> The cornerstones of our approach were the experienced biologists with stream specific field experience. In every instance for every stream and every section of stream the numbers came from an individual who had been there, who had sampled and measured and observed the actual stream conditions. These individuals selected the best method to arrive at and describe the flows necessary to protect the streams they knew. This is no academic office exercise. In some cases it was a combination of a standard method, years of experience and a sense of what was needed in that river. An approach such as this may well be the better approach, if not the only approach in making the determination such as how much water is needed, for it is tempered by actual field experience and a person – or an individual personally familiar, and in these matters it is often the individual, that is a substitution that cannot be made (Board of Natural Resources and Conservation, 1978a: 303-304).

This passage is more than a defence of the role Fish and Game experts played in the determination its reservation request. It is an implicit acknowledgement that instream flow science requires embodied expertise to overcome the constraints a dynamic river system poses to quantifying minimum instream flows.

The embodied and affective field experience of the scientists along the Yellowstone River also likely factored into helping the agency arrive at its more-than-anthropocentric position. The following passage helps articulate the deep emotional connection of certain Montana Fish and Game scientists with the Yellowstone River:

> Although it was not a predetermined objective of the Department, it should have surprised no one that the sum total of preserving [an] existing resource approached protecting something similar to the average discharge of the river. We would have liked to come before you asking for less, and then both of our burdens would have been lighter. The problem was if we had stood before you compromised, then who would have spoken for the rivers and the streams of the Yellowstone Basin? In this process, we sought to represent Montana's wild communities who otherwise have no voice in the proceedings. Were we to have observed utter silence in these chambers or in Billings, there would be no sounds from the river. It could not be heard unless the Department stands up and speaks for it and the resources which depend upon it. It is the voice of the Department of Fish and Game that has to speak for the fish and wildlife that depend on this river (Board of Natural Resources and Conservation, 1978a: 298-299).[7]

This language illustrates Montana Fish and Game's interest in preserving the Yellowstone Basin's rivers. In particular, providing a "voice" for streams such as the Powder River – a stream Montana Fish and Game could easily have ignored – highlighted the agency's willingness to move beyond the confines of the anthropocentric-based environmental protection and towards a more holistic framework that sought to secure instream flows in order to protect all parts of a river system independent of its value to human uses.

4.6 The Board's Decision

After the final arguments concluded, the seven-member Board of Conservation and Natural Resources met several times to determine how it would allocate water reservation amounts for streams within the Yellowstone River Basin. Although the Board took a decidedly anthropocentric approach to determining the final water reservation amounts, it was "inclined to grant, in each case, the largest reservation that could be justified by the application" (Clark, 1979: 30). The Board ultimately awarded instream flow water reservations that generally represented a middle ground between Fish and Game's request for thrive flows and DNRC's recommendation of survival flows. Although the actual instream reservations were site specific and almost always varied on at least a monthly basis (in accordance with seasonal fluctuations), several key points help to paint the overall picture. First, the Board generally granted less than optimal flows for the lower river basin; however, these reservations were almost always considerably higher than DNRC's suggested survival flows. For example, for the mainstem of the Yellowstone River at Sidney, the Board awarded Fish and Game approximately a 5.5 million acre-feet annual instream reservation. Although this was substantially less than the 8.2 million acre-feet it had requested, the amount awarded was considerably more than the DNRC's 3.4 million acre-feet recommendation. Additionally, the Board awarded 95,201 acre-feet annually to Fish and Game for the Powder River at Locate, which amounted to roughly half of the Fish and Game's request (198,387 acre-feet); however, it was also nearly three times greater than the amount DNRC recommended (32,170 acre-feet). Second, the Board generally granted Fish and Game's thrive flows for the middle Yellowstone. For example, the instream flow reservation for the Yellowstone at Billings and for the Bighorn River included almost all of Fish and Game's requested amount and also fully granted its

request for a 24-hour dominant discharge of 68,430 acre-feet at Billings. Lastly, the upper Yellowstone received a mixed reservation decision. During the non-irrigation months (October-April), the mainstem and its tributaries received a high-level of instream flow protection. However, during the irrigation months (May-September), the basin received much lower protection. In fact, for the mainstem of the Yellowstone at Livingston, the Board awarded less during the irrigation season than the DNRC's recommended survival flows (Montana Fish and Game Commission, 1976; Montana Department of Natural Resources and Conservation, 1978; Board of Natural Resources and Conservation, 1978b; Clark, 1979; Boris and Krutilla, 1980).

Despite this relatively mixed ruling, Jim Posewitz and Montana Fish and Game were pleased with the Board's decision. As Posewitz (1979) wrote,

> The river no longer lies totally vulnerable to unrestricted depletion. Now, for the first time, there is real hope that the Yellowstone will not follow every other major American river into dams, locks, dikes and conduits—things that would harness the river's freedom and drain its strength (35).

In this passage, Posewitz not only celebrated the positive outcome of the water reservations for environmental protection but also through his use of words gave the Yellowstone credit as an active entity. The Yellowstone's ability, according to Posewitz, to possess "freedom" and "strength" suggested that Fish and Game's ethical position was grounded in the more-than-human power of the river. In other words, the river's political agency may not exist solely through its ability to constrain scientific methodologies and fieldwork but also through its more productive capacity to inspire the imagination of Fish and Game's employees.

5 Conclusion

As evidence from the entire water reservation process suggested, a major debate existed over the interpretation of the 1973 Water Use Act's use of minimum as the legal justification for reserving instream flows. Although it is tempting to interpret minimum as the least amount possible (i.e. survival flow), Gillilan and Brown (1997) argued that minimum instream flow legislation was often a function of political compromise and largely reflects "the limited acceptance of these programs at the time statutes were passed rather than some desire to ensure that water is not used in quantities beyond those necessary to achieve a chosen level of benefit" (129). In other words, the "minimum" language in the Montana Water Use Act does not necessarily preclude a higher level of instream flow protection. As Gillilan and Brown (1997) elaborated, "In practice, widespread confusion about the meanings of the terms used to describe flow levels has meant that flows have been protected at a variety of levels, notwithstanding the terms used in statutes and policies" (129). The Yellowstone River water reservation process supports their interpretation. In reality, the Board used "adequate" to define minimum stream flows. As Board member and spokesman Wilson F. Clark (1979) stated: "The whole idea of instream reservations is quite new. The board fully agreed with the legitimacy and necessity of assuring that adequate water remains in the streams to maintain fish, wildlife, water quality, and recreational values" (30). Thus, Fish and Game's arguments for a thrive flow interpretation of minimum instream flow had traction within the legal process.

Ultimately, critical legal geography's conceptualization of law and space as co-constituted provides a powerful framework for analysing the legal aspects of environmental conflict. It allows for nonhuman entities to play a more active role in the construction of the law, and it pushes legal analysis beyond the human-nature binary and into a space where scholars can better account for the power of the material world. In the case of the

Yellowstone, the ability of the river and its nonhuman entities to affect the methodologies, data collection, thoughts, and even moral position of Montana Fish and Game's scientists speaks to the constraining and productive ways in which non-human objects acquire political agency within a legal context. Thus, Montana Fish and Game's more-than-anthropocentric ethical position became inseparable from its more-than-human environment. From a legal perspective, this interpretation allows for a less anthropocentric conceptualization of Montana's 1973 Water Use Act. Specifically, one in which the definition of *minimum* is not etched in stone but is instead a politically contested process through which different entities within the more-than-human world can affect the Act's constitution.

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Figure 1. The Yellowstone River Basin. *Source:* Jackson Rose.

Figure 2a. The 1959 Montana Stream-Fishery Classification Map

Figure 2b. The key from the 1959 Montana Stream-Fishery Classification Map.

Figure 3. The Powder River near where Tenmile Creek joins it. Notice the aridity of the landscape and amount of water in the river. *Source:* David Ritter.

Figure 1

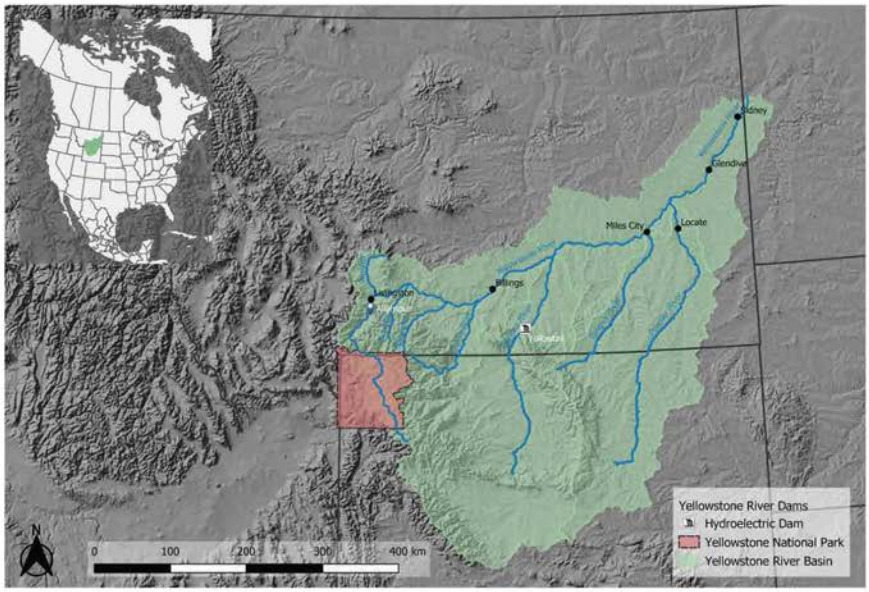

Sidney
Glendive
Miles City
Locate
Billings
Livingston
Bozeman
Yellowstone River Dams
Hydroelectric Dam
Yellowstone National Park
Yellowstone River Basin
N
0
100
200
300
400 km

Figure 2a

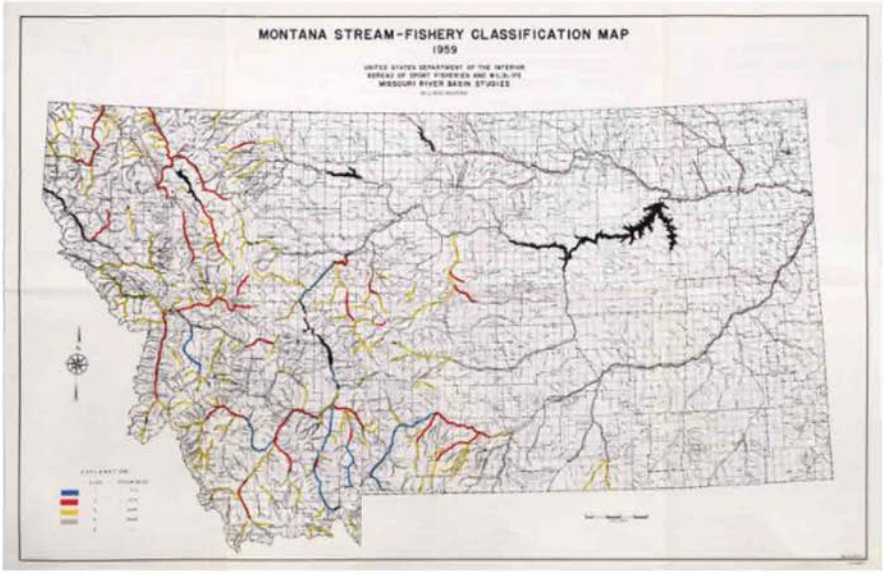


Figure 2b

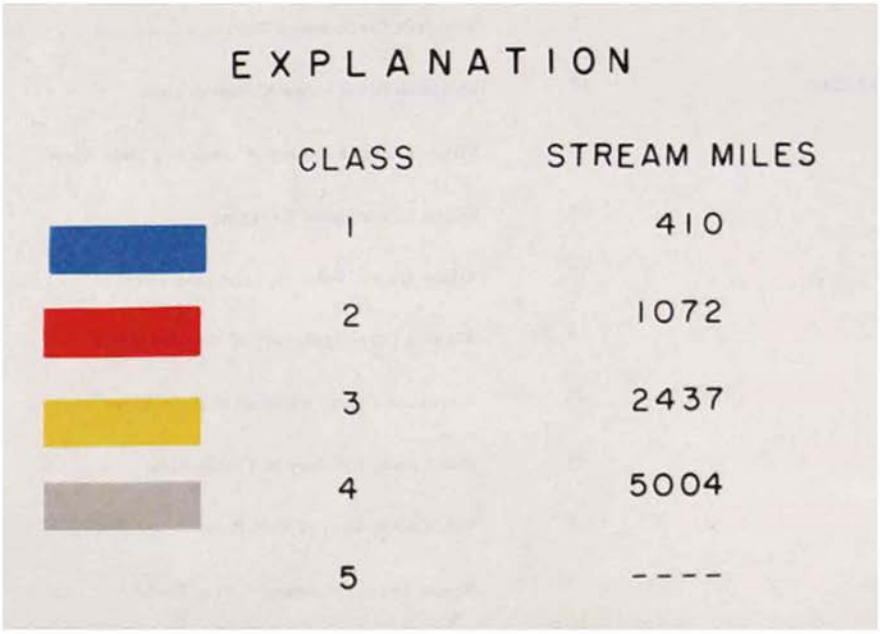


Figure 3



[1] This is an excerpt from Montana Fish and Game's legal counsel F. Woodside Wright's final argument made before the Board of Natural Resources and Conservation regarding the Yellowstone River Basin Water Reservation. The full transcript can be found at Montana State University Special Collections, Collection 2094: Montana Board of Natural Resources and Conservation, Box 10, Folder 1, Transcript of Final Argument, p. 306.

[2] My use of "Montana Fish and Game" throughout the paper is used to refer to both the Montana Fish and Game Commission, a five person Governor appointed board that oversees the Department of Fish and Game, and the Montana Department of Fish and Game, a state agency.

[3] Montana's John and Frank Craighead are credited with starting the wild and scenic rivers movement in response to federal plans to build a dam on the Flathead River (Palmer 2004).

[4] It is worth noting that plans to dam the Yellowstone River at Allenpsur had existed since at least 1902. Therefore, environmental advocates were searching for more permanent protection from a large hydro-electric impoundment on the upper Yellowstone. For further reading on Allenspur see Anderson (1974) and for the upper Yellowstone more generally Lovin (2002), Yochim (2003), and Scheiders (2003).

[5] I have these rules as part of a memo sent from J.E Acord (Chief, Resources and Planning Bureau of the DNRC) on March 1, 1976 to "All Interested Persons." The document can be found at the Department of Fish, Wildlife, and Parks' Fisheries Division Records Box 155-70M806, Folder "Water Rights" in Helena, MT.

[6] Interestingly, the agency drew on Don Tennant's "Montana Method" for its initial 1974 application but did not use it as a justification for its revised 1976 application.

[7] Archival evidence suggests that Jim Posewitz likely drafted much of F. Woodside Wright's final argument. Specifically, in the Department of Fish, Wildlife, and Park's Fisheries Division Records (Box 155-70M806, Folder "Yellowstone Reservations") exists a document entitled "Final Arguments – Yellowstone River Flow Reservation" that I interpret as a document most likely not authored by Wright.

CHAPTER THREE

THE YELLOWSTONE AS THE LONGEST UNDAMMED RIVER: AN ENVIRONMENTAL HISTORICAL GEOGRAPHY OF A MYTHIC ASSEMBLAGE

Contribution of Authors and Co-Authors

Manuscript in Chapter 3

Author: Nicolas T. Bergmann

Contributions: Conceived the study, conducted research, and wrote the manuscript.

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The Yellowstone as the Longest Undammed River:
An Environmental Historical Geography of a Mythic Assemblage

Manuscript in-preparation for submission to
Journal of Historical Geography

Abstract

This article brings together the previously distinct analytical tools of myth and assemblage to historicize and denaturalize perceptions of the Yellowstone River as the longest undammed or free-flowing river remaining in the contiguous United States. Relying on geographical understandings of myth that define it not only in relation to story but also in its capacity as landscape, I trace the emergence and evolution of belief in the Yellowstone as the longest undammed or free-flowing river from its beginnings in the wild and scenic rivers movement of the late 1950s and early 1960s to contemporary environmental conflicts that expose its contradictions and threaten its continued existence. Combining recent theorizations of assemblage with existing geographical scholarship about myth, I argue that actors within Montana Fish and Game – embedded within an active and dynamic environment – created a new 'mythic assemblage' for the Yellowstone River throughout the late 1970s as a political tool to gain legal protection for the river. During the 1980s and 1990s, however, this mythic assemblage transformed and took on an aura of an inviolate landscape. Consequently, the myth's relationship to environmental protection became more ambiguous than its creators had originally intended.

Key Words: myth; assemblage; geographical imagination; Yellowstone River

INTRODUCTION

We can never escape our myths, nor perhaps should we want to, but we need to recognize that whatever form they take, they are masks that obscure a complex, sometimes baffling world. Myths serve a purpose – they allow us to resolve imaginatively our contradictions, conflicts, and fears, and by doing so they can give us hope to summon us to action. But myths cannot fully explain our lives, especially our lives in relation to nature. So leave the mask as it is, but every now and then gently lift it up and look behind it.[1]

Where materially is the geographical imagination? Where is it physically to be found?[2]

The Yellowstone River – flowing more than 670 miles from its source in the mountains southeast of Yellowstone National Park to its confluence with the Missouri River in western North Dakota – is commonly perceived as the longest undammed or free-flowing river remaining in the contiguous United States (Figure 1).[3] Conjuring up associations with not only wildness and freedom but also the exceptional and unspoiled, this popular image of the Yellowstone River is neither entirely false nor particularly accurate. It is, however, powerful. It affects everyday experiences, intellectual understandings, political policies, and even the health of the environment, while at the same time appearing completely natural. In other words, belief in the Yellowstone as the longest undammed river is mythic.

