

Conflict and Collaboration in the Blackfoot and Big Hole Watersheds of Montana, USA

Andrea Szabo

Joint Degree Student, University of Florida

Masters in Interdisciplinary Ecology Candidate, School of Natural Resources and Environment

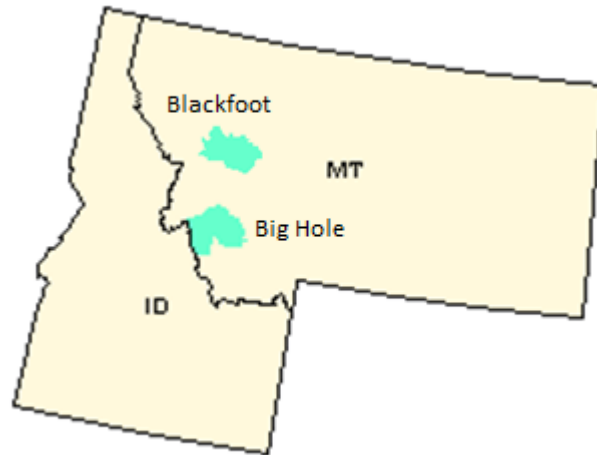
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Watershed Locations



I. INTRODUCTION

This analysis explores in detail how communities of water users within separate watersheds in rural Montana are able to find collaborative methods to manage their water uses under the legal system of prior appropriation in such a way that preserves instream flows for fish, wildlife, and recreation while also maintaining their individual ownership interests in consumptive water uses. The case analyses offered explore the methods taken in response to resource scarcity represented by drought conditions and a rare population of fish.

Prior appropriation is a legal system governing water use and can be thought of as a resource institution because it dictates the management of water. It was developed in the Western US in response to a common pool resources' use, where water can be scarce and a system needed to set up hierarchies of users that was better adapted to these arid conditions than the system in place in the Eastern US. Common pool resources are characterized by the difficulties associated with exclusion and subtractability because joint use of the resource means one user's exploitation of the resource will leaves less for the next user, and so on (Coppolillo and Mulder, 2004). However contrary to popular belief, not all common-pool resources are open-access or unmanaged (Coppolillo and Mulder, 2004) as is the case with the establishment of prior appropriation systems of water laws in the West. Water within watercourses (streams, rivers, and the like) in the West can be considered common pool resources for the purposes of this assessment because the development of the prior appropriation's system of water use laws arose from the need to delineate a hierarchy of users to determine who could use water first because the arid waters characteristic of the early settlement of the West may quickly result in no water remaining at all. Prior appropriation can be characterized as invented in response to the resource conditions of western waters or characterized as a redesign of the eastern

water law systems. Berkes' historical case study demonstrates that people can take rationalist approaches and respond to resource depletion by inventing or redesigning their resource institutions (1998). Both the state-wide approach Montana and the individual community members took in response to the conditions of their common pool resource (drought and consumptive uses that can leave no water in streams as habitat) represent such a rationalist approach to the prior appropriation doctrine by effectively redesigning the doctrine to include the interpretations of beneficial uses and developing shared-sacrifice models at the watershed level. The shared-sacrifice models are voluntarily and individual actions that are collectively agreed upon as proactive and mitigating responses to resource scarcity.

II. Overview of the Doctrine of Prior Appropriation and Montana's Response to Resource Threats within the doctrine

In the U.S., there are two historic doctrines for the system of water laws that each state uses to determine the management and use of water within their boundaries. They are the *prior appropriation system of the Western states* and the *riparian system of the Eastern states*. Prior appropriation is thought to have developed out of Westerners' rejection of the riparian doctrine. As an artifact of history, the riparian doctrine began first with the settlement of the water-rich East and evolved from land ownership whereby water use rights were associated with the land (land owners with water in their lands or abutting their lands could use the water and the water had to remain associated to tracts of land associated with an owners) (Klein 1995). Riparian users have the right to reasonable use of water but pay no attention to priority or beneficial uses (Klein 1995). This doctrine was ill-suited for the arid West where settlement coincided with mining needs because miners' needed to divert water off-tracts, often outside of watersheds to their mines and because the West can be arid the use of water often results in no water left within streams. So it is thought that prior appropriation's doctrine of water rights evolved from the 19th century's "miner's rule" where first in time, meant first in right (Abrams 1989 and Klein 1995). Miners understood that who-ever got there first and used water for their mining processes, had priority to use their right to the water by virtue of their seniority in time to those users who came later. Prior appropriation sets up a hierarchy of users based on their seniority in time and the concept of a "beneficial use" of the water as opposed to the riparian doctrine which sets up a hierarchy of users based on land ownership status and "reasonable use."

The development of both doctrines is intimately linked to cultural and historical differences among the Eastern and Western U.S. The property right to use water associated with prior appropriation is such that the water must be put to "beneficial use," and at the onset of the doctrine, this predominantly entailed diverting water some distance from its sources for irrigation and mining purposes (Klein 1995). Generally westerners regarded leaving any water in streams as waste because it generally meant the water was not being put to a beneficial use, however there are a few instances where leaving water in stream was not regarded as waste when it was to maintain water levels for rolling logs in timber operations or for livestock drinking purposes (*Re Adjudication of the Existing Rights to the Use of all the water*, 55 P.3d 396, (Mont. 2002)). Yet until there was clear statutory direction, it was unclear and undeveloped whether or not prior appropriation would consider water left instreams for the use of wildlife and recreation as a "beneficial use" under the doctrine.

Before the 1960s, the prior appropriation doctrine applied by western states did not regard instream flows critical to wildlife and ecosystem functioning as a “beneficial use;” rather, instream flows were predominantly viewed as a form of waste (Klein 1995 and Bradshaw). However, through the late 1960s and into the 1980’s there was a period of significant rise in environmental concerns among the public. There were increases in the demand for outdoor recreation, the recognition of aesthetic values in natural places, and increasing recognitions of environmental and ecological concerns across the nation (Wilkinson 1985 and Klein 1995). These trends lead to the promulgations of new environmental agencies and regulations on federal and state levels (Kepner 2016). Many states responded to such trends and some moved to generate new approaches within their state’s prior appropriation systems (Fanning et al., 2014).

Montana responded to the environmental concerns expressed throughout the nation during this time period as their constitutional amendment in 1972 reflects (Fanning et al., 2014). And the ensuing modifications to the application of the prior appropriation doctrine as the state developed responses to new resource issues over recreation, fish, and drought conditions within the existing doctrine. It is true that prior appropriation in Montana still subscribes to many basic interpretations of the doctrine; that to keep a water right protected from abandonment (the system governing a loss of the water right), the user must apply the water to a “beneficial use” without waste (Klein 1995) and in times of drought, water users with more senior water rights (i.e., those rights that are first in time over other junior rights) can use water before junior water users may have their share (Klein 1995 and Bradshaw). However, Montana has taken nuanced affirmative steps to include interpretations of beneficial use that encompass more than the historical definitions and measures within the doctrine to respond to times of scarcity for the natural resources dependent upon water within the state.

Montana was already ahead of the national trends beginning in the 1960’s because in the late 1950’s streams across Montana were rerouted for easy and cheap road construction and folks suddenly noticed the fisheries began to decline (Dickson). The Fish and Game Department, now Fish Wildlife and Parks (FWP), began to investigate 13 historic trout streams (blue ribbon streams) and determined that habitat modification was the primary cause of the deterioration (Dickson 2013). This gave rise to much early concern over the habitats of Montana’s famed trout species, and in 1963 a Stream Protection Act was passed temporarily but made permanent in 1965, which granted FWP recreational water rights to maintain instream flows for public recreational uses with a priority dates of 1962 and 1965 (Watercourse and DNRC 2015). The FWP was thus imbued with legal authority with the statutorily given water rights.

Then, in 1969 the Montana Legislature created what are called “Murphy Rights” through an Act sponsored by Representative James E. Murphy which gave the FWP authority to appropriate unappropriated waters on twelve streams to maintain instream flows for the preservation of fish and wildlife habitat (Loble 2010). This included the several water bodies within the Blackfoot watershed, including the Blackfoot River’s course through Missoula and Powell Counties (Loble 2010). These rights generally have a priority date of 1970 or 1971, meaning priority is given to those dates as it relates to more junior water users with later dates attached to their respective water use rights within the prior appropriation system’s hierarchy of temporal users or “first in time, first in right” principles (Watercourse and DNRC 2015). FWP manages changes in watercourses related to all state-wide

construction projects for the protection of the natural resources (fish) within the watercourse-modifying construction activities, thus the agency frequently interacts with the Department of Transportation. The agency may also issue closures on water-based recreation within the waters of the state, as it did recently for the Yellowstone River (FWP 2016). When drought occurs and levels drop to a requisite flow measured in cubic feet per second on the water bodies with Murphy Rights held by the FWP, the FWP may “call” their rights on water courses defined by the statute and effectively block all other junior users. This affords a protective a minimum instream flow for Montana’s blue-ribbon trout streams. Thus, FWP has the legislative authority to regulate the fisheries of Montana for the benefit of the people inherent in its former status as the Fish and Game Department for the state and also holds statutorily created Murphy Rights to protect fish and wildlife in the state.

In 1972, when the Montana legislature amended the state’s constitution to include Section 3 Water Rights within Article IX (Environment and Natural Resources), that (3) “All surface, underground, flood, and atmospheric waters within the boundaries of the state are the property of the state for the use of its people and are subject to appropriation for beneficial uses as provided by law,” they were responding to the new issues facing the resource at the time. This constitutional amendment also included other language, and paved the way to centralize and record water rights in Montana (Loble 2010). The state’s amended constitution also guaranteed Montanans a “clean and healthful environment” (Dickson 2013). The following year, the legislature passed the original Water Use Act of 1973 which authorized the Department of Natural Resources and Conservation (DNRC) to administratively control changes in water rights and the acquisition of new rights (Bradshaw and Radosevich 1978 and Loble 2010). This early act was amended in 1991 to explicitly declare that a “beneficial use” of state waters includes waters left instreams for fish and wildlife (Dickson 2013). The final Water Use statute of 1991 is codified in Title 85, Chapter 2, Subpart 101 and charges the DNRC as the over-seer of water resources within Montana, stating “(1) Pursuant to Article IX of the Montana constitution, the legislature declares that any use of water is a public use and that the waters within the state are the property of the state for the use of its people and are subject to appropriation for beneficial uses as provided in this chapter...” (MCA 2017).