Following Essebo, this article defines myth as 'a taken-for-granted belief that alleviates fear, naturalises ideology, and guides everyday behavior'.[4] Although myth is more often than not

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[1] M. Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West*, Seattle, 1999, 204.
[2] S. Daniels, Boundary Crossings: Geographical imagination, *Transactions of the Institute of British Geographers* 36 (2011) 185.
[3] For a few recent examples, see American Geographical Society, *DailyGeo*, 10 January 2020, https://mailchi.mp/americangeo/dailygeo-1139697, last accessed 10 January 2020; S. Winston (Writer), Down the river wild, 31 March 2019, in: T. Winston (Series producer), *Epic Yellowstone*, Smithsonian Channel; M.B. Anderson, L.C. Ward, S.J. Gilbertz, J. McEvoy and D.M. Hall, Prior appropriation and water planning reform in Montana's Yellowstone River Basin: path dependency or boundary object, *Journal of Environmental Policy & Planning* 20 (2018) 198-213; D. Murray, Yellowstone River still wild, but faces challenges from development, *Great Falls Tribune*, 4 June 2017, https://www.greatfallstribune.com/story/news/2017/06/04/yellowstone-river-still-wild-but-faces-challenges-development/361505001/, last accessed 9 January 2020.
[4] M. Essebo, A mythical place: A conversation on the earthly aspects of myth, *Progress in Human Geography* 43 (2019) 515.

conceptualized as story, this article is primarily concerned with the less developed interpretation of myth as landscape.[5] Combining retheorizations of landscape as co-constitutive and emergent with the decentering of human subjectivity and agency from posthumanist geographies, this article revises and expands upon Blake's definition of mythic landscape as 'a type of imagined landscape, a symbolic landscape imprinted in the mind as much as on the ground'.[6] In particular, I attempt to move the concept of myth beyond its problematic reification of dualistic ontologies by arguing that it functions as an assemblage in which the more-than-human world – through affective means – plays an inseparable role in its creation and transformation.[7]

In addition to these conceptualizations, this article also draws from M.J. Bowden's framework for systematically understanding a myth's origin and transformation. Specifically, Bowden delineates four phases in the evolution of 'the great geographical traditions that became fixed in the American mind': 1) Image Formation; 2) Myth Creation; 3) Invented Tradition; and 4) Universalization.[8] Using Bowden's framework as an additional conceptual foundation, this article traces the mythic assemblage of the Yellowstone River as the longest undammed or free-flowing river in the contiguous United States from its beginnings in the wild and scenic rivers movement of the late 1950s to contemporary environmental crises that expose its contradictions and threaten its continued existence. In particular, I argue that a 1970s environmental conflict – the Yellowstone River Basin water reservations – provided the necessary elements for Bowden's

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[5] For interpreting myth as 'story' see R. Segal, *Myth: A Very Short Introduction*, 2nd Edition, Oxford, 2015; for interpreting myth as 'landscape' see K. Blake, Making mythic landscapes, in: C. Colten and G. Buckley (Eds.), *North American Odyssey: Historical Geographies for the Twenty-first Century*, Lanham, 2014, 251-271.
[6] For a poststructuralist geographical understanding of landscape see J. Wylie, *Landscape*, London, 2007; the literature on posthumanism is voluminous but for its relation to landscape see S.J. Pries, A geographer looks at the landscape, once more: Toward a posthumanist political ecology approach, *Geography Compass* (2018); Quotation is from Blake, Making landscapes mythic, 251.
[7] For a concise discussion of assemblage and affect see N. Singh, Introduction: Affective Ecologies and Conservation, *Conservation and Society* 16 (2018) 1-7.
[8] M.J. Bowden, The invention of American tradition, *Journal of Historical Geography* 18 (1992) 4.

second phase of myth creation to take place. Specifically, key Montana Fish and Game actors – embedded within an active and powerful material world – manufactured the exceptional vision of the river as the longest free-flowing river remaining in the contiguous United States. Although originally an effective political strategy to gain environmental protections for the Yellowstone River and its tributaries, during the 1980s and 1990s, the myth's meaning evolved into belief in the Yellowstone River as an inviolate landscape. This transformation of the myth, I argue, created a more ambiguous relationship with environmental protection than its founders intended, which, in turn, potentially threatens the myth's very existence.

This article continues with a focused literature review of geographical interpretations of myth, landscape, assemblage, and affect. In particular, this article emphasizes posthumanist understandings of landscape and assemblage that provide a framework for understanding the affective power of both humans and nonhumans. This article then provides an overview of the prevalence of myth within the American West before transitioning into a case study examination of the Yellowstone River as the longest undammed or free-flowing river in the contiguous United States. Specifically, this article breaks the case study into four distinct periods that correspond to important transformations in its historical trajectory. This structure provides a framework for not only understanding the emergence and evolution of the mythic Yellowstone River but also for analyzing its various more-than-human assemblages. Lastly, this article concludes with a brief discussion of the ambiguity of the mythic Yellowstone River's relationship to environmental protection.

LITERATURE REVIEW

Myth, Landscape, Assemblage, and Affect

Geographers study myths.[9] From deconstructing the idea of 'pristine wilderness' to that of the 'immutable tiger,' critical environmental scholars seek to politicize mythical understandings of 'nature'.[10] A few notable practitioners have even constructed a systematic understanding of myth's spatial implications.[11] Although these efforts contribute significantly to advancing understandings of the geographical aspects of myth, they either too easily detach understandings of myth from their connections to physical reality or, when the material environment is incorporated, do so in a way that maintains the modernist ontological distinction between 'humans' and 'environment'.[12]

Myth is commonly defined in opposition to truth. Although not without merit, this definition often misses deeper implications that transcend such a true-false dichotomy. As Essebo argues, 'myth need neither be entirely true nor entirely false. Its power lies not in its correspondence with truth but with naturalised societal and individual belief'.[13] In other words, scholars should not necessarily seek to disprove a myth but instead critically unpack its political

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[9] D. Harvey, Monument and Myth, *Annals of the Association of American Geographers* 69 (1979) 362-381; D. Cosgrove, The myth and the stones of Venice: an historical geography of a symbolic landscape, *Journal of Historical Geography* 8 (1982) 145-169; P. Nunn, On the convergence of myth and reality: examples from the Pacific Islands, *The Geographical Journal* 167 (2001) 125-138.

[10] W. Denevan, The Pristine Myth: The Landscape of the Americas in 1492, *Annals of the Association of American Geographers* 82 (1992) 369-385 and W. Cronon, The trouble with wilderness; or, getting back to the wrong nature, in: W. Cronon (Ed.), *Uncommon Ground: Rethinking the Human Place in Nature*, New York, 1995, 69-90; J. Margulies and B. Bersaglio, Critical review: Furthering post-human political ecologies, *Geoforum* 94 (2018) 103-106.

[11] D. Livingstone and R. Harrison, Meaning through Metaphor: Analogy as Epistemology, *Annals of the Association of American Geographers* 71 (1981) 95-107; Bowden, The invention of American tradition; A. Sluyter, The Making of the myth in postcolonial development: material-conceptual landscape transformation in sixteenth-century Veracruz, *Annals of the Association of American Geographers* 89 (1999) 377-401; Essebo, A mythical place.

[12] For example, see Essebo, A mythical place and Bowden, The invention of American tradition for a primarily cultural understanding of myth. For an approach that accounts for the influence of the more-than-human world within a dualistic framework see Blake, Making mythic landscapes and Sluyter, The Making of the myth; For the classic critique of modernity's dualistic thinking see B. Latour, *We have never been modern*, Cambridge, 1993.

[13] Essebo, A mythical place, 516.

effects. Deconstructing the context of a myth's origins and development offers geographers an important avenue for exploring and critiquing its power.[14] Importantly, Essebo also identifies mythic scholarship's problematic tendencies to privilege analysis of historical myths and remove its empirical analysis from 'the everyday activities that both edify and erode myth'.[15] Thus, this article investigates a contemporary place myth through the actual practices and conflicts that shape its emergence and transformation.

Although myth is often conceptualized as an abstract phenomenon, geographers Blake and Sluyter remind us of its spatial manifestations in the material landscape. As Blake argues, myth should be understood as 'not just an imaginary construct projected onto earth' but as 'a place transformed into myth.' Furthermore, Sluyter conceptualized myth as more than a cultural fabrication of ideology but as 'feedbacks between conceptual and material landscape transformations'.[16] Thus, in order to account for the origins and evolution of myths, one must also acknowledge the constitutive influence of the physical world.

A recent turn to more-than-human and new materialism scholarship provide geographers with a body of theory and practice useful for rethinking the ontology of myth.[17] In particular, recent reformulations of landscape and the emergence of affective political ecologies offer opportunities for scholars examining the relationship between myth and place to provide a more robust conceptualization of myth's spatiality. Although a standardized definition of landscape has long eluded geographers, its historical and contemporary influence within the discipline

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[14] For an excellent example see Margulies and Bersaglio, Furthering post-human political ecologies.
[15] Essebo, A mythical place, 519.
[16] Blake, Making landscapes mythic, 253; Sluyter, The Making of the myth, 381.
[17] K. Bakker and G. Bridge, Material worlds? Resource geographies and the 'matter of nature', *Progress in Human Geography* 30 (2006) 5-27; D. Coole and S. Frost (eds.), *New Materialisms: Ontology, Agency, and Politics*, Durham, 2010; B. Braun and S. Whatmore (eds.), *Political Matter: Technoscience, Democracy, and Public Life*, Minneapolis, 2010; T. LeCain, *The Matter of History: How Things Create the Past*, Cambridge, 2017.

remains noteworthy.[18] Often cast as a choice between the real and objective or the symbolic and subjective, landscape is increasingly viewed as a process through which interactions between its various components emerge as entanglements or assemblages, never static but constantly becoming.[19] This poststructuralist interpretation gains additional theoretical traction through its association with certain aspects of affect theory. In particular, Singh's definition of affect as 'a dynamic relationality between bodies of various kinds that enhances or diminishes the capacity of a body to affect and be affected' provides conceptual depth to the metaphor of assemblage.[20] Because of its insistence to not ontologically distinguish between different types of bodies, this reading of affect allows space for more-than-human entities – such as landscapes and their components – to have political agency.

Although conceptual approaches to assemblage are diverse, Bennett's theory of vital materialism offers an explanatory framework for understanding the relationship between myth and more-than-human objects and forces.[21] Specifically, Bennett defines assemblages as 'ad hoc groupings of diverse elements' that 'have uneven topographies' and 'are not governed by any central head'.[22] In other words, assemblages, such as the mythic Yellowstone River, are asymmetrical collections of human and non-human objects and forces that have emergent properties and through which agency is distributed. Importantly, the vital or affective power of

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[18] Wylie, *Landscape*.
[19] T. Ingold, The temporality of the landscape, *World Archaeology* 25 (1993) 152-174; S. Harrison, S. Pile, and N. Thrift (eds.), *Patterned Ground: Entanglements of Nature and Culture*, London, 2004; Pries, A geographer looks at the landscape.
[20] Singh, Affective Ecologies and Conservation, 1.
[21] J. Bennett, *Vibrant Matter: A Political Ecology of Things*, Durham, 2010; For other contemporary approaches to assemblage see M. DeLanda, *Assemblage Theory*, Edinburgh, 2016; B. Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory*, Oxford, 2005; E. Swyngedouw, *Liquid Power: Contested Hydro-Modernities in Twentieth-Century Spain*, Cambridge, 2015; For a historical overview of assemblage type thinking within the history of geographic thought see G.D. Nelson, Mosaic and tapestry: Metaphors as geographical concept generators, *Progress in Human Geography* 43 (2019) 853-870.
[22] Bennett, *Vibrant Matter*, 23-24.

individual bodies – either human or nonhuman – to act or be acted upon underlies the power of an assemblage. Thus, Bennett's affective assemblage framework elevates the importance of the nonhuman world within landscapes and helps to decenter the role of human subjects in the constitution of myth.

The flexibility of an affective assemblage reading of landscape to integrate both the human and nonhuman makes it useful for reconceptualizing geographical understandings of myth. However, viewing a mythic landscape as an assemblage need not entirely undermine the value of existing scholarship. For example, Bowden breaks the evolution of myth into four periods. The first phase – image formation – is essentially a formative period in which several incomplete images exist prior to one gaining mythic status. The second phase – myth creation – commences with an important event that favorably publicizes a particular interpretation of a previously incomplete image. Following this occurrence, various actors '[lead] each other to and fro in a trial and error process to the definition of an historically suitable myth.' The third phase – invented tradition – is defined as 'a body of belief that is so deeply internalized by a nation/group that it is practically impervious to scholarship that shows it to be largely factitious.' This transition occurs when memory of the original context declines. The fourth phase – universalization – occurs at 'a later stage of elaboration in which [the mythic] tradition was incorporated into history and geography books at all levels and was later even used as superstructure, paradigm, and ideology by academics.' During this final phase Bowden notes that certain scholars may even seek to reconceptualize a mythic tradition once they become aware of its inaccuracies and lack of historical context.[23] When augmented with an affective assemblage approach to landscape, Bowden's framework becomes a useful way to historicize belief in the

[23] Bowden, The invention of American tradition, 4.

Yellowstone as the longest undammed or free-flowing river remaining in the contiguous United States.

The Mythic West

Bowden's framework develops from empirical work focused in pre-twentieth century America and centers on particular portions of the East Coast and Midwest.[24] Bowden's specific focus on how various iterations of the pristine myth originate and transform is relevant to the understanding of environmental perceptions within the Yellowstone River Basin and across the American West more broadly. As a region, the American West is often viewed as inseparable from its mythic connections.[25] As Blake writes, 'Many of the myths once associated with the entire continent, as well as other myths still dominant in American identity, are firmly entrenched in the western landscape'.[26] From the belief in the power of the frontier to cultivate democratic institutions and combat urbanity's degenerating effects to the idea of a yeoman agricultural utopia moving westward across the country, using the landscapes of the American West to perpetuate national myths has proven central to maintaining a sense of American exceptionalism.[27]

In particular, environmental perceptions of the American West's physical geography have helped to reify notions of American exceptionalism. Dramatic features within the American West – including its sheer topography, incomprehensible vastness, stark aridity, and raging rivers – provide a material foundation for explaining the high prevalence of myth throughout the

[24] Bowden, The invention of American tradition.
[25] For a broader overview see R. White, *"It's Your Misfortune and None of My Own": A New History of the American West*, Norman, 1991, 613-632 and G. Hausladen (Ed.), *Western Places, American Myths: How We Think about the West*, Reno, 2003.
[26] Blake, Making mythic landscapes, 261.
[27] H.N. Smith, *Virgin Land: The American West as Symbol and Myth*, Cambridge, 1950; White, *"It's Your Misfortune"*, 613-632; Blake, Making mythic landscapes.

region.[28] Many of these understandings draw from embodied experiences not only with these physical landscapes but also with artistic representations rooted deeply in the tradition of the romantic sublime. Such depictions of western's landscapes physical wonder not only speak to a sense of American exceptionalism but also mythologize the region 'as an unspoiled Arcadian wonderland'.[29] Beginning in the late nineteenth century, these influences combined to create a new, romanticized iteration of the pristine myth: untouched wilderness.[30]

Grounded in the traditions of the frontier and sublime, environmental reformers known as preservationists advocated for the protection of national park wilderness landscapes to remain untouched from development in order 'to protect the nation's most sacred myth of origin'.[31] In this model, humans living on land now deemed wilderness – such as American Indians and/or squatters – often became dispossessed of their homes and livelihoods for the sake of environmental protection.[32] It is within this context that certain protected areas transformed from working landscapes into tourist playgrounds. Beginning in the late 1970s, a similar attitude crystalized along the entirety of the Yellowstone River. As Montana historian William Lang wrote, 'the Yellowstone [River] took on an aura of a river inviolate, a wilderness place where tourists could experience the quintessential West that had been lost to development in so many other places. The spell cast by the Yellowstone [River] was nearly magical'.[33]

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[28] Blake, Making mythic landscapes, 253-255.
[29] Blake, Making mythic landscapes, 256; For a recent geographical interpretation of the relationship between embodied experience and environmental perception see N.T. Bergmann, J. McEvoy, E.A. Shanahan, E. Raile, A.M. Reinhold, G.C. Poole, and C. Izuieta, Thinking Through Levees: How Political Agency Extends Beyond the Human Mind, *Annals of the American Association of Geographers*, 110 (2020) 827-846.
[30] Cronon, The trouble with wilderness.
[31] Cronon, The trouble with wilderness, 77.
[32] Cronon, The trouble with wilderness; M.D. Spence, *Dispossessing the Wilderness: Indian Removal and the Making of National Parks*, Oxford, 1999; K. Jacoby, *Crimes against Nature: Squatters, Poachers, Thieves, and the Hidden History of American Conservation*, Berkeley, 2001.
[33] W. Lang, In the Yellowstone: river, myth, and environment, in: W. Lang (Ed.), *Stories from an Open Country: Essays on the Yellowstone River Valley*, Billings, 1995, 25.

The myth of the Yellowstone River as the longest undammed river in the contiguous United States drips with elements of American exceptionalism, frontier ideology, romantic sublime, and untouched wilderness. In order to more fully understand its historical and contemporary influence, however, it is necessary to denaturalize the process of its development. The following section categorizes the development of belief in the Yellowstone River as the longest undammed or free-flowing river in the contiguous United States into four periods: 1) The Rise of the Free-Flowing Yellowstone River (1957-1976); 2) The Birth of the Longest Undammed River (1977- 1980); 3) The River Inviolate (1981-1994); 4) A Dam Contradiction (1995-2019). Although the boundaries of each of these eras should be understood to have some fluidity, this periodization allows for more fruitful engagement with Bowden's framework and a deeper understanding of its mythic assemblage.

THE MYTHIC YELLOWSTONE RIVER

The myth of the Yellowstone River as the longest undammed river in the contiguous United States is a relatively recent phenomenon. However, the river as a place of myth stretches back much farther in time. The landscape of the Yellowstone River first experienced a mythic identity in the worldview of indigenous peoples. As Lang recounts, the Crow leader Chief Arapooish believed in the exceptional quality of the Yellowstone basin, stating that 'No place … could be better for human beings' and ''The Crow country is a good country. The Great Spirit has put it exactly in the right place.''[34] Euro-Americans first came to the Yellowstone River in pursuit of fur trapping and trading. Specifically, 'mountain men' actively shaped the first dominant non-indigenous myth of the region as a cornucopia of natural resources. This characterization remained the preeminent vision along the river through the gold rush years of

[34] Lang, In the Yellowstone, 14.

the 1860s. However, as the western settler colonial project expanded during the latter parts of the nineteenth century, the Yellowstone River as an agricultural Eden – achieved through irrigation and engineering – became the preeminent myth associated with the Yellowstone River.[35] With the Yellowstone as a free-flowing and wild river emerging as a new component of the geographical imagination during the latter twentieth century, the river currently has multiple myths shaping environmental perceptions. Depending on geographic location, community composition, and individual ideology, popular imaginaries of the river adhere to some combination of these myths. This makes for a landscape fraught with environmental contradiction and even, at times, conflict.[36] Despite these multiple existing myths, the idea of the Yellowstone River as the longest undammed or free-flowing river remaining in the contiguous United States has solidified into the Yellowstone River's most publicized mythic assemblage.

The Rise of the Free-Flowing Yellowstone River (1957-1976)

The movement to protect rivers as free-flowing entities began in the late 1950s as an outgrowth of the postwar wilderness movement. Frustrated with its primary focus on high-elevation forested lands and peaks, two brothers – John and Frank Craighead – envisioned a comparable national river preservation system focused specifically on protecting the environmental qualities of the country's few remaining wild waterways.[37] Grounded strongly in their embodied experiences with Montana's rivers, especially the Middle Fork of the Flathead, they proposed a systematic approach 'for evaluating upstream drainages and to classify these according to their potential recreational areas of the future'.[38] Specifically, they proposed four

[35] Lang, In the Yellowstone, 13-25.
[36] For the most in-depth study of river perceptions along the Yellowstone River see S. Gilbertz, C. Horton, and D. Hall, *Yellowstone River Cultural Inventory—2006*.
[37] T. Palmer, *Endangered Rivers and the Conservation Movement*, Second Edition, Lanham, 2004.
[38] J. Craighead, Wild River, *Montana Wildlife* 1957 15-20.

categories for upstream drainages: 1) Wild; 2) Semi-wilderness; 3) Semi-exploited; and 4) Exploited. Significantly, they advocated for a conservation approach that focused on further harnessing downstream stretches of exploited rivers for development, in exchange for preserving wild and semi-wild upstream stretches of river.[39]

As the Craigheads helped the movement for a national wild and scenic rivers system gain momentum and solidify into federal law, the term *free-flowing* emerged as the gold standard for protecting and maintaining a river's environmental integrity. As the 1968 Wild and Scenic River Act proclaimed,

> It is hereby declared to be the policy of the United States that certain protected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in *free-flowing* condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at the appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their *free-flowing* condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes [emphasis added].[40]

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[39] Craighead, Wild River, 20. Specifically, John Craighead defined the category of exploited river as 'a group characterized by impoundments, artificial channeling and dyking, and exhibiting varying degrees of pollution'. Furthermore, he believed that 'The lower reaches of most Montana rivers would fall into this category'.
[40] Public Law 90-541-OCT. 1, 1968, Section 1(b).

Importantly, a later section within the Act provided a specific definition for free-flowing as 'any river or section of a river … existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway.'[41] Thus, the meaning of free-flowing was defined according to 'natural' conditions and was conceived in opposition to any human physical modification of a river section.

In the Yellowstone River Basin, systematic usage of free-flowing occurred by 1962. As part of a proposed Bureau of Reclamation hydroelectric dam just south of Livingston, Montana at a site called Allenspur (Figure 2), a cost-benefit analysis related to the reservoir's recreational potential was conducted. The corresponding report stated that 'The entire stretch of the river from the Park downstream for 183 miles to Billings has been listed by the National Park Service as a free-flowing stream which we think should be preserved'. The report also noted that this portion of the Yellowstone River 'is considered to be an outstanding example of a large, top-quality trout stream, and one of the few such remaining streams in the United States which has remained in a relatively unchanged condition'.[42] Three elements of this report stand out. First, by the early 1960s, the NPS used the free-flowing concept to help establish a significant portion of the Yellowstone River as worthy of environmental protection. Second, only the portion of the river upstream of Billings was included in this assessment. Thus, the river was categorically bisected into two major segments: free-flowing and not free-flowing. Thirdly, the exceptional

[41] Public Law 90-541-OCT. 1, 1968, Section 16(b). Also note that immediately after the definition of free-flowing is provided, the Act states that 'The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion: *Provided*, That this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system [original emphasis].' In other words, the act allows for the potential inclusion of rivers and river sections that do not fall within the Act's own definition of free-flowing.

[42] Missouri River basin Survey Resource Planning and National Park Service, Midwest Region, *Reconnaissance report of recreation use and development, Allenspur Reservoir, Yellowstone Division*, Montana, 1962, 2.

aspect of the upper Yellowstone River was not only its free-flowing condition but its status as an exceptional trout fishery.

At approximately the same time that free-flowing emerged as a defining characteristic of riparian environmental protection efforts, other Montana conservationists were establishing a classification system to better help preserve the state's best fishing streams. Specifically, a group of state and federal actors created a five-tiered system to rank the value of stream sections according to availability, aesthetics, use, and productivity. The most well-know of these designations is Class 1, which represents rivers of national and state value. In this 1959 classification scheme, 103 miles of the upper Yellowstone River – between the Boulder River and Yellowstone National Park – became known as blue ribbon (the authors' used the color blue to spatially depict Class 1 streams on the map of Montana). The mainstem of the Yellowstone River also received an additional 50 miles as Class 2 (state-wide value), 20 miles as Class 3 (value to large districts of the state), and 294 miles as Class 4 (value to smaller districts such as counties). Although all Montanan river miles of the Yellowstone made the classification system, the Class 1 or blue ribbon garnered the most clout for fishery preservation efforts and created an indelible imprint for those interested in the Yellowstone River's trout. [43]

The near simultaneous emergence of the upper Yellowstone River as wild, free-flowing, and blue ribbon created three distinct images of the river as environmentally exceptional. Using Bowden's myth creation framework, these images fall squarely into his first phase of image formation. As the 1960s made way for the 1970s, a major new environmental conflict in the basin would pave the way for further development vis-à-vis Bowden's first phase. Specifically, the proposal of large-scale energy development in the Yellowstone River Basin, which included

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[43] C.J. Brown, J.M. Halterman, G.D. Holton, and P.H. Nelson, *Montana stream-fishery classification map, 1959*, Billings, 1959.

21 mine-mouth powerplants in eastern Montana and would require an estimated 2.6 million acre-feet of water annually from the Yellowstone River and its tributaries, threatened the agricultural, recreational, and environmental livelihood of many Montanans. The energy development scheme also reinvigorated the Bureau of Reclamation's thirst for constructing a 380-foot high impoundment at Allenspur, which motivated both local communities and state entities to seek more permanent legal protection against dam construction in the upper Yellowstone River.[44]

In response to the renewed threat of dam construction at Allenspur, environmental advocates sought legal channels to more permanently protect the upper Yellowstone River from a large impoundment and reservoir. The passage of the Wild and Scenic River Act in October 1968 provided a federal mechanism to preserve portions of the Yellowstone River that qualified as free-flowing. Thus, initial preservation attempts focused on adding the upper Yellowstone River to the National Wild and Scenic Rivers System. When the measure failed to gain enough support, attention then turned to a second mechanism – state water reservations. Created in the early 1970s through the ratification of a new state constitution and passage of a new water use act, the water reservation system created a process in which state agencies could apply for certain quantities of water for consumptive and non-consumptive uses.[45] Importantly, this included minimum instream flows for fish, wildlife, and recreation, which were defined as beneficial uses

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[44] J. Posewitz, Preserving paradise: Fortunately, some things never change, in: B. Schneider, *Montana's Yellowstone River*, Helena, 1985, 82-97.

[45] See D. Sweetman, *Protecting Instream Flows in Montana: Yellowstone River Reservation Case Study*, Instream Flow Information paper No. 10, Fort Collins, 1980.

under this progressive legislation.[46] Thus, environmental advocates moved to permanently keep a large dam off the upper Yellowstone River through the reservation of instream flows.[47]

More than any other entity, Montana Fish and Game ushered in this new understanding of the Yellowstone River. In the 1960s, the agency orchestrated a state-wide push for stream preservation. Focused on improving legal protection for the physical channel as well as regulations for water quality and quantity, it took a very progressive and active approach to environmental reform.[48] During the 1970s, the agency's Environment and Information Division – led by the charisma and dynamic vision of its administrator Jim Posewitz – became the foremost advocate for reserving a large amount of Yellowstone River water instream for environmental benefits.[49] Through a strategic approach that viewed instream water reservations on the lower Yellowstone River as fundamental to minimizing industrial development opportunities and thus preventing future dam development on the upper river, Posewitz and his team put together a water reservation application that requested 8.2 million acre-feet out of a remaining annual average of 8.8 million remain instream for the benefit of fish, wildlife, and recreation.[50]

Envisioning a more holistic view of the river, divisions between the wild, free-flowing, and blue ribbon upper river and the less enchanting lower river became deemphasized. In its

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[46] Across the American West, legal access to water use was dependent upon putting it to a 'beneficial use', which historically was limited to industrial, agricultural, or municipal uses. See C. Wilkinson, *Crossing the Next Meridian: Land, Water, and the Future of the West*, Washington DC, 1992, especially pp. 219-292 for an excellent discussion of western water management and law; For a thorough account of instream flow protection in the American West see D. Gillilan and T. Brown, *Instream Flow Protection: Seeking a Balance in Western Water Use*, Washington DC, 1997.

[47] Posewitz, Preserving paradise; J. Posewitz, Testimony of Jim Posewitz, Fisheries Division Records, Montana Department of Fish, Wildlife, and Parks, Box 20-25k705, Folder 'Jim Posewitz', Helena, MT.

[48] J. Posewitz 1985; See also G. Sullivan, *Saving Homewaters: The Story of Montana's Streams and Rivers*, Woodstock, VT, 2008.

[49] L. Peterman, *The Ecological Implications of Yellowstone River Flow Reservations*, Helena, 1979

[50] Posewitz, Preserving paradise; Sweetman, *Protecting instream flows.*

place, the idea of the Yellowstone as a collectively exceptional river began to coalesce. For example, Montana Fish and Game's November 1976 water reservation application states that 'The Yellowstone River is unique in this nation in that it is one of the few remaining 'free-flowing' streams left in the continental United States'.[51] Furthermore, when the Montana Department of Natural Resources and Conservation released its environmental impact statement the following month, it described the Yellowstone River as 'unique among the nation's major rivers. Two tributaries, the Tongue and Bighorn river, are regulated; but the Yellowstone mainstem is virtually unimpounded for its entire 670-mile length.'[52] By the end of 1976, the Yellowstone River had become associated with the well-established myth of American exceptionalism and was now perceived as one of the nation's few remaining free-flowing rivers. Thus, image formation of a new potential mythic Yellowstone River had evolved even further and now stood at the precipice of Bowden's second phase: myth creation.

The Birth of the Longest Undammed River (1977-1980)

The myth of the Yellowstone River as the longest undammed or free-flowing river in the contiguous United States emerged, in earnest, as part of Montana Fish and Game's promotion for its water reservation application. Having requested that a substantial portion of the basin's remaining average annual water flow remain instream for the benefit of fish, wildlife, and recreation, the agency faced a strong current of political opposition.[53] In response, it launched a media relations campaign aimed at convincing the general public of the Yellowstone River's extraordinary environmental value. Specifically, Montana Fish and Game organized its publicity

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[51] Montana Fish and Game Commission, *Application for reservation of water in the Yellowstone River Basin*, Helena, 1976, 5-6.
[52] Montana Department of Natural Resources and Conservation, *Volume 1: Draft environmental impact statement for water reservation applications in the Yellowstone River Basin*, Helena, 1976, 9.
[53] Sweetman, *Protecting instream flows*.

campaign around the unveiling of a special issue of its magazine – *Montana Outdoors* – and the release of its new film – *The Yellowstone Concerto*. These two objects shaped popular understandings of the Yellowstone as the longest, largest, or last free-flowing river in the contiguous United States.

On February 1, 1977 Montana Fish and Game held its first ever news conference in Billings to 'monopolize the local press on behalf of the Yellowstone'.[54] As part of this event, the agency unveiled a new special issue of *Montana Outdoors* featuring the Yellowstone River (Figure 3a). Although ideas of the upper Yellowstone as a free-flowing river had existed for at least fifteen years, popularization of the entire Yellowstone as the longest, largest, or last free-flowing river began in earnest with the production, release, and promotion associated with the special issue.[55] In fact, the magazine's introduction, written by former director Wes Woodgerd, states unequivocally that 'the Yellowstone, the longest free-flowing river in the continental United States, is the lifeblood of about one-third of Montana and much of northern Wyoming'.[56] This understanding of the Yellowstone River gained further legitimacy throughout the remainder of the special issue. Specifically, Mike Alderhold labeled the Yellowstone as 'the largest free-flowing river left in the 48 adjacent states. It's a national treasure.'[57] Importantly, this excerpt

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[54] Bill Pryor to Steve Bayless, 18 April 1977, Copy in Author's Collection.

[55] An internal Montana Fish and Game memo from Keith Seaburg to Wes Woodgerd dated 8 February 1974 describes the Yellowstone River as 'perhaps the last great free-flowing river on the North American continent'. This appears to be an early and isolated characterization of the river in these terms. Importantly, this language was not included in the agency's original water reservation application submitted in March 1974. In fact, no reference to a 'free-flowing' Yellowstone exists in the original application. A copy of this memo can be found at the Montana Department of Fish, Wildlife, and Parks (MDFWP) Fisheries Division Records in Helena, MT, Box 20-25K705, Folder 'Flow Reservations'. A copy of the Montana Fish and Game Commissions March 15, 1974 water reservation application can also be found at the Fisheries Division Records in Helena, MT, Box 20-25K705, Folder 'Reservation of Flows Yellowstone River'. Bob Anderson in his October 1974 report 'The Challenge of Allenspur' referred to the Yellowstone as 'one of the last major free-flowing rivers in America'. However, a close reading of this document suggests that this characterization refers to the upper Yellowstone and not to the river in its entirety.

[56] W. Woodgerd, A Livable Environment for Wildlife is a Quality Environment for Man, *Montana Outdoors* 8 (2), 1977, 1.

[57] M. Aderhold, Yellowstone Water: There's Only So Much, *Montana Outdoors* 8 (2), 1977, 17.

also appeared separately on the inside cover to describe the special issue's cover image (Figure 3b). Furthermore, William Hornby cemented the new vision of the river: 'Out of state in the wider world, "Yellowstone" means only the park, the great magnet. Or possibly the blue ribbon trout water of Paradise Valley. Most of the rest of the country doesn't know this great river as one of the last lengthy rivers that doesn't have a dam anywhere'.[58] Ultimately, Montana Fish and Game would print more than 50,000 copies of the special issue and the Billings news conference would prove only to be the beginning of this new geographical imagination of the Yellowstone.[59]

Like the Yellowstone special issue of *Montana Outdoors*, the 32-minute film – *The Yellowstone Concerto* – promoted a holistic vision of the river as an exceptional free-flowing river:

> The story of the Yellowstone is a story of one of our nation's mightiest rivers. It is wild. It is free. It is untethered in its entirety. Her land, people, and wildlife have been given life. And yet for all its strength and glory, it is today threatened… We have only learned how to stifle, how to channel, how to destroy. Our nation has broken mighty rivers before… We bicker and fight over isolated reaches, but from all of them we have stolen the thunder, calmed the roaring raids, stilled the sparkling riffles, stagnated their freedom. Our developments have humbled them all. The Yellowstone River is truly an irreplaceable Montana resource.'[60]

Despite the film's focus on protecting one of the country's last free-flowing rivers, the agency was careful not to use the idea of an untouched Yellowstone River. Instead, it advocated for

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[58] W. Hornby, A River is More Than Water, *Montana Outdoors* 8 (2) (1977) 22.
[59] According to the Montana Fish and Game Commission Minutes from 28 April 1977 (Vol. 42), circulation of the magazine had increased from 12,000 in 1971 to 53,000 in 1977, which included 42,000 paid subscriptions.
[60] *The Yellowstone Concerto*, directed by Craig E. Sharpe, Helena, 1977.

finding harmony between the river's exceptional environmental aspects and its agricultural and municipal uses. Thus, the vision of the Yellowstone as the longest, largest, or last undammed river in the contiguous United States emerged with influence from the myth of American exceptionalism but not from that of untouched wilderness.

Montana Fish and Game continued to promote the Yellowstone as the longest river free-flowing river remaining in the contiguous United States through additional distribution of the special issue and screenings of *The Yellowstone Concerto*.[61] From a more-than-human mythic assemblage perspective, however, it was not only the words but also the visual imagery of the Yellowstone River within the special issue and film that generated widespread belief in the Yellowstone as the longest undammed or free-flowing river (Figure 3c). As the environmental historian Finis Dunaway argues, 'Images, though, provide not only a record of external reality or a reflection of cultural values. They mold popular perceptions of nature; they legitimate certain ideas and policies to the exclusion of other; they have material consequences on past, present, and future landscapes'.[62] Moreover, images accomplish this actively as part of an assemblage where the human body serves as the key subject of experience in relation to affect generation from images.[63] In other words, more-than-human objects – such as environmental photographs and films – create affective responses in humans that actively shape perceptions. In this way, we

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[61] Montana Fish and Game sent additional copies of the magazine and as well as a copy of the film to members of the public such as journalist in the hope of securing additional publicity. The film was to be returned once viewed. For example, see James A. Posewitz to Pete Canning 9 May 1979, MDFWP Fisheries Division Records Box 155-70M806, Folder 'Yellowstone Movie', and James A. Posewitz to Tom Moore 9 June 1981, MDFWP Fisheries Division Records Box 155-70M806, Folder 'Letters/Public Yellowstone Res.'. In total, Fish and Game originally made twenty-four copies of the film printed, which were available at a nominal cost for groups to show. This was one of the primary ways in which members of the public viewed the film. See Steve Bayless to Jim Posewitz 31 March 1977, MDFWP Fisheries Division Records Box 155-70M806, Folder 'Yellowstone Movie' and Free Showing planned of Yellowstone film, *The Independent Record*, Helena, 25 March 1977, 15A.

[62] F. Dunaway, Reconsidering the Sublime: Imagines and Imaginative Geographies in American Environmental History, in: G. Buckley and Y. Youngs (Eds.), *The American Environment Revisited: Environmental Historical Geographies of the United States*, Lanham, 2018, 279.

[63] T.P. Keating, Imaging, *Transactions of the Institute of British Geographers* 44 (2019) 654.

can think of these objects and the environments they represent as having a co-constitutive power in the emergence of certain beliefs, such as myths.

In 1978 Montana Fish and Game gained another opportunity to promote its vision of the Yellowstone River through a serendipitous partnership with the private whiskey company Glenmore Distilleries. Specifically, Tom Pero – Trout Unlimited Magazine's young editor – had approached Glenmore about the Yellowstone River conflict and put them in touch with Jim Posewitz.[64] At the time, Glenmore was looking for creative ways to promote the launch of its new whiskey – Yellowstone Mellow Mash. After ironing out an agreement with the agency, Glenmore agreed to provide a $50,000 sponsorship to help publicize instream flow protection of the Yellowstone River. This money supported the vision of the Yellowstone as the longest free-flowing river in the contiguous United States through 1) production and distribution of 30 additional copies of *The Yellowstone Concerto*, 2) development of promotional materials for film screenings and at point of sale (liquor store) locations, and 3) the sponsorship of a September 1978 national press tour promoting the Yellowstone River's exceptional environmental qualities.[65]

Attended by journalists from *Field and Stream*, *Audubon*, *Omni*, *Life*, *The Wall Street Journal*, and even *Penthouse*, the press tour included an aerial overview of the river and a day on the water fishing the upper Yellowstone River.[66] The event provided a rare opportunity for journalists to experience the affective power of the Yellowstone River in person. In particular, several experiences from the press tour stick out as particularly embodied and affective. First,

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[64] Jim Posewitz to Fish and Game Commissioners and Lt. Governor Schwinden, 8 September 1978, MDFWP Fisheries Division Records, Box 155-70M806, Folder 'Yellowstone Movie'.
[65] G. Grant, Industry and Environmentalists Mix Satisfying Drink with Kentucky bourbon & Montana water, *The River Rat* 6 (6), 1978.
[66] J. Rosgen, The Selling of the Yellowstone: How Madison Avenue came to Montana… and Launched a Media Blitz, *The Billings Gazette*, 1 October 1978, 1D-2D.

Montana Fish and Game took the reporters airborne in order to gain a bird's eye perspective of the Yellowstone River Basin. The portion of the flight around the Bureau of Reclamation's Yellowtail Dam was described in this visceral fashion:

> Sky bumps and merry-go-round flight patterns soon took their toll. At Yellowtail Dam we circled several times to ensure an especially jaundiced view of the hideous cement behemoth. After about the fourth heavenly rotation a cool, quiet sweat descended collectively over the passengers. Many reporters kept face bags poised in their laps and inwardly talked scrambled eggs off ledges. One New York writer threatened to give a demonstration in projectile vomiting if the plane circled one more time.[67]

After finally landing in Livingston, the press tour spent the night at Chico Hot Springs in the Paradise Valley. Early the next morning the contingent floated a ten-mile stretch of the Yellowstone River through windy conditions with views of freshly snow-capped mountains. This embodied experience with the free-flowing Yellowstone became strongly juxtaposed to the previous day's nauseating flight around Yellowtail Dam. In fact, at the end of the float, Don Roberts wrote:

> By the end of the excursion every writer was wind burned, fatigued and slightly giddy. The general, mild state of euphoria had nothing to do with booze. We had all become intoxicated on the beauty of the Yellowstone. Before disbanding for our separate, distant destinations, I heard one of the more cynical and jaded urban

[67] D. Roberts, Getting Yellowstoned, *Flyfishing the West*, 1 (1978) 56.