Thus, by Montana’s constitutional amendment and the affirmative language of the Water Use Act, the 1970’s solidified that the State reserves the rights to instream flows for fish and wildlife habitat. The current amended version of the Water Use Act delegates Montana’s Department of Natural Resources and Conservation (DNRC) as the agency with authority to issue new permits, change old permits, maintain a record system, and delineate minimum flows (Radosevich 1978). However, in the spirit of Montana’s cultural distrust for agencies and preference for courts (suggested by one interviewee in the Blackfoot watershed), or by the enormous task before the DNRC, the Montana legislature set up courts of special jurisdiction to litigate citizen’s water rights and enter water decrees. This further modified the framework set previous set in place for the doctrine of prior appropriation in Montana. The legislature passed Senate Bill 76 in 1979 which set up Water Courts (WPIC 2015). The Water Courts and DNRC each contribute different information for water rights, with the water courts taking a more historic “snapshot” of the rights and designed eventually to phase out once the state’s water claims are adjudicated (WPIC).

Although Montana lead the way for reconciling the doctrine of prior appropriation with new issues like instream flows for wildlife through legislative solutions by granting rights within the doctrine, these measures were not enough to respond to the issue of drought, which Montana bitterly discovered during severe droughts in the late 1980's (Drought Plan 1995). In response, the legislature had agencies develop state-wide drought plans primarily to coordinate emergency responses amongst agencies and establish agreed upon threshold triggers for agency action, but people were dissatisfied with these early responses and plans, especially when they were put to the test during the late 1980s. (Drought Plan 1995). These events prompted the Montana legislature to establish a Governor's Drought Advisory Committee in 1991 (Drought Plan 1995). This body is comprised of the Governor's Office, DNRC, Department of Environmental Quality, FWP, Agriculture, Livestock, Commerce, and Disaster Services (Drought Plan 1995). Specific duties and responsibilities were designated and the committee began promulgating Drought Plans (Drought Plan 1995). Another solution Montana took to the issues surrounding instream water flows within the framework of prior appropriation was a leasing system whereby specific agencies such as FWP or conservation organizations (e.g., Blackfoot Challenge and Trout Unlimited) may lease water rights from water right holders for the purposes of protecting water flows for fish and wildlife (Shaw 2007). These private leases may only last for 10-year terms (indefinitely renewable) and are not tax deductible like conservation easements (Shaw 2007). The leasing system is organized under the amended Water Use Act with specific factors and safeguards to other water users and also allows for water rights holders to temporarily convert their use to instream flows with the DNRC (Water Rights in Montana Handbook 2014).

III. CASE ANALYSIS 1: Blackfoot Watershed and the Development of the Blackfoot Challenge Drought Committee

Meanwhile, in the Blackfoot Watershed of south central Montana, community members had been organizing towards conservation initiatives since the late 1970s (Blackfoot Challenge 2016). In 1975 mine tailings from the Mike Horse Mine's dam broke out and sent 100,000 tons of the toxic tailings downstream (Annual Report 2013). Community leaders in the valley including Becky Garland, Land Lindbergh, and Jim Stone focused primarily on the land and were compelled, in part, by watching the development surge in the south Bitterroot range during the 1980s and 1990s (Blackfoot Challenge 2016; Annual Report 2013). These community leaders later developed the Blackfoot Challenge with others. The 1970s also brought a surge of recreationists from nearby cities like Missoula. This was in step with the general trend in Montana and public demand for recreational access be it tubing, hunting, hiking, fishing and the like (Annual Report 2013).

The Blackfoot watershed, or Blackfoot River valley is spans Powell, Missoula, Lewis and Clark, and Granite Counties in Montana (EPA Surf your Watershed). The watershed is a mix of private and public lands, with more public land ownership than is average for other watersheds in the state (Coughlin 1999). Inferring from the Environmental Protection Agency's maps of the watershed and the legal descriptions for FWP's Murphy Rights, there are Murphy Rights attached to the water courses in Blackfoot watershed spanning all the counties except Granite County, which has Murphy Rights attached to a watercourse outside of the Blackfoot watershed. This means that when flows drop below a threshold level (700cfs) the FWP may "call" their 1970 and 1971 priority dated Murphy Rights and prevent junior right holders from using their water.

The newly formed Blackfoot Challenge was aware that the Blackfoot River had recently been listed by American Rivers as one of the top ten endangered rivers in the nation in the early 1990s (Annual Report 2013). The Blackfoot River is a blue-ribbon trout stream and its imperiled state caught the attention of Trout Unlimited (TU), an organization that had studied the watercourse as well as its tributaries. TU determined that the river was degraded by nearly 80%, primarily due to old mine tailings and unsustainable livestock grazing practices. TU later became an instrumental influence to the Blackfoot Challenge, and they have partnered on several projects (Blackfoot 2016).

The Blackfoot Challenge is comprised of community members both private and public, and was officially chartered in 1993 as a nonprofit to “coordinate efforts that will conserve and enhance the natural resources and rural way of life in the Blackfoot Watershed for present and future generations” (Blackfoot Challenge 2016). The development of the Blackfoot Challenge in large part is due to the relationships and management approach styles taken by community and agency partnerships both state and national (Blackfoot Challenge 2016, Annual Report 2013). The community leaders of the Blackfoot Challenge had shared values and community ethic as evinced by the Blackfoot Challenge’s mission statement. There were also key agency employees, like Mike McLane who worked for DNRC and now works with FWP, who sometimes took their own time to establish trusting relationships with community members and great effort to communicate accurate information. The Blackfoot Challenge prides itself in community-based, collaborative or cooperative approaches to conservation, which are designed to be all inclusive amongst public and private stakeholders. They aim to lead with community values that are supported by science, to engage in effective communication, and to build relationships, trust and credibility (Blackfoot Challenge 2016). The Blackfoot Challenge focuses on the “80/20 rule” where members are encouraged to focus on the 80% they probably share in common over the 20% they may disagree over (Blackfoot Challenge 2016).

As a testament to their dedication, the Blackfoot Challenge signed its first a cooperative agreement with the U.S. Fish and Wildlife Service in 1994, then in 1996 they signed a cooperative agreement with the Bureau of Land Management (BLM). In 1997 the BLM purchased land from Plum Creek Timber, Co. (the largest private landholder in the area) as Blackfoot Challenge facilitated the 1997 Blackfoot River Bull Trout Recovery Plan with their partners (including TU) (Annual Report 2013). In 2000, the Blackfoot Challenge formed its first Drought Committee to coordinate drought response in the watershed. The Blackfoot Challenge’s members and partners were aware of the Drought Plans promulgated by the state’s Drought Committee in the 1990s and sought to organize the community for a local response that could better meet everyone’s needs (Blackfoot Challenge 2016). By this point, many were aware that droughts in the valley meant some may lose water rights and that drought was inevitable, so they sought to “get ahead” of the problem by coordinating amongst themselves (Blackfoot Challenge 2016). An interviewee explained that initially many did not think Murphy Rights would be called but over the years, it became clear it was well within FWP’s authority to do so. This increased the need to organize, and the Blackfoot Challenge’s Drought Committee got FWP to agree not to call their rights if the community engaged in a “shared sacrifice” effort to respond voluntarily and collectively to drought conditions by limiting their own uses and transforming their water uses to the most effective means available (Annual Report 2013; Blackfoot Challenge 2016; personal communications). The formation of the Drought Committee was made possible by the relationships

and networks developed by the Blackfoot Challenge in the community spanning from water to land to educational issues in the community (Annual Report 2013). Today the Blackfoot Challenge's Drought Committee has promulgated several Blackfoot Drought Response plans, and effectively coordinates shared sacrifices through communicating with irrigators, anglers, and other members in the community with regular meetings and monitoring reports from the gauges on the Blackfoot River (Annual Report 2013). The Challenge is responsible for communicating to water users in the valley and recruiting new users' participation in the shared sacrifice model (Annual Report 2013).

III. a: Stakeholder Analysis – Blackfoot River Watershed

1. Primary Stakeholders

All irrigators within the watershed are primary stakeholders because they have a direct stake in the outcome of mandating minimum flows for the Blackfoot river and its tributaries within the valley. These primary stakeholders include ranchers and farmers as water users, although those most significantly affected are junior water right holders to FWP's 1970 or 1971 priority dates. Other primary stakeholders include anglers and outfitters whose derive income directly related to the availability of natural resources and wildlife in the Blackfoot River Valley. The FWP as an agency is a primary stakeholder because when water levels reach critical levels they have the legal authority to prevent other users from legally using water, the agency is also bound to protect recreational uses and monitor flows. Members of the local chapter of Trout Unlimited are primary stakeholders as they depend upon the watercourses for the expression of their valued fishing activities. Community members, such as landowners, who find value from the surrounding area are indirectly and directly involved in the outcome of the conflict, thus they shift between secondary and primary stakeholders. Tourists and vacationers that collectively have a large impact on water use also shift between stakeholder groups because they are not always present and therefore cannot always have a direct interest in the outcome of drought conditions.

2. Secondary Stakeholders

Visitors to the watershed from in and out of state are indirectly involved in the outcome of the dispute because they may not actually be involved in the decision making but will be effected by the outcome. The same holds true for the general citizens of Montana as the legal regime applies to more than one watercourse for the purposes of recreation and permits but Murphy Rights attach only to the other mentioned watersheds holding blue ribbon trout streams so although the water users within those watersheds are not directly involved in the dispute surrounding the Blackfoot valley they are indirectly related to how other communities perceive their resources. The Nature Conservancy and the Montana Land Alliance are not directly affected by the outcome of the dispute but involved themselves in land acquisitions within the watershed thus the outcome of the dispute directly effects those parcels and the overall missions of both organizations; they are both primary and secondary stakeholders at various times. The DNRC is also both a primary and secondary stakeholder because although not directly related the agency's ability to issue new permits and modify existing ones is curtailed by the legal regime that grants FWP authority for specific duties, in addition DNRC is responsible for

monitoring and reporting information regarding the watercourse that directly influences the drought response for the watershed.

3. *Peripheral Stakeholders*

National or other chapters of Trout Unlimited are interested in a resolution that continues to provide habitat for the species of fish they value. The Montana Department of Environmental Quality is not directly involved in the conflict, nor is the agency directly interested in water quantity as much as it is interested in water quality, but when water levels drop during drought conditions which generally occur with higher temperatures in the summer months, water quality becomes a serious issue. Thus, it is fair to say the agency is interested in the outcome and various responses to drought and habitat restoration within Montana and the Blackfoot watershed. Because the BLM purchased land within the watershed to provide for outdoor recreational opportunities for the public, the agency is also interested in the outcome of the conflict as it both relates to its ability to provide recreational opportunities to the public and the health of the land generally, as well as the educational value of how the Blackfoot Challenge's Drought Committee may successfully balance the needs of various stakeholders.