> writers comment as he stared across the shadowed Yellowstone, 'Anyone who says that rivers aren't mystical is an idiot'.[68]

Although undoubtedly a sensationalized account of the press tour, Roberts' writing clearly speaks to the affective power of the Yellowstone River's non-human elements and its ability to create embodied experiences to further develop the myth.

During the event, Montana Fish and Game had provided a calculated argument to the journalists: the need to keep the Yellowstone as a free-flowing river.[69] Some members of the national press who attended the event, however, took the free-flowing concept one step further in their corresponding articles. For example, *The Wall Street Journal*'s Paul Ingassia wrote in his frontpage article on October 11, 1978 that 'The Yellowstone River enchants the eye as it flows through the Paradise Valley, just south of Livingston. It is the nation's last major *undammed* river outside Alaska' [emphasis added].[70] Furthermore, *Omni's* Kenneth Brower wrote 'The Yellowstone River, we had learned in a morning briefing, was one of the last major *undammed* rivers in the United States' [emphasis added].[71] Montana Fish and Game was well aware that the lower Yellowstone River contained six major diversion dams, and thus it had carefully crafted its vision of the Yellowstone River as free-flowing and not undammed.[72]

Despite several uses of the Yellowstone as the longest undammed river, most of the national journalists followed the agency's nomenclature and continued to refer to the river as the longest free-flowing river. In one influential article from the press tour, *Life Magazine's* Jeff

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[68] Roberts, Getting Yellowstoned, 57.
[69] Jim Posewitz to Larry Peterman, Craig Sharpe, Ken Walcheck, and Ron Marcoux, 5 September 1978, MDFWP Fisheries Division Records, Box 155-70M806, Folder 'Yellowstone Movie'.
[70] P. Ingrassia, Vast deposit of coal fires controversy over Montana river: Yellowstone's water is bliss to trout; it's also ideal for a gasification plant, *The Wall Street Journal*, 11 October 1978, 1, 18.
[71] K. Brower, The Future of Paradise, *Omni* 1 (1979) 14, 137.
[72] See, for example, *Montana Outdoors'* February 1977 special issue on the Yellowstone River.

Wheelright positioned the river value in relation to Yellowstone National Park (Figure 4). As Wheelright wrote, 'Famous for its geysers and bears, Yellowstone National Park also happens to be the birthplace of the longest free-flowing river left in the lower 48 states. … Nowhere along the way is the river channelized, detoured or dammed.'[73] Still recognizing that 'the Yellowstone ceases to be a truly wild river' because 'a railroad, a highway and a string of ranches run beside it,' Wheelright paints a mythic picture of the Yellowstone that does not promote associations with untouched wilderness but does conceptualize the river as undammed. Importantly, the mythmaking power of the *Life Magazine* article did not reside solely in its words. As with the special issue of *Montana Outdoors* and *The Yellowstone Concerto*, the presence of stunning visual imagery of the river illustrating the Yellowstone River Basin's dramatic landscapes – snowcapped mountains, large open spaces, and an unimpeded river – helped to build the myth of the Yellowstone River as the longest undammed or free-flowing river.[74]

In December 1978, the Board of Natural Resources and Conservation granted Montana Fish and Game a 5.5 million acre-feet instream flow water reservation for the Yellowstone River. Although far lower than the 8.2 million acre-feet requested, the agency generally felt satisfied with the amount granted and did not attempt to appeal the ruling.[75] Certain industrial and agricultural interests, however, pursued further legal and political action in an attempt to reduce the size of the instream flow reservation.[76] Consequently, Jim Posewitz and Montana Fish and

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[73] J. Wheelright, Great River in Crisis, *Life Magazine* 1 (1978) 95.
[74] Wheelright, Great River in Crisis, 94-104.
[75] J. Posewitz, A free-flowing Yellowstone: No longer just a dream, *Montana Outdoors* 10 (1979) 35-37; The reservation decision was actually incredible complex. See W.F. Clark, A free-flowing Yellowstone: The reservations challenge, *Montana Outdoors* 10 (1979) 29-33.
[76] Sweetman, *Protecting instream flows.*

Game continued to actively promote understanding of the Yellowstone River as the longest free-flowing river in the contiguous United States.[77]

The emergence of the Yellowstone as the longest, largest, or last undammed or free-flowing river in the contiguous United States was deeply rooted in the larger myth of American exceptionalism. Before 1977, images of the Yellowstone River as wild, free-flowing, blue ribbon, and even undammed existed, but it took the agency's targeted publicity campaign during the late 1970s to establish a new myth. Importantly, its publicity push corresponds to Bowden's second phase of myth creation. According to Bowden, this phase begins with a 'critical event' in which an audience responds favorably to a 'developed version of an erstwhile inchoate image'.[78] Although Bowden viewed the critical event as a more singular occurrence, such as the publication of a book, I argue that Montana Fish and Game's promotional campaign from early 1977 through 1980 served a similar purpose. In this way, a new mythic Yellowstone River entered into the popular geographic imagination.

The River Inviolate (1981-1994)

As the legitimacy of Montana Fish and Game's 5.5 million acre-feet reservation became settled, the agency's need to serve as the primary promoter of the Yellowstone as the longest free-flowing river waned. Consequently, the myth became more naturalized as time passed, and its emergence faded from memory. Specifically, the success of the agency's campaign facilitated a celebratory narrative of the Yellowstone as a 'saved' river during the 1980s and early 1990s. Although at first this may seem harmless, perceptions of the river as saved (and thus impervious

[77] Archival evidence suggests that in Spring 1979 Fish and Game launched a post-decision publicity campaign for the river once again centered around the image of its free-flowing quality. See 'Suggestions for Yellowstone Publicity Campaign', Undated, MDFWP Fisheries Division Records, Helena, MT, Box 155-70M806, Folder 'Yellowstone Promotion' and Russ Penkal to Jim Posewitz, 27 March 1979, Copy in Author's Collection.
[78] Bowden, The invention of American tradition, 4.

to future environmental degradation) became problematic because it hid the river system's existing vulnerabilities behind a veil of myth. Furthermore, as belief in the Yellowstone as the longest undammed or free-flowing river naturalized, it also became associated with the larger myth of untouched wilderness. These two new associations – saved and untouched – imbued the Yellowstone River with an aura of invulnerability.

In the aftermath of the water reservation decision, Jim Posewitz celebrated the idea of a free-flowing Yellowstone River. However, he also provided a nuanced perspective about the Yellowstone River's current and future protected status. Essentially, Posewitz made the argument that the instream flow water reservation provided only an opportunity – albeit a good one – for the Yellowstone to remain an undammed and relatively intact river. As Posewitz wrote,

> The river no longer lies totally vulnerable to unrestricted deletion. Now, for the first time, there is real hope that the Yellowstone will not follow every other major American river into dams, locks, dikes and conduits – things that would harness the river's freedom and drain its strength.[79]

However, he was under no delusions that that river was permanently saved. As Posewitz wrote, 'The in-stream reservation will allow for preservation of a free-flowing river system, but it won't accomplish that preservation automatically. Much needs to be done. Resources need to be committed and those who would protect the river need to be vigilant'.[80]

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[79] J. Posewitz, A free-flowing Yellowstone.
[80] Posewitz, A free-flowing Yellowstone, 37. See also, M. Henckel, Preaching the Yellowstone gospel, *Billings Gazette*, 11 April 1980.

Although Posewitz preached a conservative view of the water reservation decision, other narratives trended toward an understanding of the river as saved. For example, Robin Tawney wrote:

> A significant instream flow has been assured that will allow the 671-mile long Yellowstone to remain free-flowing – probably the only such major U.S. river outside Alaska – and preserved as a national resource … the possibility of a major impoundment on the mainstream of the Yellowstone River now appears remote. Instream reservations were granted priority where it mattered most, on the upper Yellowstone River. There, the threat of an Allenspur Dam has been averted and the integrity of blue-ribbon waters upheld.[81]

It is true that the instream flow water reservation did establish legal protection that made it more difficult for a large mainstem dam to be built on the Yellowstone River. However, it did not offer the same legal protection against other potentially environmentally degrading forces such as riprap, channelization, pollution, or small impoundments.

As the years passed and context slowly faded from memory, associations of the longest undammed river with saved and untouched grew stronger. Writing retrospectively in the mid-1980s, Jim Posewitz stated that 'The agency changed, but the people didn't change. And neither did the river. Unlike other great rivers, the Yellowstone stayed the same. Perhaps it always will.'[82] Furthermore, even Montana historian William Lang became enraptured:

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[81] R. Tawney, The Yellowstone will run free, *Montana Magazine* (1979) 32, 36.
[82] J. Posewitz, Preserving paradise, 97.

> The Yellowstone River is unequalled. It stands alone as the only major river in the lower forty-eight states that flows unimpeded, the last of the great free-flowing rivers. The Yellowstone has escaped the future of the Columbia, the Colorado, and the Missouri, the other great rivers of the American West. Those rivers no longer look as they did when Native Americans camped along their banks, when emigrants attempted to cross them, and when settlers first coveted their waters. Concrete and steel block their courses, and huge impoundments of water bulge their mainstems like arterial constrictions. Their currents are abnormal; they are mutants.[83]

Lang's writing strongly connects the myth of the Yellowstone as the longest undammed river to that of American exceptionalism and untouched wilderness. He also suggested that the instream flow reservation would 'play a significant role in saving the Yellowstone in the future'.[84] Although this statement clearly articulated that the Yellowstone River was not permanently saved, Lang's previous association between the Yellowstone River myth and the idea of untouched wilderness drew from a sense of timelessness that infuses the river with an aura of immutability.

Associations between the Yellowstone River and the myth of untouched wilderness continued to strengthen during the late 1980s and into the 1990s. Through these means, belief in the Yellowstone as a river inviolate became more solidified. For example, Dean Krakel II's travel narrative *Downriver: A Yellowstone Journey* described the Yellowstone's integrity in comparison to other western rivers:

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[83] W.L. Lang, Saving the Yellowstone, *Montana: The Magazine of Western History*, 35 (1985) 87.
[84] Lang, Saving the Yellowstone, 90.

> Seven dams break the Missouri's back. Concrete and steel silence the Snake River. Water-skiers play on Green River's Flaming Gorge. Salmon climb artificial ladders up the Columbia to spawn. Only a trickle of the Colorado reaches the ocean. Only the Yellowstone remains free, roaring down out of the Absaroka as clear and cold and wild as the day it thawed from Pleistocene ice.[85]

Ten years later, in a *National Geographic* article entitled 'The Yellowstone: The Last Best River' (Figure 5), journalist Steve Chapple similarly described the river:

> From top to bottom the Yellowstone, all 670 miles of it, is the longest undammed river left in the lower 48. While haze from southern California confuses the vista of the Colorado, the Columbia no longer sustains many salmon, and the Sacramento has been corseted, the Yellowstone still rumbles and sings through canyon and badland pretty much as heard by Lewis and Clark, the Sioux and the Crow.[86]

Both of these passages conjure up a geographic imaginary of the undammed or free-flowing Yellowstone as an exceptional, untouched, and inviolate river.

More than any other promotion during the 1980s and 1990s, Donald Dale Jackson's 1994 article in *Audubon* 'Saving the Last Best River' epitomizes the transformation power of the Yellowstone as the longest undammed river in the contiguous United States:

> For 671 miles, the Yellowstone River flows undammed, untamed, and unvexed – the longest free-flowing river in the United States outside Alaska. … Those who

[85] D. Krakel II, *Downriver: A Yellowstone Journey*, San Francisco, 1987, 13-14.
[86] S. Chapple, The Yellowstone: the last best river, *National Geographic* 191 (1997) 64.

> know the Yellowstone best sometimes speak of its 'aura.' Part of this quasi-mystical devotion derives from its beauty, its fecundity, and especially its wildlife; part derives from its survival as damless when every other major western river has been systematically tamed.

Although Jackson importantly notes the presence of diversion dams on the lower river, the article's representation of the river draws heavily from the larger myths of American exceptionalism and untouched wilderness. Most importantly, Jackson's assessment of the Yellowstone couches it as a saved and thus inviolate river. As Jackson wrote, 'Fact, mystique, and ultimately law have combined to give the Yellowstone a status unique among major western rivers – untouchable'.[87]

The naturalization of the mythic Yellowstone River during the 1980s and 1990s occurred in popular media accounts and on the ground. As original context faded from memory, the myth retained its association with American exceptionalism and became inseparable from the myth of untouched wilderness. This helped widen interpretations of the myth to include the idea of the Yellowstone River as saved or inviolate. Within the context of Bowden's myth framework, this period represents a transition from Bowden's second phase of myth creation to his third phase of invented tradition. The myth's new association with untouched wilderness embodied 'a trial and error process to the definition of an historically suitable myth' characteristic of a more mature second phase. With further naturalization, the myth began to lose its original political context or what Bowden termed 'an increasingly sharp erasure of memory of the original actual geographic

[87] D.D. Jackson, Saving the last best river, *Audubon* 96 (1994) 78.

conditions.' During this period the myth became 'taken for granted as reality' and publicized en masse by local and national journalists. [88]

A Dam Contradiction (1995-2019)

By the mid-1990s, the mythic assemblage of the Yellowstone River as the longest undammed or free-flowing river in the contiguous United States had transitioned into Bowden's third phase of invented tradition. A new environmental conflict, however, stemming from historic flooding along the upper Yellowstone River in 1996 and 1997, threatened to expose the Yellowstone River myth as 'largely factitious,' thus potentially undermining its naturalized legitimacy.[89] Specifically, a rapid push from landowners in the Paradise Valley to protect their riverfront property with boulders, concrete, and rebar (i.e. riprap) challenged the river's ecosystem function and placed into question notions of the river as both inviolate and free-flowing. Although the myth's connection to American exceptionalism appeared safe from serious scrutiny, the myth – for the first time – began to face critique.

Historian William Lang, despite acting as myth builder during the 1980s, became the first academic to identify the newest myth of the Yellowstone River and its potential consequences. In a 1995 essay, Lang wrote:

> The late twentieth-century image of the Yellowstone fully embraces western exceptionalism. Even though employment in natural resource industries has declined by half since 1970, there is more agricultural, municipal, and industrial development lining the Yellowstone's banks than at any time in its history. Nonetheless, it is advertised as the last of the 'untamed' rivers, a river of mythic

[88] Bowden, The invention of American tradition, 4.
[89] Bowden, The invention of American tradition, 4.

> quality, a piece of history. It is the 'wild' Yellowstone and its romantic aura that promise to fuel the next surge of economic development on the river. Most economists predict that the river's future is likely to be an environmental one, where tourism, recreation, and the health of the river will significantly underwrite broader economic development. A 1994 survey of residential subdivisions along the upper Yellowstone confirms this direction; only one-third of the riverfront between Pray and Livingston remains free of subdivisions.[90]

His focus on challenging the Yellowstone River myth through analysis of development in the Paradise Valley proved prescient.

Starting in the late 1990s, in response to historic flooding along the Yellowstone, a record number of bank stabilization projects threatened the integrity of the river and helped bring to light the problems associated with conflating undammed and free-flowing with untouched and saved. As environmentalist Scott Bosse observed:

> People on the Yellowstone are fond of saying we never made that mistake here. We never built these huge dams like Grand Coulee or Hoover on the Yellowstone, so we still have this amazing resource. But the fact is, rock by rock and barb by barb and jetty by jetty, we're building Grand Coulees along the Yellowstone River. They don't go perpendicular to the current, they parallel the current. They're along the banks. And sooner or later those walls of riprap are going to have the very same effects that a dam like Grand Coulee would have on a major river system. We're going to start to lose our fish. We're going to start to lose our wildlife. We're going

[90] Lang, In the Yellowstone, 25.

> to start to lose our riparian areas. So, we need to view these streambank improvement projects for what they are: they're small dams. They're just pointing a different direction than the traditional dam you look at.[91]

Bosse's characterization of riprap and levees as small dams dramatically challenged the idea of the Yellowstone as an inviolate river and illustrated the need for better water management and planning across the upper Yellowstone. In response to these concerns, Montana's Governor Marc Racicot established the Upper Yellowstone River Task Force to improve environmental regulation.[92] Furthermore, six environmental organizations filed a lawsuit against the U.S. Army Corps of Engineers on the basis that the federal agency did not adequately account for the collective environmental impacts of its bank stabilization permitting increase. Out of this conflict, Congress ultimately authorized the funding of a major study to gain a better understanding of the entire river's environmental health and social context.[93]

Throughout this process, journalists and local residents struggled to reconcile the mythic Yellowstone River with the ongoing environmental crisis related to channel modifications. In an April 1999 article titled 'Strangling the Last Best River', Hal Herring wrote that

> [W]hile the Yellowstone is still the longest undammed river in the Lower 48, it is now a long way from 'saved.' A half-dozen diversion dams interrupt its flow. Trucks have dumped rock, or riprap, along miles of river bank, locking what was once a migrating and healthy river system into a single channel that effectively moves the vast runoff from the high Rockies but performs less and less like the

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[91] *Down the Yellowstone*, directed by Joe DeFelice, Brattleboro, 2004.
[92] Governor's Upper Yellowstone River Task Force, *Final Report*, December 2003.
[93] U.S. Army Corps of Engineers and Yellowstone River Conservation District Council, *Yellowstone River Cumulative Effects Analysis*, Omaha, 2015; See also, S. Gilbetz et al., *Yellowstone River Cultural Inventory—2006.*

> mighty river that meandered and eddied its way through the mountains and across the high plains. Even without dams, this last free-flowing river is beginning to resemble its tamed counterparts across the West.[94]

Around the same time, Livingston local Jim Barrett penned an article with an equally disturbing title: 'River of Paradise: Death throes of the mighty Yellowstone'. Barrett opened with:

> As dramatic as the title of this article sounds, there is a growing consensus that the Yellowstone River – often described as 'the longest free-flowing river in the lower 48' – is under siege. Two consecutive years of record flooding in 1996 and 1997 precipitated an astounding level of riverbank stabilization projects that threaten to strip the Yellowstone of its coveted status. Add to the increased pressure from the subdivision of adjacent private lands into housing developments and it becomes increasingly certain that unless the trend is curbed, the Yellowstone could become a lifeless canal.[95]

However, despite his ability to move past the idea of the Yellowstone River as invulnerable, Barrett still struggled to move past the myth's exceptional and untouched associations:

> What is significant about this 676-mile flow is that, unlike every other major river system in the county, it is unrestrained by any dam. Except for the installation of levees and other bank stabilization projects (i.e., barbs and riprap), the Yellowstone

[94] H. Herring, Strangling the Last Best River, *High Country News*, 12 April 1999.
[95] J. Barrett, River of Paradise: Death throes of the mighty Yellowstone, *Fly Fisherman* 30 (1999) 10.

> has thus far escaped – sometimes barely – the impacts of large-scale channel modification.[96]

Both authors struggle with but fail to fully undermine the seductive grip of the Yellowstone as the longest undammed or free-flowing river in the contiguous United States. As Scott Bosse implied, the Yellowstone myth as river inviolate enables a 'slow violence' that compromises the river's long-term environmental health.[97]

While the upper Yellowstone River's struggle with bank stabilization began to cast doubt upon the Yellowstone's inviolate persona and even the definition of undammed, another environmental conflict – along the lower river – provided a second existential challenge. Intake Diversion Dam supplies irrigation water for approximately 58,000 acres and 200 households (Figure 1). Built in 1909, the aging structure currently blocks endangered pallid sturgeon from reaching their upriver spawning grounds.[98] Concern over the future of this endangered species brings increased public attention to the presence of six major diversion dams along the lower Yellowstone River. These diversion dams – like bank stabilization and riprap on the upper river – represent a contradiction to the myth of the Yellowstone as the longest undammed or free-flowing river. Thus, as publicity of these diversion structures grows, it challenges environmental perceptions of the mythic Yellowstone River. As Tom Dickson writes, 'Though free of large impoundments … the Yellowstone is not the longest 'undammed river' in the United States, as it is often described. Diversion dams block the river at six sites.'[99] More recently, journalist Ben

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[96] Barrett, River of Paradise, 10-11.
[97] See R. Nixon, *Slow Violence and the Environmentalism of the Poor*, Cambridge, 2011.
[98] U.S. Bureau of Reclamation and U.S. Army Corps of Engineers, *Lower Yellowstone Intake Diversion Dam Fish Passage Project, Montana: Final Environmental Impact Statement*, Billings, 2016.
[99] T. Dickson, Little Dams, Big Barriers, *Montana Outdoors* 36 (2005) 12-16.

Goldfarb simply described the Yellowstone as 'nominally the longest free-flowing river in the lower 48'.[100]

Goldfarb argues that the myth of the Yellowstone as the longest undammed or free-flowing river is misleading and composes an alternative geographical imagination for the river:

> The Yellowstone is a curious river, at once iconic and neglected – neither contaminated like the Duwamish, nor altered beyond recognition like the Colorado, nor beloved by rafters like the Salmon. Though its headwaters rise just outside America's first national park, it's a utilitarian waterway, whose flows nourish sugar beets, wheat and alfalfa. Its upper reaches are stalked by trout and well-heeled fly fishermen; by the time it reaches its confluence with the Missouri, it's inhabited by blue-collar fish like sauger and bass, and trafficked by the jet boats of Bakken oil workers. It is the blue thread that ties Montana's mountainous west to its agricultural east, its grizzly bear meadow to its beet fields.[101]

Goldfarb's vision of the Yellowstone River certainly has its own mythic quality. However, his utilitarian interpretation clearly avoids the larger myths of American exceptionalism and untouched wilderness that make up the essence of the Yellowstone River as the longest undammed river.

Despite these contradictions, the mythic Yellowstone River's grip on the popular geographical imagination does not appear to be substantially diminished. If the fourth episode of the 2019 television miniseries *Epic Yellowstone* is any indication, the myth of the Yellowstone as

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[100] B. Goldfarb, Will a dam save the pallid sturgeon, or doom it? On the Yellowstone River, farmers and conservationists clash over controversial infrastructure, *High Country News*, 3 November 2016.
[101] B. Goldfarb, The Grand Plan to save the Yellowstone River: Can one man's pie-in-the-sky idea save one of the West's most iconic and underloved rivers? *High Country News*, 27 June 2016.

the longest undammed or free-flowing river remaining in the contiguous United States may have only recently reached its strongest associations with American exceptionalism and untouched wilderness. As narrator Bill Pullman states during the episode's opening scene:

> Most of America's great waterways have been dammed, but the Yellowstone River is an exception. It flows free for the entire length of its journey. It's among the last of its kind. A mighty river still wild. It flows from the heart of Yellowstone National Park and carves through the mountains of the American West. This is the story of a river moving as few rivers do—undammed, untamed—of raging waters that give and take. This is a journey from the peaks to the plains. Where ancient lands welcome creatures from another time. This is the Yellowstone River—unleashed and free.[102]

In an era of accelerating climate change and apocalyptic visions for the future, this mythic representation of the Yellowstone River continues to naturalize ideology and guide everyday behavior.

Bowden defines his third phase of invented tradition as 'a body of belief that is so deeply internalized by a nation/group that [it] is practically impervious to scholarship that shows it to be largely factitious'. On the one hand, as *Epic Yellowstone's Down the River Wild* suggests, it is possible, if not probable, that the myth will shrug off publicity of its contradictions and continue to progress towards Bowden's fourth phase of universalization. On the other hand, the myth of the Yellowstone as the longest undammed river may not fit as neatly into the later stages of Bowden's framework. Specifically, the environmental controversies over bank stabilization in

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[102] S. Winston, Down the river wild.

the upper Yellowstone and diversion dams blocking fish passage in the lower river expose the myth's contradictions. Importantly, this latter interpretation may not adhere to Bowden's framework, because the myth is already being reconceptualized before it has had enough time to become universalized. In other words, a growing awareness of the Yellowstone River myth as 'a product of art and artifice' may challenge the utility of Bowden's framework for interpreting the recent developments regarding the Yellowstone River myth.[103]

Although a valuable analytical tool, Bowden's framework falls short when accounting for the power of non-humans as an active force in the origin and evolution of myth. For example, *Epic Yellowstone's Down the River Wild* starkly demonstrates that the myth of the Yellowstone as the longest undammed or free-flowing water is largely grounded in a more-than-human assemblage dependent on the power of not only the river's water but also its avian, mammalian, salmonid, arthropod, and human populations. In the end, the myth's naturalization is itself co-constituted through affective representations of a dynamic and forceful nonhuman nature. Thus, naturalization does not exclusively exist as a human representation but also is fundamentally constructed through the real capacities of the more-than-human world.

CONCLUSION

In late August 2016, a parasite-induced proliferative kidney disease fish kill in the upper Yellowstone forced Montana Fish, Wildlife, and Parks to make 'an unprecedented move' and close the entirety of the Yellowstone River from Gardiner to Laurel (including its tributaries) to all water-based recreation.[104] Although the closure illustrated the agency's authority within Montana's legal and political framework to quickly react to environmental crises, its need

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[103] Bowden, Invention of American tradition, 4.
[104] B. French, Fish kill closes 183 miles of Yellowstone River, tributaries to all recreation, *Billings Gazette*, 19 August 2016.

highlighted environmental problems associated with aquatic invasive species, low flows, and warm water temperatures.[105] As local residents dependent on recreational tourism struggled to cope with the fish kill and corresponding closure, the contradiction embodied by the mythic Yellowstone River became painfully obvious. On the one hand, the idea of the Yellowstone as the last, great free-flowing river attracting people to the upper Yellowstone is embedded within the region's contemporary tourism economy and historically has helped to gain some environmental protection for the river. On the other hand, the myth has contributed to an economy increasingly dependent on consuming the Yellowstone River's environmental amenities, has not saved the river and the myriad animal and plant species that depend on it from environmental violence, and is likely even partially responsible for its degraded condition.

Ultimately, this article cannot authoritatively tease out the precise environmental consequences of the mythic Yellowstone as the longest undammed or free-flowing river remaining in the contiguous United States. However, it is clear that the myth – in its various forms – has influenced the river system's health in tangible ways. From its creation by Montana Fish and Game as a political tool to help protect the Yellowstone River Basin to its complex relationship with increased river channelization and endangered species, the myth is a more-than-human assemblage that touches nearly every aspect of the contemporary river and will continue to shape its livelihood well into the future.

[105] B. French, Last summer's 'shocking' fish kill reduced number of large Yellowstone trout, *Billings Gazette*, 7 June 2017.

Figure 1. The Yellowstone River Basin. *Source:* Jackson Rose.

Figure 2. From near Carter's Bridge looking north towards the Allenspur Gap. This is the site of the formerly proposed Allenspur Dam. *Source:* Nicolas T. Bergmann.

Figure 3. (a) Cover image from the February 1977 *Montana Outdoors* Special Issue, (b) Cover description located on the 'contents' page, (c) Image associated accompanying Jim Posewitz's article 'Time for a Decision'.

Figure 4. *Life Magazine's* December 1978 Yellowstone River Article.

Figure 5. *National Geographic's* April 1997 Yellowstone River Article.

Figure 1

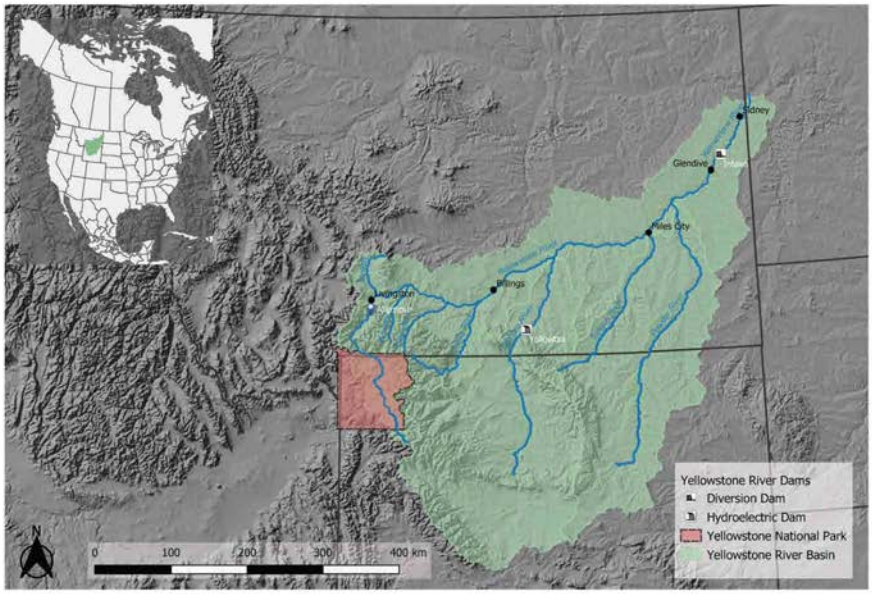

Sidney
Glendive
Miles City
Billings
Livingston
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N
0
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Yellowstone River Dams
Diversion Dam
Hydroelectric Dam
Yellowstone National Park
Yellowstone River Basin

Figure 2



45

Figure 3a

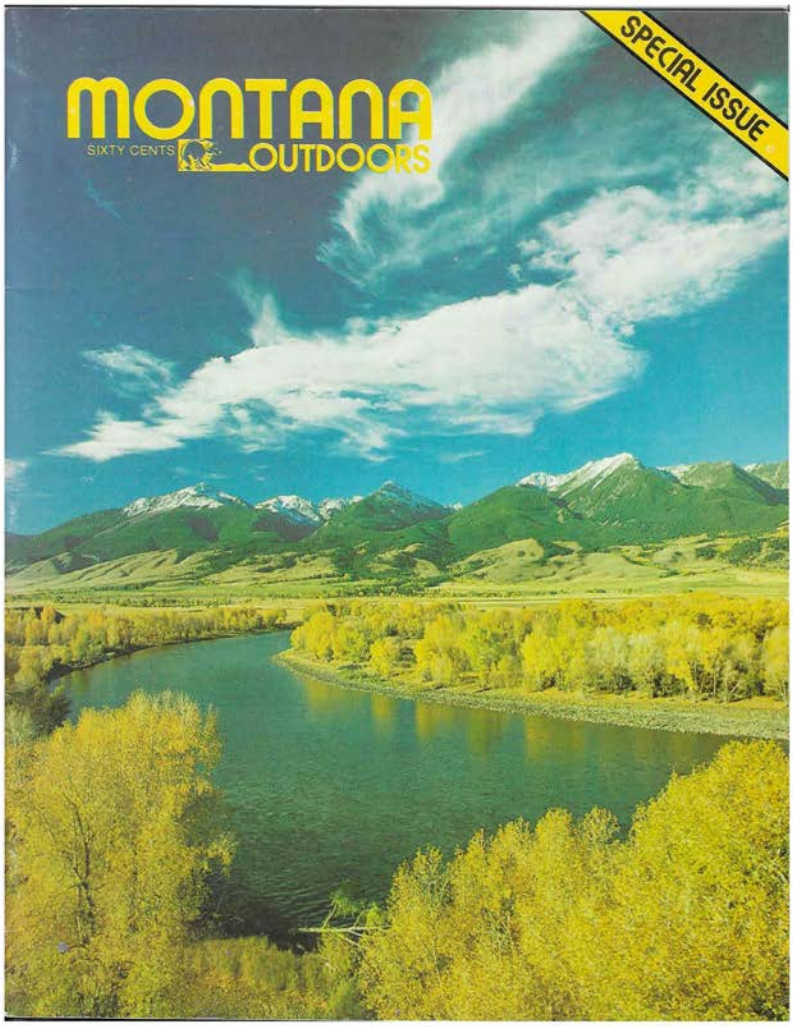


Figure 3b

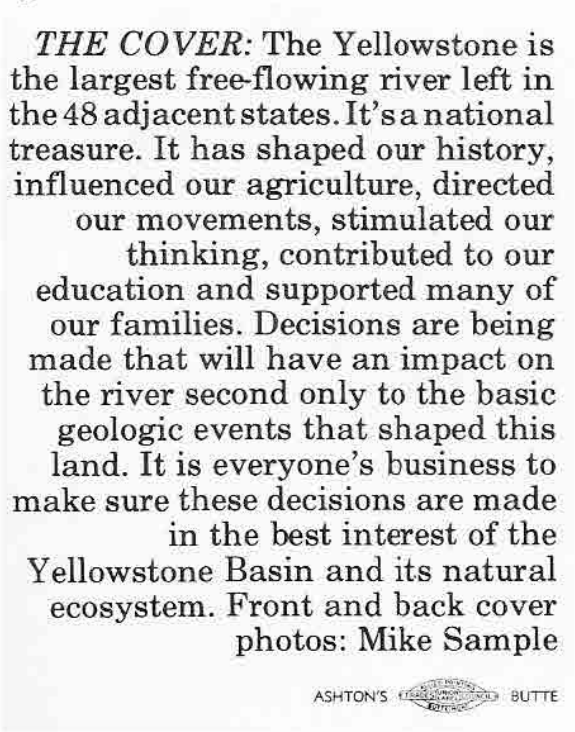

THE COVER: The Yellowstone is the largest free-flowing river left in the 48 adjacent states. It's a national treasure. It has shaped our history, influenced our agriculture, directed our movements, stimulated our thinking, contributed to our education and supported many of our families. Decisions are being made that will have an impact on the river second only to the basic geologic events that shaped this land. It is everyone's business to make sure these decisions are made in the best interest of the Yellowstone Basin and its natural ecosystem. Front and back cover photos: Mike Sample
ASHTON'S
BUTTE

Figure 3c

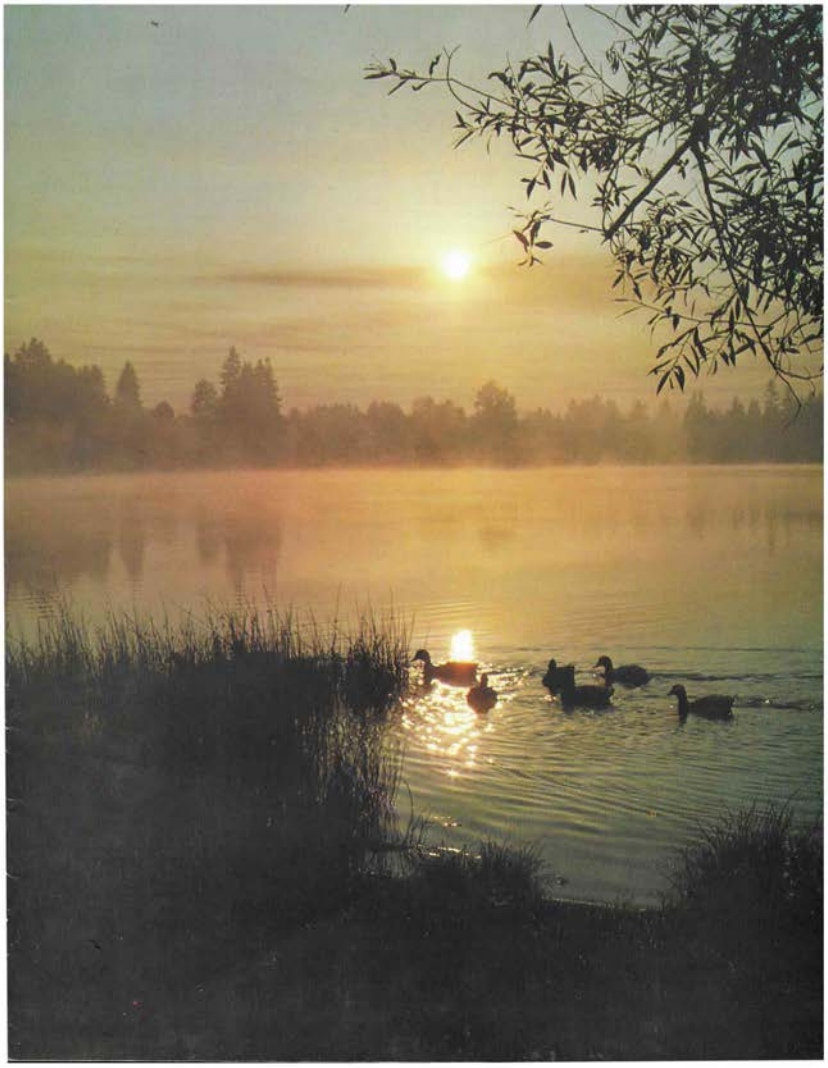


Figure 4



Great River in Crisis

There is too much demand for the Yellowstone's water

Famous for its geysers and bears, Yellowstone National Park also happens to be the birthplace of the longest free-flowing river left in the lower 48 states. The Yellowstone River runs in the mountains around the park, collects itself in Yellowstone Lake and then lashes north out of Wyoming. Flowing for 550 miles through southwestern Montana, it provides drinking water for towns and cities, irrigation for farms and ranches, cooling for power plants and habitat for a wide range of wildlife. Nowhere along the way is the river channelized, dewatered or dammed. Yet the Yellowstone is in trouble today. One of the culprits could be the native lies to its path. The coal developers need for water has sparked new demands from other users (page 102). In the parts where there is no longer enough river to go around. This is the story of the Yellowstone's beginnings running over the falls at the dramatic promontory of the park, the river is unstoppable—but with big downstream, we have that could drain it dry.

Photography: Farrell Grehan

Figure 5

SPECIAL PLACES

THE YELLOWSTONE



TWO OCEAN PLATEAU, WYOMING

The Last Best River

Fluid emblem of vast western spaces, the Yellowstone runs free, undammed despite potent demands for irrigation, flood control, and electric power. Making for the river's headwaters on the Continental Divide, outfitter H. A. Moore (above, and previous pages) finds moments of respite in the wilderness. In the Yellowstone's namesake national park (following pages) the earth's cauldrons turn lodgepole pines into lifeless needles that measure the sun's passage across a steam-filled sky.

By STEVE CHAPPLE
Photographs by ANNIE GRIFFITHS BELT

CHAPTER FOUR

THINKING THROUGH LEVEES:

HOW POLITICAL AGENCY EXTENDS BEYOND THE HUMAN MIND

Contribution of Authors and Co-Authors

Manuscript in Chapter 4

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Contributions: Conceived the study, conducted research, and revised the manuscript.

Co-Author: Anne Marie Reinhold

Contributions: Conceived the study, created figures, and revised the manuscript.

Co-Author: Geoffrey C. Poole

Contributions: Conceived the study and revised the manuscript.

Co-Author: Clemente Izurieta

Contributions: Conceived the study and revised the manuscript.