4. *Stakeholder's Realm of Values Table Explanation*

Values, particularly divergent values, are often at the heart of natural resource conflicts because they guide individual's behaviors and value expressions (Trainor 2006). Individuals may rationally and consistently have overlapping realms of values because landscapes and natural resources can simultaneously be valued in many different ways by a single individual or group of diverse stakeholders (Trainor 2006). Therefore, care must be taken to decipher the values present for stakeholders within natural resource conflicts to determine how, if at all, collaboration may proceed. I chose five value realms that I think represent the Blackfoot River valley, or watershed, they are: cultural, social, recreational, scientific/ecosystem, and economic/technological.

Trainor argues that incommensurability is the recognition that the same metric may not capture different value realms even if a value realm may have economic components. She states that acknowledging incommensurability legitimizes other realms of value, or forms of value expression and decision criteria. She offers that the deliberative process (one where interested and affected parties collectively arrive at a mutually agreed upon decision outcome) has the best potential to account for multiple values without forgoing their incommensurable natures. This is consistent with the Blackfoot river valley's response to drought because although economic values are expressed in other realms (like the cost of a fishing pole or the gas to get there) but the economic measures do not completely capture the other realms well (like the worth of the fishing memory between family members). The Blackfoot Challenge's Drought Committee exemplifies the deliberative process well in that many interested parties were able to deliberate and agree upon a shared sacrifice model by focusing on the preservation of values held in common by the parties.

Trainor (2006) defines the cultural realm as integral to the practice, preservation and/or reproduction of a culture that can also have religious and historical values. I chose to separate the cultural and social realms although they often overlap because although cultural heritage is reproduced through social bonds, it has historical values and expectations interlaid that make it a

separate realm as an individual may not express or reproduce their sense of cultural heritage in a social setting but still attribute value to the resources through a cultural identity and perspective that the natural resources of Montana will be available for use (e.g., fish in streams or elk on land). Trainor (2006) defines social values as those that promote and strengthen social relationships and/or institutions. She says they're reproduced through social and cultural processes in social capital, thus implying the cultural and social realms are intimately linked. However, the social value realm includes "family integrity, sense of home, 'small town feel,' civic participation, and community cohesion," the social value realm necessarily involves direct social exchanges while culture can be reproduced in literature, art, or other ways. The social realm was included in the Blackfoot Challenge Drought Committee because community cohesion and social capital were important entities that were valued, evinced by the Blackfoot Challenge's mission statement "to promote and protect [the valley's] rural way of life." However, this statement implicates the tight relationship between cultural and social value realms as a rural way of life has both social and cultural modes of reproduction and expressions as well as some overlapping entities that are valued. I also included self-reliance/ingenuity as entities valued under the cultural realm because the Western US is well known to have libertarian perspectives where individual autonomy is a key ingredient (Anderson et al, 2016).

Trainor (2006) defines recreational values based on the judgement for the potential(s) of a quality recreational experience. She states further that recreational values are often reproduced via cultural and social processes although the content of the value can be expressed in different ways and sometimes the same recreational value realm may have mutually exclusive decisions outcomes like in the case of a single canyon's motorized versus non-motorized uses. For the Blackfoot River valley, recreation takes several expressions, some that are reinforced socially and culturally, others perhaps only one and yet others neither. For example, tubing may be reinforced socially but not culturally by heritage while hunting may be reinforced culturally but not necessarily socially as one can hunt alone.

Trainor (2006) defines scientific and ecosystem value realms separately but for my purposes I thought they were better combined as the discipline of ecology informed the interested parties, science itself was not valued *per se*, as ecosystem health was the important goal. However, facts and the scientific method were trusted and valued by interested parties. Sharing the scientific information and increasing awareness among interested users and parties was highly valued.

Likewise, I combined economic and technological value realms because technology itself is often limited by economic means and both value realms are assessed well by willingness to pay measures in the river valley. An efficient but expensive technology may not lead to more users because it is cost prohibitive. Water use by users in the Blackfoot river valley can be assessed by willingness to pay, like whether or not to improve technologies for irrigation which is both representative of economic and technological realms. Other stakeholders in the Blackfoot River valley also value entities that can be expressed in willingness to pay measures affect the technology chosen by outfitters, anglers, and recreationists.

<u>Realm of Value</u>	<u>Concept of Value</u>	<u>Expression of Value</u>	<u>Mode of Value Reproduction</u>	<u>Entities that are Valued</u>
Cultural	Preservation of community lifestyle, heritage/cultural identity	Shared norms	Cultural processes	Cultural heritage of available natural resources, independence and self-reliance/individual autonomy
Recreation	Quality of resource for recreational potential	Fishing, hunting, tubing, hiking, outdoor activities	Social processes, friendships, Experiences.	cut throat and bull trout, water in stream, wildlife species
Scientific/ Ecosystem	Integrity of ecosystem function, scientific knowledge in action	Monitoring gauges, communication of information	Scientific processes, ecosystem ecology	Information exchanges, cut throat and bull trout, native species, restoration of ecosystem functions and habitat
Social	Promote social relationships and partnerships	Community events, participation in education, communication	Social processes and learning	Social capital, community cohesion
Economic/ Technology	Efficiency of uses	Money/income derived, willingness to pay to adopt new technologies or modify existing	Market systems, increasing efficiency of use of technologies	Crops, livestock, markets, technologies as a means to an end (i.e.-better irrigation system, more effective fish hook, etc.)

III. b: Issues Analysis – Blackfoot River Watershed

Values are the beliefs that determine a party's position on an issue or their behavior regarding a natural resource. A party's interest is their expected share of a scarce resource. In accessing natural resource and environmental conflicts, issues arise between parties when a party's values and interests collide with another's values and interests. These issues over natural resources can generally be grouped with primary generating factors that reflect various interests and values. Generating factors for issues in natural resources conflicts can include disagreements over facts, values, interests, jurisdictions, persons, or history based.

In the Blackfoot River valley, the natural resource issue is about the amount and quality of water in streams for wildlife and recreationists and determining an equitable response to drought conditions within the framework of prior appropriation. The cultural realm of values for stakeholders in the Blackfoot River valley encompasses the sense of entitlement legal recognitions to private rights holders yield, as well as the cultural-based the expectations that natural resources in Montana shall be available to all Montanans regardless of one's water use right. The social realm of values is also important for collaboration in the watershed because members of the Blackfoot Challenge value the rural character of the area. The Blackfoot River valley, or watershed, can be simultaneously valued in multiple ways, however these values do not necessitate mutually exclusive actions like a recreational decision whether or not to allow motorized vehicles in an area might because provided there is enough water, one may irrigate for crops, fish, and float on the same river. Because these stakeholders hold some values in common, they were able to find collaboration amongst themselves over a scarce resource (water during drought).

1. Stakeholders' Interests and Positions

The authority vested in the FWP agency enables the possibility of a mutually exclusive action for those with water rights more junior to FWP's during times of shortage in the event of droughts, since the agency has the legal authority to call its water rights for instream flows and exclude more junior water right users from utilizing their ownership interests in using water. The FWP evinces cultural heritage in Montana's natural resources as a value entwined with the agency's mission (FWP Vision and Guide 2016-2026). Thus, the agency places value on cultural heritage in Montana and this value is expressed every time a Montanan is able to hunt, fish, float, or hike. Because the FWP values cultural heritage it is likely to endeavor to protect and improve upon natural resources to the extent they provide for the expression of this value for Montanans, like ensuring there's enough water in the right places within the Blackfoot river valley to allow for fish habitat and blue-ribbon trout streams. However, it is also true that the agency has an interest in maintaining a positive public image and good working rapport with the electorate base of Montana. Employees of FWP realize the electorate will vote in the governmental officials that ultimately control the agency's purse strings. Thus, the FWP's decision whether or not to call water rights places the agency's interest in survival in jeopardy. Many from the electorate base depend upon the availability of water to exercise their water use rights and would surely be upset if they were prohibited from doing so by a FWP call. Therefore, the FWP's position in this circumstance is a preference *not to call their rights* unless they absolutely must. In the event they do, the FWP would also be motivated to have an agreed upon mitigation plan in place so

responsibilities are shared and duties are known between interested parties. Such an agreed upon plan also avoids blaming FWP for imposing management restrictions on water rights holders.

The local chapter of Trout Unlimited (TU) has the position that the more trout habitats of sufficient quality and quantity to support the various species' needs for survival, the better. Thus, in the Blackfoot river valley and elsewhere in Montana, TU has undertaken efforts to lease water rights for instream uses through the Montana's Water Use Act in combination with other conservation and land restoration techniques such as conservation easements (Shaw 2007 and TU video 2012). This stakeholder values recreation by the potential of the landscape to offer fishing opportunities and has an interest in accessing healthy watercourses with suitable habitat for the species they fish. TU also has a preference for the FWP to not call its rights either because if the water levels are low enough for drought conditions to exist then the Blackfoot river might also be closed to public fishing access by FWP or other agencies with publish fishing access points like the BLM or DNRC. Thus, because TU has an interest in accessing the natural resources for the potential fishing opportunities, TU's position is in favor of maintaining water quantities above drought conditions. In the event of shortages, TU's position is also in favor of collaboration to form an agreed upon mitigation plan that will speed up response time and decrease the amount of time drought conditions persist. TU is also in favor of collaboration because some of its members may harbor social realm values that overlap recreational realm values in the forms of social relationships during fishing trips or TU members may inhabit the watershed and may value community cohesion and the preservation of the Blackfoot River valley's rural character.

Irrigators and ranchers as water users that can hold senior and/or junior water rights to FWP have an interest in the availability of water for the survival of their economic livelihoods. Their values are less easily generalized than TU's or FWP's, because the irrigators and ranchers of the Blackfoot watershed are more likely to hold cultural and social values that attach to concepts like community cohesion, or preserving a small-town feel, and represent more variability in their recreational choices. In addition, irrigators and ranchers within the watershed have the expectation that they will be able to access natural resources for their water use needs through their ownership interests in legal water rights and depend directly upon this for their economic opportunities. The junior water right holders to the FWP have a strong position in favor of their rights not getting called because they will not be able to use their water during drought. Depending upon the severity of the drought conditions, some senior water right holders will be effected as well because every time the water levels drop among the senior rights holders, a more junior right holder will have to forego his/her interest so that the senior user may use his or hers, thus the least senior of the senior to the FWP's water rights will have an interest in preventing or mitigating drought conditions so they may more quickly recover their uses. Theoretically, the most senior water right holders of all do not have an interest to collaborate in the Blackfoot Challenge Drought Committee at all since their water rights are secure, thus if they have collaborated then they must value the natural resource (water) for other values like recreation and/or social values like community cohesion.