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Thinking Through Levees:
How Political Agency Extends Beyond the Human Mind

Abstract

Emerging new materialism scholarship provides an exciting theoretical space not only for challenging traditional conceptions of human agency but also for rethinking the role of the material world in shaping political outcomes. Although a wildly diverse intellectual movement, this scholarship shares the common goal of widening traditional understandings of agency to include non-human objects. This paper adopts insights from cognitive science in order to extend the concept of political agency beyond the confines of human intention. Instead of focusing on the constraining material characteristics of the non-human within a large-scale relational framework, we argue in support of a distributive understanding of agency based on the co-constitutional essence of the mind itself. Specifically, we integrate insights from embodied cognition grounded in dynamical systems theory into the established framework of the hydrosocial cycle to argue that residents' experiences within an active material world help explain the existence of certain flood risk perceptions. In other words, human intention or agency—as it is commonly understood—comes into existence through a co-constitutional process involving brain, body, and aspects of a wider environment. Using qualitative interview data from two communities along the Yellowstone River in eastern Montana, we support our arguments through an investigation of three types of embodied experiences between residents and the levees that shape risk perception. *Key Words: new materialism, hydrosocial cycle, embodied cognition, risk perception.*

Introduction

The rise of postmodernism in the latter decades of the twentieth century allowed little space for substantive discussion about the power of non-human objects. However, a turn to new materialism in the social sciences and humanities (Whatmore 2006; Coole and Frost 2010; DeLyser and Greenstein 2017) has provided an exciting theoretical direction for not only challenging traditional conceptions of human agency (Knappett and Malafouris 2008; Bennett 2010; Roberts 2012) but also for realizing the active role of the material world in shaping political outcomes (Braun and Whatmore 2010; Shaw and Meehan 2013; Anand 2017). Although a wildly diverse intellectual movement, new materialism shares the common goal of rethinking traditional understandings of agency to include objects such as lawns, cotton, cellos, and water (Robbins 2007; Russell 2011; Ingold 2004; Bakker 2004). Relying heavily on insights from science and technology studies (Latour 1993) and critical feminist studies (Haraway 1991), new materialism has extended poststructuralist relational thinking beyond human institutions (Ash and Simpson 2016). Aside from understanding non-humans as important "wellsprings" of political power (Meehan 2014), scholars have moved to redefine humans through an emphasis on corporeality that challenges the independence of not only the human body (Bakker and Bridge 2006; Langston 2010; Bauch 2017) but also—more radically—the mind (Clark 1998; Shapiro 2011; Malafouris 2013).

Despite new materialism scholars' success in theorizing agency as distributive[1], methodological approaches grounded in empirical evidence remain limited. Challenges persist in gathering evidence for the existence of an alternative way of being especially when the origins of current knowledge systems can be traced to the dualisms of modernity (Latour 1993). Most new materialism scholarship relies on large-scale relational approaches that weave a narrative of human and non-human actors together to support the existence of more-than-human

understandings (Whatmore 2002; Bennett 2010; Swyngedouw 2015). The difficulty inherent in gathering evidence supporting the agency of non-human objects helps explain the tendency of scholars to focus on the constraining rather than productive capacities of more-than-human things (Bakker 2004; Braun and Whatmore 2010; Anand 2017).

To strengthen the claim for attributing agency to non-human objects, we adopt insights from cognitive science to extend the concept of political agency beyond the confines of human intention. Instead of focusing on the constraining material characteristics of the non-human within a large-scale relational framework, we argue in support of a distributive understanding of agency based on the co-constitutional essence of the mind itself (Shapiro 2011). Specifically, we integrate insights from embodied cognition into the established framework of the hydrosocial cycle (Linton and Budds 2014) to argue that residents' experiences within an active material world help explain the creation of certain flood risk perceptions. In other words, human intention or agency comes into existence through a co-constitutional process involving brain, body, and elements of a wider environment. Throughout the paper, we use qualitative interview data from two communities along Montana's Yellowstone River to provide empirical support for the claim that human cognition and political agency exist only as larger conglomerations within a creative material world.

This paper begins with a focused literature review of new materialism scholarship. Our case study deals specifically with water-society issues. Therefore, we pay particular attention to a framework known as the hydrosocial cycle. We then review literature that has challenged traditional notions of an independent human mind and discuss embodied cognition's relevance to expanding geographical research on the hydrosocial cycle as well as emotion and risk perception. We then explain our qualitative methodological approach and present our case study analysis of two flood-prone communities—Miles City and Glendive—that share many political and

demographic similarities but have strikingly different attitudes towards flood risk associated with their levee systems. We build our analysis and discussion around three categories of embodied experiences between the levee and each community. We conclude our paper with a comparative analysis of the two case studies and present an argument for using embodied cognitive science as a platform to more fully integrate more-than-human objects into geographical research.

Literature Review: Hydrosocial Cycle and Embodied Cognition

Contemporary hybrid approaches to socio-material relations have roots in the critique of the modernist dualism that separates "human" (social) and "nature" (material) into discrete categories. During the late twentieth-century nature became widely accepted as, at least in part, a social construction (Smith 1984; Cronon 1995; Castree and Braun 2001). As a result, many objects once thought of as completely natural began to be theorized as also social, while human bodies and systems once thought to be completely social were also recognized as, in part, material (Haraway 1991; Latour 1993). Hybridity emerged as a popular term to describe these permutations of the social and the material (Whatmore 2002; Bakker and Bridge 2006; Sutter 2013). One influential frame that emerged within critical human geography to theorize about hybridity relied heavily on the relational approaches from post-structuralism combined with a Marxist perspective deeply rooted in a tradition of dialectical materialism (Swyngedouw 1999, Bakker 2004; Kaika 2005). Because this approach developed largely in concert with studies focused on the role of water in developing political and social power, it has coalesced into its own distinct body of analytical scholarship known as the hydrosocial cycle (Linton and Budds 2014; Swyngedouw 2015).

The theoretical core of hydrosocial scholarship rests on the idea that water and social institutions are internally related. As Linton and Budds (2014) write, "Understanding things as related internally... implies a shift from thinking of relations *between* things – such as the impacts

of humans on water quality – to the relations *constituting* things – such as the cultural, economic, and political processes that constitute the particular character of desalinated water, treated drinking water, or holy water" (173). Essentially, this approach argues that nature and humans are not discrete entities but instead co-constitutions created through an active and dynamic process of "becoming." Bakker's (2004) work on water privatization in England and Wales illustrates how the physical properties of water—both its weight and liquid state—constrain neoliberalization of the region's water systems. Furthermore, Anand's (2017) monograph on water infrastructure in Mumbai, India uses water leakages in pipes as a way to rethink political agency. For Anand infrastructure creates "political effects" not simply because it fails to adhere to "a human-centered politics of measurement and control" but also because it is "an accretion of human and nonhuman relations that make it extremely difficult and inconvenient for engineers to regulate leakage" (230-231). In other words, Anand argues that infrastructure has political agency—despite being incapable of intention—because it is not only "material" but also "social".

While hybridity provided scholars with a relational framework to move beyond simple binaries and to rethink the agentic capacities of various socio-material assemblages, research within this framework has largely accounted for the material through its entanglement in a social world outside the human body (Cousins 2017; Clark et al. 2017; Williams 2018). As a result, hydrosocial scholarship has largely neglected to examine how non-human objects relationally co-constitute the human mind. However, other scholars of new materialism working outside the hydrosocial paradigm have engaged with emerging evidence from evolutionary biology, cognitive science, and even quantum theory to challenge the modernist definition of culture and agency as the product of a disembodied human mind (Ingold 2004; Barad 2007; LeCain 2017; Simandan 2017). While scholars have long emphasized the role of structural forces in limiting

human agency, commonly defined as the "ability of people to act, regarded as merging from consciously held intentions, and as resulting in observable effects in the human world" (Gregory et al. 2009, 347), the emergence of post-humanistic perspectives that aim "to put the human mind back in the world" challenges this conventional definition of agency through a radically different understanding of what constitutes the human mind (Nash 2005, 69).

Integrating emerging insights from the embodied cognition research program within the field of cognitive science offers a way for geographers to expand the conceptual scope of the hydrosocial cycle. While geographers occasionally engage with embodied cognition (cf. Butcher 2012; Jones 2017; Portugali 2018), those working within the hydrosocial cycle have yet to draw on this field of scholarship. Although itself a disparate body of research, certain aspects of embodied cognition further breakdown the human-environment ontological boundary and support the relational view of distributive agency through a distributed cognition framework in which the brain, body, and environment co-constitute the mind. Specifically, Portugali (2018) defines embodied cognition as a research program in which "mind, body, and environment are not independent from each other as implied by classical cognitivism, but form an integrated cognitive system in which bodily experience in the environment gives rise to a variety of linguistic and behavioral cognitive capabilities" (28). Unlike standard cognitive science, which is grounded in a computational understanding of cognition as "algorithmic processes upon symbolic representations," embodied cognition has a more flexible set of ontological commitments and methodologies that may reject computational approaches to cognition (Shapiro 2011, 2). Some strains of embodied cognition align productively with the relationality of the hydrosocial cycle, as they theorize the distributed existence of the mind beyond the boundaries of the human nervous system and elevate the importance of the more-than-human world within cognitive processes.

One specific hypothesis within embodied cognition—grounded in dynamical systems theory—argues that the brain (nervous system), body, and environment form a "circle of causality" from which cognition emerges (Shapiro 2011, 124; van Gelder 1998). In other words, cognitive behavior emerges "from continuous interaction between brain, body, and world" (Shapiro, 2011, 127). Specifically, the nervous system is dynamically embodied within the human body, while the human body itself is situated or dynamically embedded within a wider environment (Beer 2003). In this sense, the embodiment of the nervous system and the embeddedness of the body in an environment extend the boundaries of the cognitive system beyond human brain and nervous system. In this model, environment, body, and nervous system are conceived as dynamical systems that have coupling relationships with each other and thus constitute one overarching cognitive system (Shapiro 2011; Beer 2003).

Embodied cognition also provides a conceptual framework for deepening understanding geographies of emotion and risk perception. Although a topic of geographical study since at least the 1970s, emotions have gained greater prominence in recent years (Bondi 2005, Pile 2010). While this "emotional turn" has brought a much-needed focus onto the spatiality of where emotions reside and emphasis on their relational constitution, scholars have only recently explicitly acknowledged the importance of an active, more-than-human world in shaping political outcomes through emotion (González-Hidalgo and Zografos 2019). While certainly a welcome addition to the geographical literature, this relational approach has yet to investigate how non-human objects shape emotions at an individual scale. A dynamical systems approach to embodied cognition offers a conceptual framework for understanding the role of the material world in shaping individual human emotions.

Specifically, enactivism—a form of embodied cognition that also draws from dynamical systems theory—conceptualizes emotions as dynamical patterns (Colombetti 2014). While

broader in scope than the hypothesis previously explained, enactivism does view cognitive systems as embodied, situated, and involving simultaneous interactions between brain, body, and environment (Thompson 2007; Colombetti 2014). Unlike most approaches to embodied cognition, enactivism incorporates emotions into the cognitive process through a dynamical approach to affective science. As Thompson and Stapleton (2009) state, "the enactive approach does not view cognition and emotion as separate systems, but treats them as thoroughly integrated as biological, psychological, and phenomenological levels" (26). While admittedly speculative in character, this approach makes space for events in the body and the environment to shape emotions (Colombetti, 2014). Although only a hypothesis, a dynamical systems approach to emotion offers insights into the inseparability of emotions from cognition and provides a space for more-than-human objects to actively influence emotional episodes.

Emotions also have an emerging role in the study of risk perception. In fact, some scholars have shifted from conceptualizing risk through rational choice models to thinking about risk-as-feelings (Loewenstein et al. 2001). Emotions such as sadness, fear, anger, joy (Lerner et al. 2015) and positive or negative feelings about objects (Slovic et al. 2007) often drive perceptions and behavior more than cognitive assessments of risks (Leiserowitz 2006). Within the discipline of geography, there exists a long tradition of risks and hazards research (Galliard and Mercer 2012). While geographers initially viewed risks and hazards as simply interactions between "man and nature" (Kates 1971) or technology, society, and the environment (Cutter 1993), Watts (1983) importantly argued for an epistemological exploration of the concept of nature itself as the "proper starting point for the study of environmental hazards" (233). Specifically, he drew on Marx's theory of metabolism to argue for more sophisticated explanations grounded in a materialist conceptualization of nature-society relations as dialectical. Although Watts' (1983) eschewed cybernetic models of cognition in favor of political economy

approaches, the emergence of embodied cognitive understandings of the human mind necessitate renewed ontological and epistemological attention from geographers. Specifically, an embodied cognition perspective requires scholars to more fully account for the political agency of non-human objects on an individual scale, while still conceptualizing risk perception through a relational-dialectical framework.

The qualitative evidence presented in this paper neither proves nor disproves a dynamical systems conceptualization of embodied cognition. However, it does support a relational approach to cognition (and emotion) that favors a distributive view of agency and elevates the importance of certain non-human objects or things (e.g., levees and rivers) in the shaping of flood risk perceptions. From a hydrosocial cycle perspective, a dynamical systems approach to embodied cognition provides opportunities for understanding water-society relations through a deeper engagement with human cognition and risk perception. The interview data presented in the two cases studies is suggestive of agentic capacity of non-human objects to shape human cognition and risk perception.

Methodology

As part of a larger project centered on capturing how individuals narrate their perception of flood risk, the qualitative data used in this paper came from semi-structured interviews of residents in two river communities along Montana's Yellowstone River. We selected Miles City and Glendive based on the commonalities of proximity, flood infrastructure (i.e. levees), a history of flooding, and flood-related community conflict. To capture risk narratives, the researchers developed a protocol informed by the Narrative Policy Framework (NPF) to elicit dimensions of narrative to understand variation in risk perceptions: problem definition, characters, and solutions (Shanahan et al. 2018).

We used a purposive sampling approach and snowballing technique to recruit individuals from across a range of affected sectors, including riverfront homeowners, business owners, government officials, and other interested citizens that had experience with flooding and/or flood risk. We conducted 18 interviews in Miles City and 13 interviews in Glendive between February and June 2017. With the exception of one interview, all interviews were digitally recorded and transcribed. The length of the interviews ranged from about a half hour to over two hours.[2] We used NVivo 11 and a validated NPF codebook to analyze the data. Specifically, we employed the developed codebook to create three narrative character categories—hero, villain, and victim. We then iteratively developed an inductive coding scheme to identify entities—human and non-human—who populated these characters (Cope 2016). While semi-structured interviews provided the bulk of the data for this paper, document analysis of pertinent secondary source material (government documents, consultant reports, and newspaper articles) also contributed to the authors' findings.

During the coding process, the lead author observed contradictory views towards flood risk and levee infrastructure in Miles City and Glendive as well as the important role more-than-human objects (i.e. levee and river) played in each community. Informed by new materialism, the hydrosocial cycle, and embodied cognition, the lead author created a supplementary codebook through an additional round of indicative coding focused on interviewees' different embodied experiences with the levees and river. Three themes emerged through this: 1) levee construction; 2) river recreation; and 3) high-water experiences. Ultimately, this analysis represents how residents from two communities describe their embodied experiences with their community's levee and the Yellowstone River.

Case Studies

The degree to which people perceive flood risk depends not on some disembodied rationality apart from the environment but instead on the ways in which dynamical relationships between brain, body, and environment create thought. In the following section, we support our claim that political agency extends beyond the human with empirical evidence from two communities in eastern Montana—Miles City and Glendive. Although located less than 160 kilometers apart on the lower Yellowstone River, we find that the residents of these two communities have substantially different perceptions of flood risk grounded in different material experiences with their levees and river systems.

The Case of Miles City, MT

Situated at the confluence of the Tongue and Yellowstone Rivers, Miles City—population 8,500—functions as Custer County's commercial center [Figure 1]. Growth and expansion of the city as well as construction of a levee in the late 1930s facilitated increased building in the geologic floodplain. The levee or "dike"—as it is colloquially termed—is a long embankment that follows the east bank of the Tongue River and the south bank of the Yellowstone River [Figure 2]. Functioning as a barrier that keeps the river from entering Miles City during high water, the levee is a collection of socio-material components including clay, sand, gravel, automobiles, concrete, trees, and insects and is also a product of human labor, leisure, and other experiences [Figure 3]. Originally constructed by the Works Projects Administration between 1936 and 1939, the levee underwent additional expansion and improvements under local efforts in 1950 and again in 1974 (KLJ 2015).

As part of the National Flood Insurance Program (NFIP), the Federal Emergency Management Agency (FEMA) first issued a flood insurance rate map for Miles City in 1979 (KLJ 2015). This map designated 35 percent of the structures in Miles City as being within the

100-year floodplain. In 2007 the United States Army Corps of Engineers (USACE) completed an updated flood model for the Tongue and Yellowstone Rivers. Three years later FEMA used this data to revise and expand Miles City's flood insurance rate map. As a result, the number of structures within the 100-year floodplain increased from 35 to 69 percent (Thackeray 2010a). The main reason for the drastic increase in the number of properties came from the USACE's determination that the city's levee had significant design flaws, such as trees growing out from the levee and unknown substrate materials. As a result, the levee no longer met FEMA's requirements and was judged to provide zero protection from the base flood (KLJ 2015). Thus, the levee disappeared from FEMA's 2010 flood insurance rate map (Thackeray 2010b).

The impact of the USACE's determination is significant because a suite of restrictive regulations pertains to structures located within the newly defined 100-year floodplain. For example, regulations limit the ability for structures to undergo expansion or renovation. Also, homes and businesses must carry flood insurance if the property has financing through a federally backed mortgage. Thus, the number of people required to purchase flood insurance rose dramatically as a result of the new map. Furthermore, during the time when many residents were coming to grips with the additional cost of flood insurance, Congress passed the Biggert-Waters Act in 2012 thereby lowering federal subsidies for flood insurance as part of a larger effort to make the NFIP more financially sound. This caused substantial rate increases for flood insurance premiums not only in Miles City but also across the country (Collier 2014). As of December 2013, Miles City was Montana's largest holder of flood insurance policies (23% of the state total) and collectively spent approximately $625,000 annually on flood insurance premiums (KLJ 2015).

During our fieldwork we observed that Miles City residents perceived FEMA's new flood insurance rate map as a greater threat to community well-being than flooding. Although it

is tempting to resort to simplistic political and economic rationalities to explain such thinking, we believe an investigation into the embodied relationship between Miles City residents and the levee offers a more robust explanation. Specifically, we apply an embodied cognition framework to better understand how experiences between residents and the levee forged a deep faith in its ability to prevent flooding. We argue that various embodied experiences that engage brain, body, and elements of the riverscape (levee and river) shape Miles City residents' flood risk perceptions. While scientific studies that indicate the levee has structural flaws (cf. KLJ 2015), residents maintain a high level of trust in the levee. We offer three categories of embodied experience to help explain most interviewee's "irrational" trust in the levee: 1) Levee Construction; 2) River Recreation; and 3) High-Water Experiences.

Levee Construction

The federal government's decision to erase the levee from Miles City's flood insurance rate maps because of its structural flaws sparked outrage across the community. As one resident succinctly stated,

> FEMA does not recognize it. The Corps of Engineers does not recognize it as a levee. They no longer call it a dike. As a levee, as far as they're concerned it is nonexistent. [Interview #9]

The reason for this outrage runs deeper than frustration with increased flood insurance costs and asymmetrical power relations. For local residents, non-recognition of the levee denies both historical experience and physical reality. As one resident explained:

> People kept saying that FEMA refuses to certify the dike, which ticks people off because there it is. You can see it, and according to the flood map there is no levee of any kind. There is no flood control of any kind if you look at FEMA's calculations. [Interview #3]

FEMA's elimination of the levee from the flood insurance rate maps and the USACE's refusal to fix the existing levee not only denied the physical reality of the infrastructure but also erased connections between Miles City residents and the landscape. As one individual said:

> We've always been told, and this is another thing that really irritates this community and has irritated the leadership of this community for years, is that our effort was wasted. Because all of this dike that's here was built by people.... There were locals that came in and went out and picked up the gravel and the dirt and whatever, and they went up there and they dumped it and then it was sculpted and it was turned into the dike. [Interview #5]

The process of construction provides one type of embodied experience through which the levee and Miles City residents became co-constituted. One interviewee's discussion of family connections is suggestive:

> My uncle helped build it. He was a dirt contractor and had the big equipment, the Caterpillars and stuff like that. It's done a good job, but it's just sad that we can't fix what we have. [Interview #12]

Although the federal government did facilitate the construction of the original levee system in the late 1930s, local government oversaw additional construction and maintenance. This has relevancy because it meant that local organizations and peoples had more opportunities to forge embodied relationships with the levee. As one resident recalled:

> [In the early 1970s] the [Miles City] Jaycees came in and they raised that dike three feet, so it's never been a problem ever since they raised it. So, people in Miles City feel like they've got a very good dike. Well, the Corps of Engineers will say the dike will never last. You get a twenty-five year storm, and it's going to wash out.... You're saying the dike won't do the job, and the people in Miles City are saying yes it will. It's been there. It's been doing the job since 1939. [Interview #6]

For more than 70 years the Miles City community has forged connections with its levee through the process of its construction and maintenance. While typically viewed as a unidirectional process in which people build and repair a levee, the embeddedness of the human body in the environment allows for a more dynamic understanding of this relationship. Specifically, this evidence suggests that the levee's causal role in cognition (along with brain and body) shapes Miles City residents' trust in the levee and their corresponding low level of flood risk perception. As a result, many locals find both the levee's erasure from the updated flood maps unfathomable.

River Recreation

One positive outgrowth of the levee's ad hoc construction and management is its emergence as a significant de facto public space where residents exercise, socialize, and experience the aesthetic beauty of the Tongue and Yellowstone Rivers. In particular, walking is one of the most popular levee activities. As one individual conveyed:

> I like our dike because I'm a diabetic, so I walk every day I can, and where I walk is always on the dike. I can look into the river. I can look across the river and see the coyotes. I can look across the river and see the deer, and I can talk to the fishermen along the river. [Interview #6]

Interviewees also commonly cited their use of the levee as a source of entertainment. For example, one interviewee stated:

> I'm not big into fishing, but I grew up here and going down to the bridge to look at the river, walking along the dike, watching the ice go out, that's just part of what you do around here. Entertainment is sometimes rather thin, so we go down and watch the river flow by. [Interview #3]

The embodied practice of walking in these passages is of particular importance. Noting performative activities (such as walking) as a useful space to recognize the relationality between humans and non-humans (Wylie 2005; Waitt, Gill, & Head 2009), geographers have turned to the "body" and the concept of "embodied experience" to make sense of the agential capacity of more-than-human entities (Stanes and Gibson 2017; Bakker and Bridge 2006). Despite this

engagement with embodied and relational practices, geographers have yet to integrate valuable insights from embodied cognition to explain how and why "'human consciousness' does not take place 'in' the bodies of the human but 'with' the dense scaffolding of things that enables and shapes human thought" (Ash and Simpson, 2016, 63). While walking is undoubtedly a relational experience, a dynamical systems approach to embodied cognition provides an even deeper mechanism through which to understand the way brain, body, levee, and river—as part of the embodied experience of walking—shape residents' perceptions and attitudes towards flooding.

A major reason for the levee's recreational popularity stems from its location. Unlike many river levees that are set back hundreds if not thousands of feet from the river channel, the Miles City levee system remains very close to the river in most places. Although this does threaten the structural integrity through a higher potential for erosion from high water (US Army Corps of Engineers 2007), it makes the levee an integral part of the landscape and a place to experience the rivers' dynamism and aesthetic beauty. The embodied connection between the levee and the people of Miles City grows even deeper when one takes into account its role in facilitating interactions between people. One person shared:

> I value the fact that I like to walk down there by it and go fishing and take my grandson there.... I like to walk at noon from where I work. I actually go down the dike at the Tongue River and then I walk down to the Yellowstone.... I just enjoy it, and it's beautiful. [Interview #11]

During the same interview, the individual later elaborated on the levee's social value:

> So people will go down there and they'll be on the dike or they'll go over the bridge and then they'll pull over. You'll see somebody and you'll start visiting. [Interview #11]

Because of its public access, close proximity to the river, and aesthetic value, it is difficult to overstate the levee's recreational significance.

From a hydrosocial cycle and embodied cognition perspective, it is crucial to conceptualize this infrastructure as not simply providing a stage for residents' experience but as an active participant in creating and shaping their thoughts. The USACE's refusal to fix the existing structure undermines more than just the levee from the standpoint of the interviewees. This decision also undermines the legitimacy of their own embodied recreational experiences through which their identity becomes constructed. According to one resident:

> Well, picture this. You put up a fence around your house, right? And you live in your house for forty-six years, and all you'd ever done was painted that fence. And the posts are still hard, the slats are still good, paint's sticking to it. Somebody comes and tells you that fence isn't any good. I mean it's been a part of your life. You painted it. You know, in our case we walked on it, we fish from it, we've driven on it. We drove on it a lot when we were in high school when we had to drink beer... Yeah I mean a lot of stuff. A lot of lives have changed on that dike. [Interview #17]

High-Water Experiences

During late winter and early spring, ice jams provide Miles City residents with a source of entertainment and an additional excuse to watch the river. However, their occurrence is not stress free and can elicit negative emotions. As one resident recalled,

> The only stories we hear is when the levees are getting close to flood stage, people start getting nervous. But that's the only negative part of any flooding issue that we've ever heard of. [Interview #2]

High water showcases the raw power of rivers and momentarily makes many residents of Miles City anxious. These types of embodied emotional experiences related to fear and anxiety are of particular importance. They provide a window into the dynamic relations between river, levee, body, and brain that shape individual human emotions and that as part of the cognitive process help shape attitudes towards flood risk.

Since the levee was expanded during the 1970s, it has successfully shielded Miles City from numerous flood events. As a result of this historic success, interviewees generally minimized the town's risk of flooding. Referencing a high-water year in 2010, one individual recounted:

> We had the wettest year we've ever had. One hundred and thirty-five percent more rain, snow, moisture, [and] runoff... we had springs out in the mountains that came alive that hadn't been alive in twenty years, and the [levee on the] Yellowstone held. Everybody's watching it. Everybody was holding their breath. Is it going to hold? Is it going to hold? Well the Tongue [River]'s putting a lot of

> weight on it too. Is it going to hold? Is it going to hold? And everything held fine. They say we had a five-hundred year flood in a hundred-year time, and everything held fine. [Interview #4]

It is these embodied experiences between people, levee, and river during high water that creates positive emotional responses through which the levee becomes viewed as a community hero.

Even when Miles City has flooded, recollection of these experiences has served to strengthen—not weaken—the relationship between the residents and the levee. This apparent paradox occurs because the levee bears no responsibility in the residents' memories. As one person recounted:

> I've been here since 1960, and I've never seen the dike fail. You keep reading in the paper that there have been failures. I have yet to see a failure since I've been here. We had one. In 1971 we had a failure—a little failure right down next to the bridge. But that was because a man decided he wanted to put his boat in the river, so he cut a hole through the dike. So consequently, it ran through his hole, and it flooded houses around where he lived. So, nobody was really happy with the man. [Interview #6]

Importantly, these flood events from the 1970s do not undermine the success of the relationship between the levee and the people but instead serve as the exceptions that prove the rule—the levee has succeeded in preventing river flooding.

Miles City residents explained previous flooding in two ways. First, the floods occurred because of human error. Second, the floods occurred before the levee was fully constructed. As one resident argued:

> If you look in the records, the records will show that Miles City has had about 16 floods. And out of the 16 floods, 12 of those were between 1882 and 1944. And other than that, we had two floods after that in '71 and '79, and they were man caused. And the [floods] that took place before '44 and even in '44, that was before the dike was even built. [Interview #6]

Even when residents ruminate on the possibility of future large floods, the residents' positive embodied relationship with the levee minimizes the perceived risk. As one resident described:

> You never know when that big flood is going to happen… Because they haven't had one yet for more than 100 years, but it has happened here before.... And they talk about a flood happening at that time and finding the big slabs of frozen river just lying in the middle of Main Street when the flood receded. But of course that would be, you know, 100 years at least before the dike was built. [Interview #2]

High water from ice jams and spring runoff showcases some of the raw and visceral power of the Yellowstone and Tongue Rivers. However, the levee has successfully shielded Miles City residents from the potential for a more negative affective experience—that of a significant flood event. Some Miles City residents admit some anxiety and nervousness during high water. However, our interviews suggest that these negative emotions are overshadowed by

the presence and historic success of the levee. Furthermore, these periodic high-water episodes have provided opportunities for the levee to protect Miles City residents. Our interviews indicate that because residents perceive that the levee has a strong record of success in these moments, a shared feeling of safety from flooding exists throughout the community. We argue that residents' various embodied emotional experiences with the levee in Miles City plays an important role in the construction of their thought process. This helps explain not only the residents' faith in the levee but also their belief that Miles City currently has a low degree of flood risk.

The Case of Glendive, MT

Located 145 kilometers upriver from the Yellowstone River's confluence with the Missouri River in western North Dakota, Glendive is the economic hub of Dawson County [Figure 1]. Although its population fluctuates considerably based on changes in regional energy development, the Glendive area has a population of approximately 7,000 (2016 Growth Policy). The Yellowstone River splits the community into West Glendive and Glendive proper. Glendive typically faces its greatest flood risk as a result of ice jams (USACE 2014). Because the majority of Glendive's structures exist on elevated land adjacent to the Yellowstone River, most of the community does not require levee protection, and most home and business owners are not required to carry flood insurance.

Although the physical geography of the Yellowstone's southeast bank minimizes a large part of the city's flood risk, a low-lying area along Marsh Road between downtown and the Cottonwood subdivision does experience periodic flooding from ice jams. Furthermore, there are other isolated low-lying areas on the southeast bank—especially along North River Road—that have experienced occasional flooding. Therefore, the USACE sanctioned the construction of two levees in Glendive. The longer levee—built in 1959—protects a large portion of the floodplain in

West Glendive from flooding. The shorter levee—built in 1969—protects the Cottonwood subdivision south of downtown on the river's southeast side [Figure 4].

The West Glendive levee—approximately three kilometers in length—is composed of foundation materials like silty gravels and sands. Consisting of a 10-foot crown with a gravel roadway, the dike is a formidable structure that partners with railroad, bridge, and road embankments to constrain the natural migration of Yellowstone River across the floodplain [Figure 5]. Despite documented federal construction of the levee, FEMA's 1980 Flood Insurance Study judged it as inadequate to prevent a 100-year ice jam event from flooding West Glendive. Thus, FEMA included a significant portion of West Glendive within its flood insurance rate map (USACE 2014).

When the community failed to approve floodplain building restrictions, FEMA suspended Dawson County from the NFIP. Furthermore, local government allowed additional commercial development within the floodplain during the 1980s. As a result, the town sited its grocery stores and many of its restaurants within the 100-year floodplain. These structures do not comply with the NFIP. When the county requested reinstatement to the NFIP, FEMA granted acceptance on the condition that it addresses noncompliant structures in the floodplain (USAE 2014). Because of these restrictions against building improvement and expansion, several businesses—most notably a beloved McDonald's—have left the community. Thus, Glendive residents disdain FEMA and blame the federal agency for its stagnant economy.

Despite residents' scorn towards FEMA and the West Glendive levee's historic success in holding back floodwaters in 1969, 1986, and 1994, Glendive residents generally found the levee inadequate. In fact, the people of Glendive—especially in West Glendive— perceived ice jam flooding as a real threat even though the levee, with the exception of its height, is structurally sound. In this section, we examine how a dearth of embodied experiences with the

West Glendive levee facilitated a set of relationships between the residents and the Yellowstone River that elevated the perception of flood risk across the community. To provide a comparison with Miles City, we again present three categories of embodied experience that help explain most interviewees' skepticism towards the West Glendive levee's ability to prevent future flooding: 1) Levee Construction; 2) River Recreation; and 3) High-Water Experiences.

Levee Construction

Our Glendive interviewees took little pride in the construction and maintenance of the West Glendive levee. This should come as little surprise since the Army Corps of Engineers designed and oversaw the levee's construction (USACE 2014). When asked about the construction of the levee in Glendive the majority of interviewees responded with comments such as

> Gosh I don't remember. I think I looked at one time. It might have been in the '60s or the late '60s. [Interview #33]

Or more definitively:

> I really don't know. The only thing I can say is maybe asking one of the county commissioners. [Interview #29]

Our interviewees in Glendive had minimal memories and very little embodied connection to their levee's construction.

Out of the 13 semi-structured interviews conducted in Glendive, only 2 residents had any definitive knowledge about the construction process. As one resident recalled,

> It's just compacted soil and all that soil was picked up right there alongside the dike when it was built.... They use just scrapers and big packers.... There are absolutely no car bodies or any foreign material. There are no trees or anything that can rot out or cause some type of a defect in the dike. The big thing is when they built the dike. They came in. They scraped all of the grass and topsoil off of it before they started, so they had a nice clean deal. [Interview #26]

Although clearly adhering to a high engineering standard and possessing credible structural integrity, the lack of automobiles and trees in the West Glendive levee indicates a construction process that had fewer embodied opportunities for the levee and local residents to forge cognitive and emotional relationships.

Despite the desire to raise the height of the levee, Glendive residents failed to gain the necessary level of public support. This is not entirely from a lack of effort. One interviewee recalled his personal crusade to facilitate levee expansion:

> I was in [redacted] in 1956 to 1959, and when I came back they had constructed the levee in West Glendive where my mother-in-law lived. And the first experience was my looking out the window at the river going by was when I was making coffee with her... I'm looking out, and I see something move by.... An ice cake was flowing behind the levee on the river side.... It was floating on the river, and it was a three-foot thick ice cake. So a foot of it was over top the height of the levee, when I was looking at the level of the levee. That's how close it came to going over that. I told my mother-in-law. I said, 'I am going to work to get this

> levee raised. I'm going to work. This is not high enough. If the river's that high now, it could get higher, and we're going to raise this levee.' I have worked since that period of time to raise the West Glendive levee. And I've failed all the time. [Interview #34]

This excerpt is indicative of the community's historical inability to raise the levee's height which has deprived Glendive residents of additional opportunities to forge embodied experiences with the levee. As a result, the West Glendive levee construction process did not facilitate the creation of embodied relationships between residents and the levee system and played little role in shaping their perceptions of flood risk.

River Recreation

Glendive's levee system is not a significant medium through which people recreate and experience the Yellowstone River. Despite the presence of a "walking path" on the dike's crown, its substantial setback from the river—over 500 feet at its closest point—reduces its recreational importance. Instead, various other sites around the city serve as focal points for recreation along the river. The Black Bridge Fishing Access Site—located in West Glendive between the levee and the Yellowstone River—is among the most popular access points for river recreation. Featuring not only a boat ramp but also a hiking trail along the river, users can fish, boat, drive, walk, and engage with wildlife at this site. As one Glendive resident extolled,

> There's a public access fishing site here, right in Glendive, right across the river... you can drive down on the river bottom to the fishing access site. [Interview #20]

Although part of the levee is included as a recommended "walk" at the Black Bridge Fishing Access Site, its proximity to a trailer court and distance from the river are suggestive of its diminished recreational utility.

The presence of two working boat ramps in Glendive makes the Yellowstone River readily accessible to watercraft. According to one resident:

> We do have a boat ramp in town here, and people do launch their boats and they will go as far upstream as Terry. They'll fish for walleye up there, or they'll go downstream and fish for catfish, or they'll go a little further and fish for paddlefish before they get to the intake. [Interview # 29]

Located just 26 kilometers downstream of the city, Intake Diversion Dam slows the progress of migrating paddlefish and makes it an ideal spot to snag one of the congregating fish. As one resident claimed,

> Paddlefishing's big in the spring, and we've been kind of known as the paddlefishing capital of the world for a long while. [Interview #27]

Fishing and boating as well as most other recreational experiences in Glendive remain disconnected from the levee. Thus, the levee essentially plays no part in fostering embodied recreational relationships between Glendive residents and the Yellowstone River and consequently does not significantly influence the residents' flood risk perceptions.