<u>Primary Stakeholders</u>	<u>Interests</u>	<u>Positions</u>
Fish, Wildlife & Parks (FWP)	Availability of water instream for public recreation, fish, and wildlife	Collaborative
Blackfoot Chapter of Trout Unlimited	Availability of water instream and sufficient suitable habitat for valued fish species	Collaborative
Irrigators & Ranchers (<i>senior and junior rights holders within river valley</i>)	Availability of water for legal right to use	Collaborative and/or Adversarial (mutually exclusive)

2. Issues and Generating Factors

The primary issue for the Blackfoot River valley is the availability of water during drought conditions. The overlapping values and interests of stakeholders represented by primary generating factors in the watershed enabled stakeholders to take collaborative positions on their natural resource issue. The formation of the Blackfoot Challenge Drought Committee and the development of their shared sacrifice model are the outcomes of such collaborative positions.

Social bonds formed in the watershed can be considered a history-based primary generating factor toward collaboration because the existence of the Blackfoot Challenge as an organization was well underway with numerous partnerships by the year 2000 when the Drought Committee formed. The Blackfoot Challenge’s emphasis on the 80/20 rule can also be considered a culture-based generating factor because members value community cohesion by choosing to focus on similarities over differences and their desire to preserve their rural livelihoods. These cultural value realms also overlap FWP’s interest in maintaining the natural resources of the state for citizen cultural heritage and recreational potentials.

Facts-based primary generating factors were tipped in favor of collaboration because there was relatively little disagreement about the facts of the issue since the majority of stakeholders perceived the possibility of future droughts as a real threat and agreed that past drought conditions were an issue. Indeed, public awareness had grown over the drought conditions in Montana and the scarcity of water as a major issue in the Western USA. Since the 1980’s Montana had experienced historic drought conditions (Zeimer et al. 2016). Many were aware of the legislative changes taking place in Montana and importance of maintaining instream flows despite strict prior appropriation’s disfavor for lack of diversion and inclination to define beneficial use of water by diversions. The public’s demand for recreation and public access had steadily increased since the 1960’s and TU had already been instrumental in several lobbying efforts. Beginning in 1989 through partnerships with other conservation organizations in Montana, TU lobbied to pass legislation for the leasing of instream rights that came to fruition in the 1990’s (Zeimer et al 2016).

The Blackfoot Challenge was well suited to develop a drought committee and develop a drought plan from its precedent with other natural resource issues in the Blackfoot river valley since the early

1970's. Although the Blackfoot Challenge had primarily worked on land conservation, the organization had formed key partnerships and information exchanges between agencies, other organizations, and land owners in the area. This made history-based and fact-based generating factors well-suited for collaboration because the working relationships had already been formed for a common understanding over the facts and history in the area. Community members were aware of state-wide efforts and changes, with a particular focus on the Big Hole Watershed's similar approach. Community members agreed upon the facts and trusted the agencies to report accurate information about water levels.

In addition, as demonstrated in the stakeholder's analysis, culture was a primary generating factor in reaching a collaboration as many stakeholders valued the resource in overlapping realms. The importance stakeholders in the Blackfoot watershed placed in culture is responsible for concepts like preserving rural livelihoods and providing landscapes with fishing potential. Further the same cultural attitudes that favored the development of prior appropriation through the promotion of independence and ingenuity also favored the attitude that it's better for the community within the Blackfoot watershed to 'take back control' of the resource by collaborating to create a drought plan, rather than face the external threat of an agency calling its water rights.

There was some jurisdiction-based disagreement over FWP's authority to call its water rights, an interviewee indicated this dispute was quelled in the early 2000s as the Drought Plan for the watershed was in the works and just before the committee fully formed. This debate centered outside of the Blackfoot river valley within the Big Hole river valley and was in response to drought conditions from lower than average snow packs. An interviewee indicated that TU threatened suit with FWP over FWP enforcing Murphy Rights to protect the Montana's constitutionally provided rights for the public's use and enjoyment of the waters within the Blackfoot watershed. However, environmental conditions changed and the dispute was eventually settled. Through work on the Big Hole river basin and the Big Hole Watershed Committee (which formed 3 years before the Blackfoot Challenge's water committee), TU was able to convince the FWP not to call their rights if a drought plan was created for the Blackfoot River valley. Montana Supreme Court case affirmed the State's authority to delegate the regulations of instream flows in 2011 with *Montana Trout Unlimited v Beaverhead Water Co.* That case affirmed TU's interest in maintaining instream flows for the public and expanded standing requirements to include Montana's chapter of TU for the purposes of representing public interest in instream water flows. An interviewee indicated the suit's development outside of the Blackfoot watershed also settled concerns over the enforceability of FWP's Murphy Rights. Other case law likewise affirmed the State's new approaches to water laws, including in *Coalition for Stream Access Inc. v Curran* in 1984 when the Court declared the constitutional rights coupled with the public trust doctrine compelled the state to provide the public adequate instream flows for recreational opportunities. In *Re Adjudication of the Existing Rights to the Use of All the Water* in 2002 or *Bean III*, the Court reaffirmed this right of public use in addition to the holding that instream water uses for fish and wildlife constituted a beneficial use under the prior appropriation doctrine in Montana. Taken together, these cases quelled interests-based disagreements over whose rights carry seniority in relation to agencies and the public because the Court was clear that the public had a right to water for recreational purposes ensured by the state's 1972 constitution and that a beneficial use of water under the prior appropriation doctrine in Montana also included non-consumptive uses as a way to provide for wildlife and recreation.

Generating Factor for Issues	Definitions as Applied to the Blackfoot Watershed
Facts-based	Water level measurements and drought condition indicators, facts related to suitable habitat preferences for wildlife and fishes.
Interests-based	The distribution of water for consumptive and non-consumptive uses among users in the valley
Jurisdiction-based	disagreement over who has authority or jurisdiction over the ability to call water rights
History-based	Pre-existing conservation-related partnerships, previous drought experiences
Culture-based	Community cohesion/small-town feel, self-reliance/ingenuity

III. c: Findings – Blackfoot River Watershed

For the stakeholders in the Blackfoot river watershed, the best alternative to a negotiated agreement (BATNA) was the only alternative available, that FWP through its Murphy Rights on the Blackfoot river would call its rights during drought and prevent junior water rights holders from using their allotted water rights. A drought could also mean that the DNRC and other agencies would close the public access points along the river to surface water uses like fishing and boating. This BATNA could also be construed as a bottom line, because the legal authority granted to the agencies prevented other viable alternatives. It's possible irrigators in the watershed could ignore the agencies' directives and take up legal action, however by 2000 when the drought committee formed, it was already clear Murphy Rights were well established and that the FWP had authority to call its rights as well as the DNRC's ability to close public access points throughout Montana. For many, the choice was to reach an agreement amongst themselves for action or face an imposed plan of action.

The parties had ample opportunities for mutual gains by reaching a negotiated agreement and developing a drought plan within their watershed. A drought plan in place details who does what when and reduces response time for all involved. Therefore, nearly every stakeholder is interested in a more efficient response to drought conditions and would benefit from a plan in place. A plan clarifies the roles amongst agencies' response and avoids duplicative agency action; as well as indicating what local users can expect and how to respond. The Blackfoot Challenge's Drought Committee's drought plan follows a shared sacrifice model that is relatively unique, barring the Big Hole Watershed Committee. This model requires the drought plan has self-imposed measures on irrigators to prevent a call of water rights by FWP. Interviewees indicated the approach required extensive and repeated information exchanges. Typically, members of the drought committee called in for meetings as needed which ranged from once a month to every day depending upon conditions in the area. A current FWP employee who previously worked for the DNRC stationed in the area for a number of years, indicated the development of the drought committee required him to go above and beyond his employment positions and use his own time. Several interviewees indicated that landowners and irrigators in the watershed were familiar with the Blackfoot Challenge and the various agencies from previous work, and that many were willing to adjust their water uses in times of drought but lacked information on how and what to do. Significant outreach was undertaken by key individuals within agency positions, the Blackfoot Challenge organizers generally, and TU's collaborative efforts.

Trust and social relationships played significant roles in developing the drought committee. One interviewee described the perspective of irrigators in Montana as viewing their water rights as sacramental. This interviewee alluded to requisite social bonds required for the formation of the drought committee's shared sacrifice model by clarifying that water rights are the last thing he talks about when meeting a new rancher and only with good rapport would he bridge the topic and advocate for instream flows. Many of the interviewees had a sense of cultural heritage and often grew up in Montana spending countless childhood hours fishing. As interviewees commented over the shared sacrifice model they spoke of the drought committee as an "on-going conversation" amongst users and interests, that the collaboration required each to legitimize other users' use of water. Because of the cultural importance of fishing for Montana and increased public demand for water-based recreation, some noted that over the years irrigators have become more interested in protecting the resource for fish that has coincided with a more active public.

IV. CASE ANALYSIS 2: The Big Hole Watershed and the Development of the Big Hole Watershed Committee

The Big Hole river is situated within the Upper Missouri River Basin (Watercourse and DNRC, 2015). The Big Hole river's headwaters are near the town of Jackson at the Continental Divide and it serves as a headwater tributary to the Missouri River (Big Hole Watershed Committee, 2012). The majority of the Big Hole watershed spans six counties in southwest Montana and one county in Idaho (Surf your Watershed, 2018). The counties are Deer Lodge, Beaverhead, Granite (shared with a portion the Blackfoot watershed), Silver Bow, Madison, and Ravalli in Montana and Lemhi in Idaho (Surf your Watershed 2018). The Big Hole River depends entirely upon snowpack and precipitation for its water sources (BHWC Where We Work 2018). Its waters flow into the Missouri Headwaters (BHWC Where We Work 2018).

The area was settled early, Lewis and Clark's exploration took place through the area in 1805 (BHWC, Where We Work, 2018). In 1864, the first gold strike hit the Big Hole at French Gulch which is today's Mount Haggin Wildlife Management Area that the Montana Fish, Wildlife, and Parks manages (BHWC, Where We Work, 2018). West of the nearby town of Wisdom is the Big Hole National Battlefield, managed by the National Park Service, where a band of Nez Perce fought to retain autonomy of their historic range in the Big Hole Valley (BHWC, Where We Work, 2018). This battle was lost in 1877 during the Nez Perce's flight of 1877 (NPS, 2018) and the non-native American miners and fur-trappers were shortly followed by waves of American homesteaders in the 1880's and 1890's (BHWC, Where We Work, 2018). Today, the watershed consists of rural residents and a mix of public and private lands. Ranches often lease the public lands for cattle grazing, and much of the private lands are used for hay production and ranching purposes (Big Hole Watershed Committee, 2012). Indeed, by the Nature Conservancy's estimate about 90% of the Big Hole watershed's drainage is private ranching land (Williams 2016). The highlands in the area are predominantly publicly-owned by state and federal agencies and the valley floors are predominantly privately-owned (BHWC, Where We Work 2018). The highlands' ownership consists mostly of USFS or BLM lands, notably with the Anaconda-Pintler Wilderness (USFS) on the north end of the watershed, established in 1964 with the original federal Wilderness Act (Big Hole Watershed Committee, 2012). The majority of the area USFS manages in the

highlands are part of the Beaverhead-Deer Lodge National forest (BHWC, Where We Work, 2018), which is the largest national forest in Montana (USFS 2018).