High-Water Experiences

Glendive sees its fair share of high water from ice jams. In fact, the West Glendive levee has always kept floodwater out of its designated area. According to one resident who lives in West Glendive:

> Anything that was damaged by the floods was on the outside of the dike. It was actually in the floodway. I've seen some houses out here on the Marsh Road and on the other side of the dike that had ice chunks up against them or took out a corner of a house but nothing within the dike. There's never been any water in the dike or over the dike. [Interview #26]

Despite the historic flood protection from the levee, residents interviewed had little trouble imagining a scenario in which the West Glendive levee overtopped. As the same interviewee later stated:

> Now I have seen it within 18 inches of the top of the dike. That will make you nervous…. The river will come up three feet on the dike within a matter of minutes. They had an evacuation order one time. They blew their sirens and basically everybody left West Glendive. But then the river [ice jam] broke, and they were all back in their homes within a couple hours. They're not going to stay, because it's in a bowl. You're going to get wet if it comes over the dike. [Interview #26]

A major reason for this lack of faith in the West Glendive levee comes from residents' embodied experiences from previous floods. Because levees and topography only partially shield Glendive from high water, all Glendive interviewees had experienced river flooding. Whether along the southeast bank of the Yellowstone near Marsh Road, on the northwest bank in between the river channel and the levee, or on agricultural land upstream or downstream from the city itself, these areas have undergone periodic flooding and formatively shaped interviewees' perceptions. As one resident recalled:

> The worst I have seen any flooding, I can't give you the year, it came within 8 inches of overtopping the dike. The year before I came here in the spring of '74, the guys that I worked with in the [redacted] told me that was the worst they had ever seen it, and it came within 4 inches of overtopping the dike. On Marsh Road there were chunks of ice that were as big as cars and pickups. [Interview #29]

Emotions such as fear—experienced as part of an embodied flood event—have a powerful effect on risk perception through embodied cognitive processes. Recalling a formative flood experience from his youth, one Glendive farmer recounted:

> We used to have a big D8 Cat that we used to clear fields with in the meadow and it was down there in the meadow, when the flood was going to happen, and the water came up, and it wasn't a severe flood, and the Cat was sitting in like two feet of water. I—a young, dumb kid like I was at the time—decided that I was going to go out there and start that Cat and bring it up to the bank. Well I walk out there with probably water up to my knees… when I was at the Cat and decided I

> want to come back over to dry ground... I got halfway and I could feel my legs going up over twigs, and I got concerned that my feet were freezing, and I would lose control of my feet, and I wouldn't be able to get my feet back under me... I was kind of scared for my life. [Interview #21]

Another interviewee described flooding this way:

> Scary. It really is scary. Especially here in town it's scary because there [are] so many people that stand and watch it. It's just so dangerous. I grew up next to a creek that flooded like that, and it would come up. I just know it's dangerous. [Interview #22]

A significant rationale for Glendive residents perceiving the Yellowstone River as scary and dangerous, especially at flood stage, comes from embodied experiences of death. One popular story, recounted by many interviewees, involved a rancher downstream from Glendive who had the misfortune to leave around 100 cattle grazing on a river island during flood season. When the river rose rapidly, the cattle drowned and were swept downriver. Specifically, one interviewee recalled:

> We have a neighbor. He did have a disaster and didn't have his cattle off the river bottom, and he lost a lot of cows. That stays in your mind for a long time, and you don't ever want to become one of them people that has that happen to them. [Interview #21]

Aside from animals, flooding on the Yellowstone River over the years has claimed the lives of 16 Glendive residents (USACE 2014). These tragedies made many of the interviewees acutely aware of the river's power. One resident told the story of lives claimed by a flood in the early 1900s:

> They were having a party over there at the barn. There was like 6 [or] 10 people over there… and the river came up, and the ice started flowing... That barn is the highest point on that land over there. When they left to walk back to Glendive from there, they walked into deeper water as they left... [the men] pushed the ladies up into the trees—cottonwood trees—and gave them their suspenders to tie themselves off into the trees with, and they tried to get up. I think there was three people drowned here and the family drowned on the other side of the river. [Interview #34]

Historic embodied experiences between the Yellowstone River and its residents help create emotions and a way of thinking about flood risk in Glendive that contributes to the residents' questioning of their existing levee system. Because Glendive's levees do not eliminate flooding from the town, its residents—especially those who have lived through flooding—take the power of the Yellowstone very seriously. As one member of the community stated:

> A lot of these guys along the river now that have experienced that, you know, they know. They don't even want to take a chance. It's some of the newer ones that aren't as familiar with it. [They take] a little more risk and don't think something like that really can happen. [Interview #23]

The peripheral character of the Glendive levee system minimized the number of possible embodied experiences and its corresponding influence on Glendive residents' risk perceptions. However, the diminished importance of the Glendive levee system does not necessarily negate the power of non-human objects. Instead, it simply changes the calculus. In Glendive's case, the minimal influence of levees provides a greater opportunity for the Yellowstone River itself to co-constitute the residents' perceptions of river flooding. As one Glendive interviewee declared,

> The Yellowstone River is basically, if you've lived in Glendive all your life like I have, just part of you. [Interview #20]

Conclusion

Despite a mutual dislike of federal control and regulation of floodplains, Miles City and Glendive have drastically different views towards flood risk. We have argued that these attitudes emerge not simply because of political and economic reasons but because of the communities' embodied experiences with their respective levee and river systems. Specifically, three different types of embodied experiences—levee construction, river recreation, and high-water experiences— affected the cognitive and emotional composition of these communities' flood risk perceptions. As a result, the two communities diverged significantly in their respective trust for their levee systems and corresponding perceptions of flood risk.

Unlike in Miles City, where residents spearheaded expanded construction and maintenance of their levee system, Glendive's local efforts failed to raise the height of the levee. Consequently, Glendive residents have historically had less of an embodied connection to the levee than their counterparts in Miles City. Recreationally, Glendive and Miles City residents engage in similar types of pursuits. From fishing and boating to walking and agate hunting, both

communities enjoy spending time in and around the Yellowstone River. When it comes to river recreation, the main difference between the two communities' is the importance of their levee systems. Unlike in Glendive, Miles City's levee is located very close to the river. There is little space on the east bank of the Tongue or south bank of the Yellowstone for parks, boat ramps, or fishing access sites. Thus, the levee serves as a central site of river recreation in Miles City and provides its residents with embodied opportunities to build a more personal relationship with their levee.

While Miles City and Glendive have both experienced historic flooding, the levee system in Miles City has largely shielded residents from harm. Although some interviewees did report anxiety around high-water events, the repeated success of the levee during these embodied events has built a high level of emotional faith and trust in the levee. Like in Miles City, the Glendive levee system has historically held during high-water. However, because the levee system does not entirely protect the town, interviewees frequently experienced flooding events. The fact that these embodied flood events have taken both bovine and human life creates a substantial level of fear within the community. When combined with the decreased embodied connections residents have to their levee system through construction and recreation, one can better understand why Glendive residents have a lower level of faith in their levee and higher perception of flood risk than their counterparts in Miles City.

Throughout this paper we have argued that political power extends beyond humans through a distributive understanding of agency that rests on the idea that brain, body, and elements of the environment co-constitute human thought and emotion (Bennett 2010; Colombetti 2014). While geographers have long theorized agency as dispersed through relational networks (Swyngedouw 1999; Whatmore 2002), we have argued that the human mind itself—the traditional locus of agency—is itself a distributed phenomenon (Shapiro 2011). While

existing relational approaches such as the hydrosocial cycle rely on the constraining effects of non-human objects at a scale well beyond the mind (Clark et al. 2017; Williams 2018), we use insights from a dynamical systems approach to embodied cognitive science to argue in support of the idea that certain non-human objects actively help produce human cognition (Beer 2003; Shapiro 2011).

To support our argument, we analyzed qualitative interview data about flood risk perception from two eastern Montana communities. Empirical evidence from Miles City suggests the existence of relations between levee and residents in which the more-than-human world (levee)—through different types of embodied experiences—takes an integral role in the construction of flood risk perceptions. Conversely, interview data from Glendive illustrates the presence of fewer embodied experiences between levee and residents, which in turn diminishes the levee's influence on shaping cognition and emotion. As a result, the river in Glendive plays a more active role than the levee system in shaping flood risk perception. Whether a product of human ingenuity or not, more-than-human entities such as levees and rivers actively shape human cognition and emotion through embodied experiences.

While this paper cannot definitively prove conceptual frameworks from embodied cognition such as the causal role of non-human objects in the production of cognition and emotion, the qualitative interview data from Miles City and Glendive is suggestive of the agential capacity of levees and rivers to shape human thought and risk perception. We encourage geographers and other scholars to continue our engagement with embodied cognitive science. Ultimately, we hope this paper will help bring geographical discussions about non-human agency back down to the "human" mind.

Notes

1. Political theorist Jane Bennett's theory of distributive agency offers a useful heuristic to conceptualize political power in a more-than-human reality. To make sense of the 2003 North American power blackout that affected more than 50 million people, Bennett (2010) argues for an understanding of agency "distributed across an ontologically heterogeneous field, rather than being a capacity localized in a human body or in a collective produced (only) by human efforts" (p. 23).

2. This range of interview length is due to many factors, such as diversity in interview settings (outside, in a vehicle, inside, or some combination), interviewing couples versus individuals, and differences in participant personality, knowledge, and experience with flooding.

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Figure 1. Map of the study site.

Figure 2. Aerial photograph of Miles City. Note the location of the river in relation to the city and the proximity of the levee to the Tongue and Yellowstone Rivers. *Data source:* http://geoinfo.msl.mt.gov/data/yellowstone_river/GISData.

Figure 3. Miles City levee just downstream from the Tongue and Yellowstone Rivers' confluence. The view is looking upstream. Note the proximity of the levee to the Yellowstone River, the gravel roadbed on top of the levee, the tree growing out of the levee's side, and the structures near the levee. Photo by Kirsten Bergmann.

Figure 4. Aerial photograph of Glendive. Note the location of the West Glendive levee and the distance between the levee and the Yellowstone River. *Data source*: http://geoinfo.msl.mt.gov/data/yellowstone_river/GISData.

Figure 5. West Glendive levee near the western terminus of the Towne Street Bridge. The view is looking downstream. Note that no vegetation is growing on the levee and that the river is not visible. Photo by Elizabeth Shanahan.

Figure 1

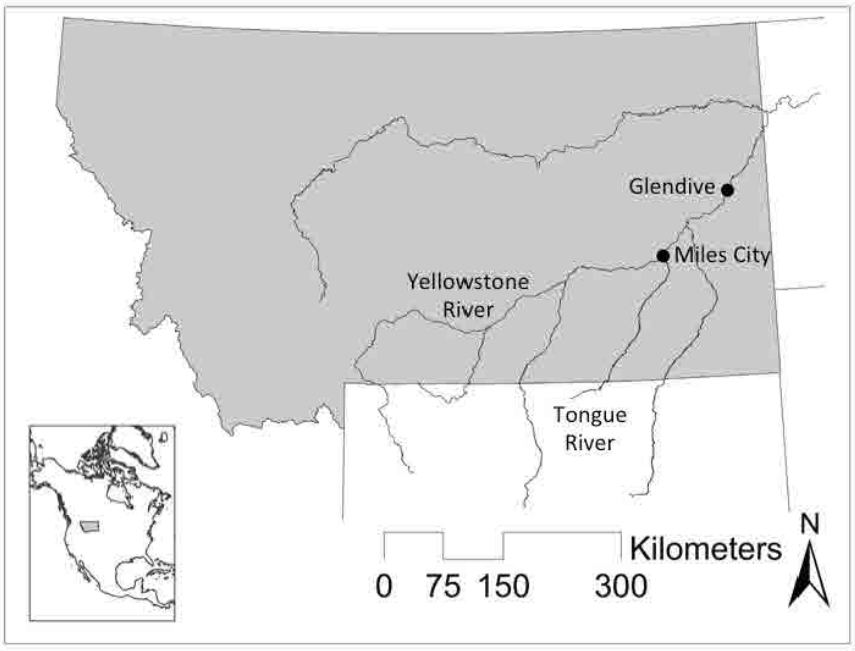
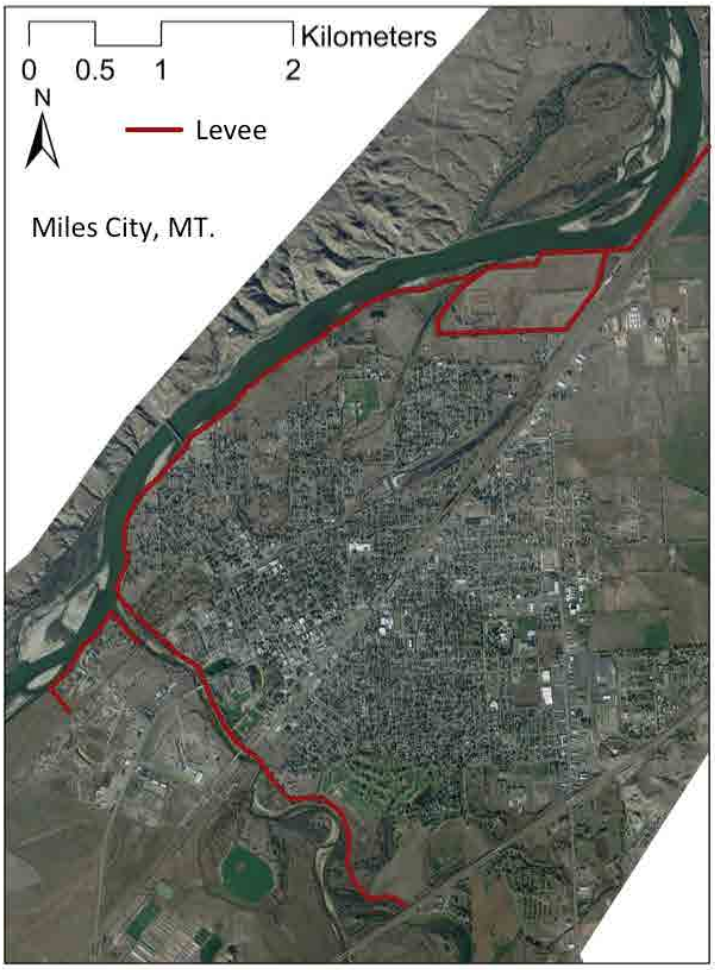

Glendive
Miles City
Yellowstone
River
Tongue
River
Kilometers
0 75 150 300
N

Figure 2



47

Figure 3



Figure 4

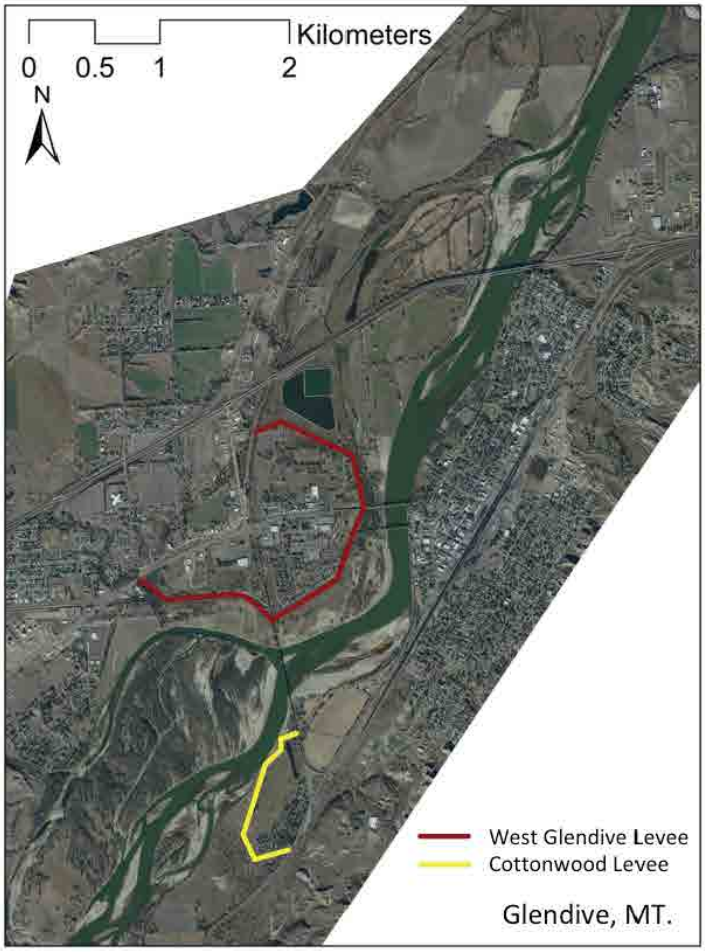

Kilometers
0 0.5 1 2
N
West Glendive Levee
Cottonwood Levee
Glendive, MT.

Figure 5



CHAPTER FIVE

REFLECTIONS

As I sit at a desk on the third floor of the library laboring over this dissertation's final pages, I hear water falling in the background, and it breaks my concentration. I look over my shoulder. My eyes tell me that it is just the fountain. My heart tells me otherwise. Sighing quietly, I let my mind wander and soon return to thinking about the Yellowstone River as a place, specifically a more-than-human one (Cresswell 2013; Cresswell 2019). In lieu of a more conventional closing, I offer these reflections inspired by both the fountain's falling water and the Yellowstone River's fluctuating flows.

The Importance of Fieldwork

This dissertation, although typed on a computer in a library, is largely a product of fieldwork. One can learn a great deal about the Yellowstone River Basin from books, documentary films, and government reports; however, there is no substitute for learning about a landscape through embodied field-based experiences. This is especially true for a project grounded in a more-than-human theoretical perspective. Consequently, this dissertation is co-constituted through 1) many days spent in the Yellowstone River Basin interviewing landowners, government officials, and concerned residents about their perceptions related to oil and gas development and flood risk; 2) a laborious week planing the Yellowstone River at low water and conducting scientific fieldwork in its murky and insect-infested backwaters with Dr. Adam Sepulveda and the United States Geological Survey (USGS); 3) nine months spent living in Billings – the river's largest

city; 4) countless evenings and weekends recreating along, in, and on the Yellowstone River Basin's varied terrestrial and aquatic ecosystems; and 5) attending various meetings throughout the years related to topics such as flood awareness, cumulative effects analysis, and the upper Yellowstone River's 2016 fish kill.

For a historical geographer, there is also no substitute for archival fieldwork. Although a much different landscape with its own peculiar set of embodied practices, archival research opens up windows into the past and fills the mind with both delight and monotony. A perk of working in the not-so-distant past is that documents are often housed more informally. This allows greater space for serendipitous encounters. While conducting archival fieldwork at the Montana Department of Fish, Wildlife, and Parks, I often sat in a cubical within the Fisheries Division office, pouring over boxes of loosely organized correspondence. During this time, I was privy to office conversation and gossip. Although much of the dialogue was either too technical for me to understand or too inane for me to care, I would occasionally glean an invaluable insight. Because I frequently worked at the Fisheries Division office during August 2016, I overheard several exchanges related to the agency's plan to exercise its instream flow water rights for the upper Yellowstone River Basin to mitigate the ongoing fish kill. As the agency readied a call for water against junior appropriators, Governor Bullock's office – in the heat of a tight reelection campaign – intervened and directed Fish, Wildlife, and Parks to stand down. Amidst highly frustrated voices conversing all around me, I sat in my cubicle and marveled at the political nature of water law enforcement. This serendipitous

experience and understanding informs Chapter 2's conceptualization of Montana water law as an ongoing relational process composed of both human and nonhuman actors.

The Materiality of Water

The physical properties of the environment play a central role in more-than-human understandings. For example, the material properties of water matter. From the constraints it imposes on humans (Bakker 2004; Anand 2017) to its embeddedness in social power (Swyngedouw 2015), water's physical properties – such as its weight and unbounded liquid form – shape its social and environmental use. Furthermore, there is something particularly powerful about water that moves, and the rate and volume at which water travels through the landscape matters greatly. In this way, the Yellowstone River's seasonal flow regime – intimately connected to its water management – is significant because it affects the experiences of not only its human but also its nonhuman inhabitants in an elemental way. Because the Yellowstone does not have a large mainstem dam and reservoir, its flow regime, especially above its confluence with the Bighorn River, has a low degree of human control. Thus, the timing of its high flows is often less predictable than other river systems, which accentuates its potential affective power. One need only to walk along the Miles City levee or drive over the I-90 bridge in Livingston during the spring rise to understand the affective force of moving water and its connection to mythic understandings of the Yellowstone as a free-flowing river.

The Relevance of More-Than-Human Thinking in the Anthropocene

What is the practical utility of a more-than-human geographical approach? I admit that this question often causes me a certain amount of consternation. There is no doubt that more-than-human theories are speculative. Furthermore, accumulating empirical evidence to support a more-than-human geographical argument is often quite challenging. So why even bother with this approach?

In defense of a more-than-human approach, I offer this answer: The planet is currently in the midst of a socioenvironmental crisis. It is likely that capitalism and its corresponding anthropocentric values system are largely at fault for the rapid onset of climate change, species extinction, and acidifying oceans (Moore and Patel 2017). Because the capitalist system largely views nature and culture as distinct ontological entities, it fails to fully account for the power of the nonhuman world. More-than-human approaches offer hope that a new paradigm, which better accounts for the agency of the nonhuman world, is possible (LeCain 2017). Furthermore, the emergence of the Anthropocene concept has stimulated political ecologists to call for "experimental" approaches in order to help create environment management and governance strategies that transcend dualistic thinking (Whatmore 2013; Braun 2015; Martin et al. 2019). In order for these experimental approaches to have utility, however, they must fully account for the co-constitutional relationship between humans and nonhumans. Consequently, I view more-than-human geographical research as an essential component in the pursuit of a more equitable societal structure. I am cautiously optimistic that further empirical research into more-than-human understandings of the "human mind" – through an

embodied cognition approach – may help to further political ecology's approach to experimental environmental governance and help to solve some of the Anthropocene's unceasing socioenvironmental problems.

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