The Big Hole watershed is home to several native species of fish including the Westslope cutthroat trout that also inhabits the Blackfoot river, but the Big Hole river is unique in that it is home to a rare species of fish, called the fluvial Arctic Grayling (BHWC Fish & Water, 2018). This species went into significant decline during the 1970's to 1980's (Big Hole Watershed Committee, 2012). In addition, the 1980s (notably 1988's drought) and early 1990's had several significant drought years for the watershed and tensions among water users were on the rise (BHWC How we Work 2018). Much of FWP's work today in the Mount Haggin Wildlife Management Area is aimed at restoring the degradation of habitat for fish from placer mining and smelting of previous years, and much of the work involves restoration efforts for the Arctic grayling under the terms set forth in the Candidate Conservation Agreements with Assurances (CCAA) (Dunlap 2016 and CCAA 2006). Trout Unlimited and the Nature Conservancy are also partners in restoration efforts for the grayling (Williams 2016).

There are no Murphy Rights for the watercourses within the Big Hole Watershed, but there are minimum instream flow water rights for Montana's Fish Wildlife and Parks (FWP) that have younger dates than the 1970's Murphy Rights for instream flows. The state agency was granted water reservations for minimum instream flow rights of 245 streams for fisheries, wildlife, and public recreation in the Upper Missouri River Basin as result of the 1992 state-wide Water Use Act and these water rights have been given a priority date of 1985 (Watercourse and DNRC, 2015). This means for certain areas within the Big Hole watershed, FWP may call its rights when stream flows conditions hit triggers set out in the public recreational, fisheries and wildlife water rights held by FWP for some streams within the Big Hole watershed, but not all. And, even when where the agency may be able to call its rights, the priority date is relatively recent. Thus, FWP has limited authority within the Big Hole watershed to call its' 1985 rights in the Big Hole compared to the Blackfoot watershed because FWP lacks the Murphy Rights associated with Blue-ribbon streams like the Blackfoot. However, pursuant to FWP's mandate to protect the fish and wildlife of the state, FWP may issue emergency temporary closures on fishing in any waters within the state (Drought Plan 1995) and may close off public fishing access points situated on lands the agency owns or public access easements to lands that it owns. FWP has long held management authority over Montana's fish, wildlife, and game populations with original legislation over the agency codified in 1921 (MCA 2017). Today it's duties are codified in Title 87, Chapter 1, Part 2 and it is charged with overseeing voluntary agreements with landowners and the public as well as empowered with all powers necessary to fulfill its duty of protecting and preserving the fish, wildlife, and game population in Montana (MCA 2017). Under Section 87-1-201(9)(i) this includes managing animal species in a manner that prevents the need for listing under the Endangered Species Act (MCA 2017). Indeed, FWP has set triggers for the maintenance of minimum instream flows for the purpose of protecting fisheries on three sections of the Big Hole river as part of the agency's statewide drought policy (FWP 2010). But through the voluntary agreement of the Big Hole Water Committee (BHWC)'s Drought Management Plan, FWP has agreed the BHWC's plan supersedes its own (BHWC 2016). BHWC's own drought management plan sets triggers for low flow levels in which FWP will issue fishery closures based on the limits BHWC developed in its own drought management plan (BHWC 2016).

It's important to realize that FWP's authority to issue fishing closures does not assure adequate instream flows as they merely prohibit fishing in the water, not the use of the water by rights holders. Neither can DNRC's legislative responsibilities for the maintenance and preservation of state's water uses, maintain minimum flows for the Big Hole river, unless DNRC makes a determination that the river is "chronically dewatered". Recall that by statute MCA 85-2-101, under the authority of Montana's Constitution, Article IX, DNRC is tasked with making available permits and records for all water use in the state and under the 1991 Water Use Act statute has the authority to identify list chronically dewatered, codified as 85-2-150. If a watercourse is identified as chronically or partially dewatered, the DNRC may impose regulations and measurement over all irrigation diversions within the watershed (BHWC How We Work 2018, MCA 2017) and must consider the condition of the watercourse in issuing new water use permits or modifications to existing ones as part of the review criteria for environmental assessments. In addition, under the Water Use Act, any water rights the US Department of Agriculture or the USFS has may be converted to protect, maintain, or enhance stream flows to benefit the fishery or other natural resources on national forest system lands (85-2-230 MCA 2017). Recall that there's a significant portion of USFS lands within the Big Hole watershed. Furthermore, as federal agencies, they are mandated to protect endangered species and work in cooperation with other agencies to effect these goals, indeed many federal and state agencies collaborated to produce monitoring reports with the USFWS on the fluvial arctic grayling (Magee et al, 2005).

To work within the system of prior appropriation and protect the rights of individual water users whilst grappling with the issues of instream flows for fish, wildlife and recreation the legislative Water Policy Committee (WPC) developed under Title 85, Chapter 2, Section 105 (MCA 2017) declared in its 1995 report that "committee [was] convinced that the proper forum for addressing instream flow issues is at the local level. The Committee's experience in the Big Hole Basin solidified the belief that the water users themselves water better solutions to stream flow mgmt. issues and can contribute to solving instream flow problems rather than simply rely on the legislature, or federal or state agencies. "(WPC 1995). This committee is separate from the Drought and Water Supply Advisory Committee under the DNRC that tasked with developing drought plans for the state under MCA 2-15-3308 (MCA 2017) rather, the Water Policy Committee advises the state legislature on water policies concerning the Water Use Act and operates to coordinate agency efforts. In 2009, the WPC became a permanent legislative body, and as the early 1995 report indicates the WPC believes coordination with local users is the best way to secure instream flows for fish and wildlife. This report reflects the state's encouragement of local voluntary agreements for instream flows within watersheds (WPC 1995).

The Big Hole Watershed Committee formed in the early 1990's after the Water Policy Committee's visits in 1993 and 1994 with residents and ranchers (WPC 1995, BHWC How We Work, 2018). The public meetings held under the WPC's meetings helped form the basis for the Big Hole Watershed Committee (BHWC) (BHWC How we Work 2018). After the meetings a group of six ranchers, requested assistance from the Governor to set up a committee to deal with the problems associated with the Big Hole River (BHWC How We Work 2018). Their calls were answered and in 1995 the Big Hole Watershed Committee was formed with assistance from the Montana Consensus Council (BHWC How We Work 2018). Three of the six original ranchers requesting assistance later became some of the first governing board members of the BHWC. BHWC has since formed other collaborative partnerships with other water-related organizations in the Upper Missouri Headwaters as part of the

Missouri Headwaters Partnership, and because the Big Hole River watershed is within the continental divide region of the Rocky Mountains that includes Idaho, BHWC also participates in the High Divide Collaborative (BHWC Where We Work 2018).

BHWC members concerned because a DNRC's 1993 survey report indicated that the Big Hole River may be listed as chronically dewatered, a designation that DNRC is tasked with making under the 1991 Water Use Act and invokes agency regulation and measurement over all irrigation diversions within the watershed (BHWC How We Work 2018, MCA 2017). Under this Montana Water Use statute, codified as 85-2-150, DNRC is encouraged to resolve conflicts among water rights holders, thus early on the BHWC convinced the DNRC not to list the Big Hole River as chronically dewatered so long as the BHWC could identify solutions to the water issues among water rights holders within the watershed (BHWC How We Work 2018, MCA 2017). One major issue for the water users is the presence of the arctic grayling and the species which requires restoration efforts and minimum instream flows for its present and future survival.

The arctic grayling population in the Big Hole watershed was faltering, the 1988 drought and ensuing high temperatures were devastating to the fish, as temperatures about 70 degrees can be lethal, (Wuerthner 2016), and the fish is already vulnerable to high sediment loads from land use changes, common among salmonids, as well as the pressures of competition from introduced species of fish (Rens and Byorth 2010). Instream flows are critical to maintaining temperature levels suitable for survival (McEvoy et al, 2018). A group was formed with the assistance of Montana's FWP among others like the Montana Chapter of the American Fisheries Society, TU, and the BHWC, called the Arctic Grayling Recovery Program (AGRP) in 1990 to respond to the threats facing the arctic grayling in the Big Hole watershed (Williams 2016, Rens and Byorth 2010). This group monitors the population and develops partnerships for habitat restoration efforts (Rens and Byorth 2010). According to a previous FWP director, Jeff Hagener, AGRP would not exist but for the collaboration of private landowners and ranchers in the area.

In 1991, George Wuerthner, a fishing guide, writer, and member of the Western Watershed Project, first sought the species listing to garnish protections afforded under the Endangered Species Act for the fish population in Big Hole (Wuerthner 2016). On the federal level, the US Fish and Wildlife Service (USFWS) had been studying and contemplating listing the species since 1982's Review of Vertebrate Wildlife Listing, CFR 50 Part 17, but in 1994 USFWS indicated that the Upper Big Hole River was a critical area for some of the last remaining populations of a species of fish, the arctic grayling, in the lower 48 and the fish population in the Big Hole was a candidate species for listing under the Endangered Species Act (BHWC How We Work 2018, USFWS 1982). The USFWS determined in 1994 however that the species warranted listing but was precluded by other high priority actions (*Center for Biological Diversity v Jewell* 2016). BHWC was well aware of the threats facing the grayling and the threats a listing determination would have on the ranchers in the area. Harold Peterson, a rancher in the Upper Big Hole River and BHWC board member says succinctly, "Nothing would have happened on the ground without the BHWC...and I am damn proud of the work we've done... if we hadn't done anything in '95, the grayling would be listed and we'd all be suffering" (BHWC How We Started 2018).

BHWC drafted its first Drought Management Plan in 1997, as one of the first of such plans in the state (BHWC How We Work 2018). By 2004, conditions for the Arctic Grayling worsened in the watershed and the USFWS was considering a proposal for an emergency listing of the species under the Endangered Species Act (BHWC How We Work 2018). The Center for Biological Diversity and the Western Watershed Project had brought suit in federal district in response to the USFWS 1994 decision and the case was coming to a close, the plaintiffs challenging the fish's listing determination as arbitrary and capricious under the Administrative Procedure Act and Endangered Species Act (ESA) challenging the USFWS' determination at the time that the fluvial arctic grayling's listing under the ESA was warranted but precluded under ESA Section 1533(b)(3)(B)(iii), 16 USC. The suit finalized in 2004 with the court finding that the USFWS' determination was not supported by substantial evidence (*Center for Biological Diversity v US Fish and Wildlife Service*, 350 F.Supp. 2d 23 (D.D.C. 2004)). USFWS eventually settled and pledged to have a final determination by 2007 (Rens and Byorth 2010).

This 2004 case strengthened the resolve of the BHWC which was not interested in having the species listed under the ESA, neither was the MFWP interested in such as mandated by 87-1-201-9(i) and (ii) to take steps necessary to prevent the need to list species in Montana (MCA 2017 and BHWC How We Work 2018). Thus, the BHWC helped draft the recovery program (Magee, 2005) submitted the document to FWP and BHWC members began enrolling in Candidate Conservation Agreements with Assurances with the USFWS in 2005, leading to the 2006 CCAA. Under the CCAA, FWP is authorized by USFWS under the ESA's Enhancement of Survival Permit pursuant to Section 10(a)(1)(A), to enroll community members under the CCAA terms (Rens and Byorth 2010). CCAA are proactive plans to mitigate the impacts of water shortages on species threatened with an ESA listing (McEvoy et al, 2018). CCAA seek to improve grayling populations by improving in stream water flows, protecting and enhancing habitat with landowners and eliminate the entrainment of fish in irrigation ditches as well as improving fish passages (Rens and Byorth 2010). For BHWC this entails a shared sacrifice, shared success model where pursuant to the BHWC's drought plan and landowner's CCAA, irrigators and ranchers voluntarily agree to modify their practices and decrease their water uses (CCAA 2006 and BHWC 2016) for the benefit of the arctic grayling. The CCAA establishes partnerships with landowners and FWP, USFWS and the DNRC to create site specific plans and in exchange land owners are assured should the species be listed they will not be subject to more regulations under the ESA (Rens and Byorth 2010).

In 2007, several days late from USFWS' promised final determination, the agency revised their findings and determined the species did not warrant listing (Rens and Byorth 2010). This decision was challenged and the agency settled again to initiate a new status review (Rens and Byorth 2010). By 2010, USFWS considered listing the fluvial arctic grayling population in the Big Hole watershed as a distinct population segment under the belief that only 5 populations between Montana and Wyoming were genetically distinct from Canada's and Alaska's populations (Williams 2016). In 2012 FWP developed statewide fisheries management plan developed in cooperative effort with MFWP, the public, government and non-government organizations (MFWP 2012). Recall that the FWP has primary authority to regulate Montana's fisheries under its authority from the state legislature in the agency's enabling act, codified under Title 87 Fish and Wildlife, Chapter 1 Organization and Operation, Part 2 Department of Fish, Wildlife, and Parks, Powers and Duties (MCA, 2017). The plan addresses arctic grayling recovery plans within the state and the Big Hole watershed.

In 2014 when the USFWS finally determined not to list the species, there were actually 22 genetically distinct populations (Williams 2016). However, their decision was challenged again in 2014 by the original 2004 case's plaintiffs (Center for Biological Diversity and Western Watershed Project) joined by Earthjustice among others, arguing that the grayling deserved a listing status (Wuerthner 2016). The court found that the USFWS' interpretation of current range and current threats under the ESA was reasonable and accepted USFWS' rationale that the grayling didn't warrant listing after the efforts of CCAAs with private landowners and FWP's reintroduction and habitat restoration efforts and partnerships in key areas (*Center for Biological Diversity v Jewell*, United States District Court of the District of Montana (2016)). Members of the BHWC are very proud that they have been able to prevent the species from a listing determination.

IV. a: Stakeholder Analysis – Big Hole Watershed

1. Primary Stakeholders

Primary stakeholders are those who have a direct stake in the outcomes of natural resource issues and disagreements. Parties often have direct contact with one another as they pursue their goals. The primary stakeholders in the Big Hole watershed are the members of BHWC who primarily consist of consumptive water users in the area like ranchers, irrigators/farmers, or land-owners, and non-consumptive water users like outfitters and anglers. Consumptive and non-consumptive water users do not necessarily have to be members of the BHWC, but all members of the BHWC are primary stakeholders. For example, some non-consumptive water users like anglers may vacillate between primary and secondary stakeholders as they may not always be directly involved, but generally speaking an outfitter for the area has a direct stake in the outcome of drought conditions as fishing closures may directly impact their economic livelihoods within the watershed. Primary stakeholders also include the local chapter of TU who depend upon the watercourse for their recreational values and are directly involved in habitat restoration efforts.

State agencies are also primary stakeholders by virtue of their land holdings in the watershed and/or their trust responsibilities to the public that include the opportunities for recreation as well as the health of Montana's fish and game species including the preservation of the grayling. The relevant state agencies for this assessment are the FWP and DNRC (which can be considered primary because it has the power to list the river as chronically dewatered and the authority over water use permitting decisions), however there are others like the Department of Transportation that may be involved in the watershed which are not included in this assessment.

Another group of primary stakeholders for the purposes of this assessment are those federal agencies that also have land holdings and/or an interest in preserving the grayling population, they include the USFS, USFWS, and BLM.

2. Secondary Stakeholders

Secondary stakeholders are those parties who have an indirect stake in the outcome but are not directly involved. However throughout various stages of a natural resource issue, secondary parties may become primary, and vice-versa. In the Big Hole watershed, secondary stakeholders may include non-consumptive water users who do not directly have a water use right. These stakeholders are likely to also be primary stakeholders when considering drought conditions and public fishing access closures and when they depend upon non-consumptive uses for their livelihood like in the case of outfitters.

The Western Watershed Project, the Center for Biological Diversity, and the Nature Conservancy all have larger ecological goals than just the habitat within the Big Hole watershed but are certainly interested in the outcomes of any natural resource issues surrounding the Big Hole River watershed and they are indirectly involved in outcomes through their habitat restoration efforts in and beyond the watershed. At times, some of these groups become directly involved, particularly through litigation or through partnerships and assistance to BHWC members.

3. Peripheral Stakeholders

Peripheral stakeholders are defined as those parties who simply have an interest in the successful resolution of the conflict. For the Big Hole River watershed, these include any visitors (some of which are anglers others may just be hikers, etc.) in the area who value recreational opportunities afforded by suitable wildlife habitat and stream flows. Other peripheral stakeholders include broader groups interested in the health of the Upper Missouri River basin generally or the entire watershed's ecosystem health as it relates to other regions such as the Missouri Headwaters Partnership or the High Divide Collaborative. These stakeholders may also include federal partnerships that are aimed at larger ecosystem restoration plans.

4. Stakeholder's Realm of Values Table Explanation

Trainor discusses multiple realms of values that are relevant for natural resource decision making (2006). Individuals may rationally and consistently have overlapping realms of values guiding their behavior in natural resource conflicts because landscapes and natural resources can simultaneously be valued in many different ways by a single individual or group of diverse stakeholders (Trainor 2006). Therefore, care must be taken to decipher the values present for stakeholders within natural resource conflicts to determine how, if at all, collaboration may proceed. I chose five value realms that I think represent the Big Hole River watershed, they are: cultural, social, recreational, scientific/ecosystem, and economic/technological.

Incommensurability is the recognition that the same metric may not capture different value realms even if a value realm may have economic components (Trainor 2006). Acknowledging incommensurability legitimizes other realms of value, or other forms of value expression and decision criteria and the deliberative process (one where interested and affected parties collectively arrive at a mutually agreed upon decision outcome) has the best potential to account for multiple values without forgoing their incommensurable natures (Trainor 2006). This is consistent with the BHWC's response to drought because although economic values are expressed (like the cost of new irrigation technology to

protect the fishery), the economic measures do not completely capture other realms well (like the worth of the fishing memory between family members). The BHCW exemplifies the deliberative process well in that many interested parties were able to deliberate and agree upon a shared sacrifice model by focusing on the preservation of values held in common by the parties.

Trainor (2006) defines the cultural realm as integral to the practice, preservation and/or reproduction of a culture that can also have religious and historical values. I chose to separate the cultural and social realms although they often overlap because although cultural heritage is reproduced through social bonds, it has historical values and expectations interlaid that make it a separate realm. A single individual may not express or reproduce their sense of cultural heritage in a social setting but still attribute value to natural resources through a cultural identity and perspective that links the natural resources of Montana as available for citizen use. Trainor (2006) defines social values as those that promote and strengthen social relationships and/or institutions. She says they're reproduced through social and cultural processes in social capital, thus implying the cultural and social realms are intimately linked. However, the social value realm necessarily involves direct social exchanges between parties while the cultural value realm can be reproduced in more indirect ways like literature, or art. The social realm was included in the BHCW because community cohesion and social capital were important entities that were valued, evinced by the BHCW's genesis made up of water users in the area first as ranchers in the watershed who later invited other interests to join their conversations (BHCW How We Work 2018). The cultural values of self-reliance were also important to the BHCW at an early stage as members sought to maintain local control in the early 1990's and convince DNRC not to list the river as chronically dewatered if the BHCW could develop its own plans (BHCW How We Work 2018). Self-reliance and a sense of local control also motivated both the BHCW and FWP to seek recovery methods for the arctic grayling that would strengthen the population of fish and reduce the likelihood it would need the protections and ensuing regulations under the ESA.

Trainor (2006) defines recreational values based on the judgement for the potential(s) of a quality recreational experience. She states further that recreational values are often reproduced via cultural and social processes although the content of the value can be expressed in different ways. For example, fishing may be reinforced culturally but not necessarily socially as one can fish in solitude. Due to the number of public lands in the Big Hole watershed, much of the area has recreational experience potentials in terrestrial forms like hiking, hunting and camping. Given the number of fish species cherished by anglers, the Big Hole river and tributaries in the watershed have high recreational potential for fishing.

Scientific and ecosystem value realms are combined for the BHCW because the discipline of ecology, particularly as it related to the habitat requirements for the Arctic grayling significantly informed the interested parties, and science itself was not valued *per se*, rather its contribution to the general ecosystem and watershed health as a whole is valued. Facts and the scientific method is trusted and valued by interested parties. Sharing the scientific information and increasing awareness among interested users and parties is highly valued in the Big Hole watershed. Indeed, the governing board of the BHCW (which is comprised of ranchers, local government representatives, anglers, residents, and conservation organizations) frequently seeks the advice of state and federal agency partners as technical advisory roles (BHCW Governing Board 2018). Scientific education and

communication have been interwoven since the beginning of the BHWC and informed the development of the committee’s first drought plan in 1997 (BHWC How We Work 2018)

Economic and technological value realms for the Big Hole watershed are combined because technology itself is often limited by economic means and both value realms are assessed well by willingness to pay measures in the river valley. An efficient but expensive technology may not lead to more users because it is cost prohibitive. Water use by users in the Big Hole watershed can be assessed by willingness to pay, like whether or not to improve technologies for irrigation which is both representative of economic and technological realms. Other stakeholders in the Big Hole watershed also value entities that can be expressed in willingness to pay measures affect the technology chosen by outfitters, anglers, and recreationists.

<u>Realm of Value</u>	<u>Concept of Value</u>	<u>Expression of Value</u>	<u>Mode of Value Reproduction</u>	<u>Entities that are Valued</u>
Cultural	Preservation of community or rural lifestyle, heritage/cultural identity	Shared norms	Cultural processes	Cultural heritage of available natural resources, independence and self-reliance/individual autonomy
Recreation	Quality of resource for recreational potential	Fishing, hunting, hiking, and other outdoor activities	Social processes, friendships, experiences.	Westslope cut throat trout and arctic grayling, water in stream, wildlife species
Scientific/ Ecosystem	Integrity of ecosystem function, scientific knowledge in action	Monitoring gauges, communication of information	Scientific processes, ecosystem ecology	Information exchanges, native species including grayling, restoration of ecosystem functions and habitat
Social	Promote social relationships and partnerships	Community events, participation in education, communication	Social processes and learning	Social capital, community cohesion
Economic/ Technology	Efficiency of uses	Money/income derived, willingness to pay to adopt new	Market systems, increasing efficiency of	Crops, livestock, markets, technologies as a means to an end (exp-better

		technologies or modify existing	use of technologies	irrigation system, more effective fish hook, etc.)
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IV. b: Issues Analysis – Big Hole Watershed

Recall that values are beliefs that determine a party’s position on an issue or guide their behavior regarding a natural resource conflict. Interests are the expected shares of a scarce resource. Issues arise when disagreements between parties occur, which are generally about colliding values and interests (although sometimes it’s just personality conflicts). These natural resource issues and disagreements can be grouped by primary generating factors that often reflect various values and interests.

In the Big Hole Watershed, the natural resource issue is providing suitable habitat for the arctic grayling and ensuring enough water in streams during drought. These are difficult issues under the legal framework of prior appropriation in Montana as applied to the watershed since there are no Murphy Rights and about 90% of the river’s drainage lands are privately owned ranching lands. Culture serves as a generating factor for collaborative solutions in the watershed because culture encompasses a self-reliance strategy over top-down management strategies, evinced by FWP’s statutory mandate to take measures that avoid the need to list species and by BHWC members acceptance of a shared-sacrifice model in CCAA’s over ESA regulations. But the issue pertaining to suitable habitat for the arctic grayling in the watershed also represents an intractable conflict.

1. Stakeholders Interests & Positions

Carpenter and Kennedy discuss there are other methods for disputes that do not have to result in adversarial positions (1988). However, people in US society are often primed to assume a defensive or adversarial position by following social norms/customs and familiar procedures like litigation. Sometimes adversarial positions make sense when there is no other alternative approach available for a stakeholder to protect their interests or parties distrust one another based on past experiences (Carpenter and Kennedy 1988). Adversarial positions must follow intractable conflicts because intractable conflicts are characterized as zero-sum in nature, since the parties on either side of an issue are unwilling to reach compromises or concessions for their interests (Bar-Tal 2007). In natural resources and environmental contexts intractable conflicts arise when parties will not respond to non-adversarial approaches (Bar-Tal 2007). This is generally because each party values (beliefs that guide behavior) or interests (expected shares of a resource) are opposed and require mutually exclusive outcomes. (Bar-Tal 2007).

Stakeholders in the Big Hole River watershed represent both adversarial and collaborative positions. For purposes of analysis I shall highlight adversarial positions within the watershed, although the watershed can certainly be used as an example of collaborative resource management by the development of BHWC drought plans and BHWC partnerships which enable arctic grayling habitat restoration efforts between agencies and landowners.

The Western Watershed Project and its partners in past litigation have an interest the availability of suitable habitat for the population of arctic grayling in Montana and share this interest in common with the FWP and BHWC members. However, the Western Watershed Project and its partners in past litigation take an adversarial position compared to FWP and BHWC members because these stakeholders have divergent beliefs guiding their behavior. Inferring from the litigation initiated by the Western Watershed Project and its member’s efforts to list the population of fish since 1991 (Wuerthner 2016), the stakeholder pursues a mutually exclusive outcome by insisting the listing of Montana’s population of arctic grayling as threatened or endangered under the Endangered Species Act. These facts point to an intractable conflict as viewed from the perspective of the Western Watershed Project.

The USFWS and FWP can be grouped together when assessing these three categories of stakeholders in the watershed. Both agencies are entrusted to care for these terrestrial freshwater fish within their respective jurisdictions that overlap (federal and state) and the interests they have statutorily align. The FWP has a state-mandated statute to take measures necessary to avoid the listing of species. The Endangered Species Act itself encourages federal cooperation with states to develop and maintain “conservation” programs that better safeguard the Nation’s heritage in fish for the benefit of all citizens (16 U.S.C. 35, Section 1531(a)(5)), keep in mind this term is defined by the act (16 U.S.C. 35, 1532(3)) as the use of all methods necessary to bring a listed species to the point at which ESA protections are no longer necessary. Furthermore, if a species makes it on the list as threatened or endangered then recovery plans must be made (16 U.S.C. 35, Section 1533(f)(1)). Thus, the USFWS and FWP may be grouped together in this instance.

BHWC members are united in a collaborative position in this instance as well even with their interest in utilizing water for their needs (both consumptive and non-consumptive uses of water) because they have proactively sought methods to avoid listing the arctic grayling as evinced by entering partnerships through Arctic Grayling Recovery Program (AGRP) respond to the threats facing the arctic grayling in the watershed since 1990 (Williams 2016, Rens and Byorth 2010).

<u>Primary Stakeholders</u>	<u>Interests</u>	<u>Positions</u>
Montana Fish, Wildlife, & Parks (FWP) and USFWS	Availability of water instream & sufficient suitable habitat for grayling	collaborative
BHWC members	Availability of water for legal right to use & sufficient suitable habitat for grayling to prevent listing under the ESA	collaborative
Western Watershed Project	ESA federal protections guaranteeing sufficient suitable habitat for the grayling and the availability of water instream	Adversarial and mutually exclusive

2. Issues and Generating Factors

Recall that issues over natural resources can be grouped by broad generating factors that represent differences and similarities among the stakeholders' values and interests. However, since the analysis on assessing stakeholders within the watershed is limited to an instance of an intractable conflict with stakeholders poised in adversarial positions, the generating factors are likewise constrained to the points of disagreement over the arctic grayling listing issue.

For Western Watershed Project members facts and values based generating factors are closely entwined over this issue because there's a disagreement over the reality of the issue (whether or not the arctic grayling should be listed to ensure survival needs) and what facts may amount to the policy decision to list the species under the ESA. There may be person-based generating factors at play in the watershed but that is beyond the scope of this analysis.

The BHWC members, FWP and the USFWS agree amongst themselves but disagree with the Western Watershed Project members regarding facts and values based generating factors because the BHWC, FWP, and USFWS all perceive a solution to the issue that does not necessitate a federal listing designation and currently agree upon the facts used for such a determination.

History-based generating factors are also at play that are closely linked to the facts-based factor because the perception by Western Watershed Project that the only solution available is a federal listing determination began over 20 years ago and USFWS, BHWC members and FWP have had contact with the project in adversarial positions through litigation. Culture-based disagreements may also be history-based in so far as they contribute to Western Watershed Project's perception that a federal listing is the only solution. Culture-based and history-based factors contribute to the perception that BHWC members, the FWP and USFWS can enter partnerships to avoid a listing determination.

Generating Factor	Definitions as Applied to the Big Hole Watershed
Facts-based	disagreement over "reality," judgment and perceptions over what the "facts" of the issue are and which solutions are available.
Values-based	disagreement over what should be the determinants of a policy decision
History-based	Perceived conflict (or collaborative) relationship by parties involved
Culture-based	disagreements related to cultural orientations, worldviews, and identities.

IV. c: Findings – Big Hole Watershed

When the natural resource issue within the Big Hole River watershed is couched in terms of whether or not the arctic grayling population located there will receive adequate protection for its continued survival, an intractable conflict arises among certain stakeholders because the issue is perceived as requiring a mutually exclusive outcome. The arctic grayling is either listed under the ESA or not. However, if the natural resource issue is perceived in a manner that does not require a mutually

exclusive outcome, i.e.-the grayling can still receive adequate protection for its continued survival without a listing, then collaborative positions emerge among stakeholders within the watershed. BHWC members and CCAA enrolled landowners are willing to collaborate with agencies and among themselves under a shared sacrifice, shared success model to voluntarily reduce water consumption and participate in restoration efforts through partnerships that will bolster the species survival to such a success that it will not need a listing designation and avoid top-down regulations from state or federal agencies.

V. DISSCUSION AND CONCLUSIONS

Not all natural resource issues are intractable. Some can be resolved with negotiation, compromise, and concessions when parties are able to agree that the natural resource or environmental issue does not necessitate a mutually exclusive outcome (Bar-Tal 2007). Collaborative positions are more likely to unfold if parties are able to focus on solving a problem that they have defined and share in shaping the resolution through communication that works out differences and similarities among the parties' interests and values as they follow agreed upon procedures to generate a resolution that hopefully represents the best possible solution for each (Carpenter and Kennedy, 1988). The formation of such groups like the Blackfoot Challenge's Drought Committee and the Big Hole Watershed Committee exemplify these key ingredients to collaboration in many instances. Both groups focus on a solution to the natural resource issue, have a willingness to sit at the table with different stakeholders to define the problem, inform one another of the issues while in direct contact (phone calls and meetings) for information exchanges regarding water levels, habitat quality, and population statuses while care is taken among members of the committees to reach agreements reflective of consensus.

However, as the Big Hole River watershed case analysis describes, stakeholders will take up adversarial positions and view natural resource issues as intractable when these stakeholders view the outcome of a natural resource issue as mutually exclusive and are therefore unwilling to negotiate in any fashion. The adversarial position described in the analysis of the Western Watershed Project in that instance can be characterized as an attitudes and perception-based barrier described by Wondolleck and Yafee (2003) because the disagreement stems from divergent perceptions about solutions to the threats facing the arctic grayling.

Both the Blackfoot Challenge's Drought Committee and the Big Hole River's Watershed Committee offer good examples of collaboration in natural resource management. Their collaborative efforts were carefully crafted cultural values to strike common ground among water users in a joined effort to maintain instream flows for prized fish and allow irrigators access to their water needs within the framework of prior appropriation. The collaboration successfully placed the power of water users back to the community by developing their own drought plans to prevent agency imposed closures in the case of the Blackfoot and to prevent agency imposed regulations under the ESA in the case of the Big Hole. Both communities were able to employ a shared sacrifice model. Overlapping values of community members and common interests of stakeholders were essential ingredients for the success their shared sacrifice model. Interestingly, the cultural attitudes that favored the establishment of the prior appropriation system are also responsible for the desire to "take back" local control in the

Blackfoot Challenge's formation of its drought committee and the steps taken by the Big Hole Watershed Committee to avoid federally imposed regulations within the Big Hole watershed. This is consistent with Anderson et al.'s (2016) finding that community water resource management can arise when local users effectively create a commons through the recognition they all collectively depend upon the resource and can use this recognition as force of mobilization for more palatable and local regulations through shared sacrifice models. The Big Hole does this through its efforts to keep the arctic grayling off the endangered species list and the Blackfoot does this by a shared sacrifice in the form of a drought response plan. Like the case offered by Berkes (1998) analysis, the analyses of the Blackfoot River and Big Hole River watersheds can be viewed as successful redesigns or modifications to the existing resource institutions established by the prior appropriation doctrine, albeit both watersheds are embedded within larger state-wide modifications to the prior appropriation doctrine of water rights in Montana generally. Ultimately, the sustainability of any natural resource management framework depends upon its capacity to adapt to changing needs of the persons and resources involved.

REFERENCES

- Abrams, Robert H. "Charting the Course of Riparianism: An Instrumentalist Theory of Change", 35 *Wayne L. Rev.* 1381 (1989).
- Anderson, Matthew B., Lucas Ward, Jamie McEvoy, Susan J. Gilbertz, Damon M. Hall. (2016) Developing the water commons? The (post)political condition and the politics of "shared giving" in Montana. Elsevier Ltd. *Geoforum*: 74, 147-157.
- Berkes F. (1998) Indigenous knowledge and resource management systems in the Canadian subarctic. In F. Berkes and C Folke, *Linking Social and Ecological Systems*. Cambridge University Press, pp.98-128.
- Bar-Tal, Daniel. (2007) Sociopsychological Foundations of Intractable Conflicts. *American Behavioral Scientist* Vol 50, No.11: 1430-1453. Sage Publications.
- BHWC (2016). Big Hole Watershed Committee. Big Hole River Drought Management Plan. Version 2016. Available at http://bhwc.org/wp-content/uploads/BHWC-DMP-2017_FINAL-with-Cover.pdf
- Big Hole Watershed Committee, (2012). "Big Hole River, Montana Watershed Restoration Plan."
- BHWC (2018) "Where We Work." Available at <http://www.bhwc.org/about/where-we-work/>
- BHWC (2018) "How We Work." Available at <http://www.bhwc.org/about/how-we-work/>
- BHWC (2018). "Fish & Water." Available at <http://www.bhwc.org/fish-water/>
- BHWC (2018). "Governing Board." Available at <http://www.bhwc.org/about/board-staff/>
- Blackfoot Challenge. (2016). A Presentation to the Montana Historical Society, Helena Montana. Accessed on June, 2017 at <https://youtu.be/KvoPG5rXipw> . (Video at 5:40-8:46, 9:15-13:10, and 16:51-18:50).
- Blackfoot Challenge Annual Report. (2013) "Celebrating 20 Years of Partnerships."
- Blackfoot Drought Response Plan. (2016) Accessed on June, 2017, at <http://www.blackfootchallenge.org/?cat=53>.
- CCAA (2006). Candidate Conservation Agreement with Assurances for Fluvial Arctic Grayling in the Upper Big Hole River. March 30, 2006.
- Bradshaw, Stan. "A Buyers Guide to Montana Water Rights" Trout Unlimited, Montana Water Project Publication (unknown year).

Carpenter, Susan L. and W.J.D. Kennedy (1988). Ch.2 “Dealing With Conflict Productively” p.18-29 in *Managing Public Disputes: A practical guide to handling conflict and reaching agreements*. 1st Edition, San Francisco: Jossey-Bass, 1988.

Coppolillo, Peter and Monique Borgerhoff Mulder. 2004. Chapter 6 “Rational Fools and the Commons” 129-155, in *Conservation: Linking Ecology, Economics, and Culture*. Princeton University Press.

Coughlin, Chrissy. (1999). Chapter 6: Blackfoot Challenge. In master’s project: A systematic Assessment of Collaborative Resource Management Partnerships. Ecosystem Management Initiative, School of Natural Resources & Environment, University of Michigan at <http://seas.umich.edu/ecomgt//pubs/crmp.htm> .

Dickson, Tom. (2013). “Bridging the Divide: Fifty years ago, Montanans came together and decided that streams were worth saving.” Celebrating the 50th Anniversary of Montana’s Stream Protection Act. *Montana Outdoors*. May-June 2013. Pages 35-39

Dolce, Chris. (2017). “Exceptional Drought Returns to Montana and North Dakota for first time in more than a Decade.” Climate and Weather at <https://weather.com/news/climate/news/exceptional-drought-northern-plains>

Dunlap, Susan. (2016). First Aid for the Big Hole: Major restoration work targets tributaries. *The Montana Standard*. September 18, 2016. Accessed on March 20, 2018 at http://mtstandard.com/natural-resources/first-aid-for-the-big-hole-major-restoration-work-targets/article_ac625b86-3269-5a73-a8dc-8b4d99267af0.html

Environmental Protection Agency. (2017). “Surf your Watershed Blackfoot watershed.” Accessed on June 1, 2017 at https://cfpub.epa.gov/surf/huc.cfm?huc_code=17010203.

Environmental Protection Agency. (2018). “Surf your Watershed Big Hole watershed.” Accessed on March 20, 2018 https://cfpub.epa.gov/surf/huc.cfm?huc_code=10020004

FWP, montana.gov. “Yellowstone River Closed, Ongoing Fish Kill.” Waterbody Restrictions, Closures & Reopenings, August 2016. Accessed on June, 2017 at http://fwp.mt.gov/news/newsReleases/closures/waterbodies/nr_0105.html.

FWP, montana.gov “Vision and Guide 2016-2026” Accessed on January 2018 at <http://fwp.mt.gov/doingBusiness/insideFwp/visionAndGuide/>

FWP, Governors Drought Advisory Committee. Accessed on January 2018, at <http://fwp.mt.gov/fishAndWildlife/habitat/fish/waterManagement/drought.html>.

FWP (2010) “Statewide Drought Fishing Closure Policy.” Available at <http://fwp.mt.gov/news/drought/closurepolicy.html> .

Kepner, W. (2016). EPA and a Brief History of Environmental Law in the United States. Accessed on March 2018, at https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=319430

Klein, Christine A. "The Constitutional Mythology of Western Water Law", 14 Va. Env'tl. L. J. 343 (1995).

Fanning, William; Carolyn Sime, Michelle Byran Mudd; and Martha Williams (2014). "Water Rights in Montana: How our legal system works today, how Montana compares to other states, and ideas for Montana's Future." Land Use & Natural Resources Clinic, University of Montana School of Law report prepared for Montana Supreme Court, Spring 2014.

Loble, Bruce C., Chief Water Judge, 1999, 2003, 2010 (2010). Original by Ted J. Doney, Esq. (1990). "Basic Montana Water Law." Montana Water Courts.gov Accessed on January 2017, at https://courts.mt.gov/Portals/113/water/guides/basic_law.pdf.

MCA (2017) Montana Code Annotated. Available at <http://leg.mt.gov> .

McEvoy, Jamie, Deborah J. Bathke, Nina Burkardt, Amanda E. Cravens, Tonya Haighm Kimberly R. Hall, Michael J. Hayes, Theresa Jedd, Marketa Podebradska, and Elliot Wickham. (February 20, 2018). Ecological Drought: Accounting for the Non-Human Impacts of Water Shortage in the Upper Missouri Headwaters Basin, Montana, USA. MDPI open access *Resources* 2018, 7 14; doi:10.3390/resources7010014

Magee, James; Emily Rens, and Peter Lamothe (2005) Arctic Grayling Recovery Program, Fluvial Arctic Grayling Monitoring Report: Big Hole River and Reintroduction Efforts.

McKinney, Matthew and Will Harmon. 2007. "Governing Nature, Governing Ourselves: Engaging Citizens in Natural Resource Decisions." *The International Journal of Public Participation*. Vol 1, Issue 2.

The Montana Drought Response Plan. (1995). The National Drought Mitigation Center, University of Nebraska-Lincoln. Accessed on January, 2018 at

<http://drought.unl.edu/Planning/DroughtPlans/StatePlanning.aspx?st=mt>.

Montana Trout Unlimited v. Beaverhead Water Company, 316 Mont. 77 (2011).

Montana Fish, Wildlife & Parks. (2012) Montana Statewide Fisheries Management Plan: 2013-2018.

Montana Watercourse and Montana DNRC. "How are Instream Flows Protected? Water Fact Sheets #8" (2015).

NPS. (2018) The Flight of 1877. Accessed on March, 2018 from <https://www.nps.gov/nepe/learn/historyculture/1877.htm>

Radosevich, George E. (1978) "Western Water Laws and Irrigation Return Flow." United States Environmental Protection Agency, Research and Development.

Rens, Emily and Patrick Byorth. (January, 2010). Status of the Arctic Grayling in Montana. From Montana Fish, Wildlife and Parks for Montana Chapter of the American Fisheries Society. Accessed on March 20, 2018 at <http://www.fisheriessociety.org/AFSmontana/ArcticGrayling.html>.

Shaw, Jane. "Water Leasing in Montana through Trout Unlimited's Eyes." (2007). Property and Environment Research Center, PERC Report Vol 25, No. 2 Summer 2007. At <https://www.perc.org/articles/water-leasing-montana-through-trout-unlimiteds-eyes>

Trainor, Sarah. 2006. "Realms of Value: Conflicting Natural Resource Values and Incommensurability." *Environmental Values* 15:3-29. The White Horse Press, UK.

Trout Unlimited, Montana Chapter. (2012). Big Blackfoot Chapter Trout Unlimited. video at <https://www.youtube.com/watch?v=Fj0slc7NeNo&feature=youtu.be>

USFS (2018). About the Beaverhead-Deerlodge National Forest. Accessed on March 15, 2018 at <https://www.fs.usda.gov/bdnf>.

USFWS (1982) Review of Vertebrate Wildlife for Listing, 50 CFR Part 17. Federal Register, Vol. 47, No. 251 Proposed Rules.

Water Policy Interim Commission (WPIC). 2015. "A Short History of the Water Court." Study of the Future of the Water Court, Legislative Env. Policy Office.

Water Policy Committee (1995) Report of the Water Policy Committee to the 54th Legislature of the State of Montana. Available at <http://leg.mt.gov/content/Publications/Environmental/1995-water-policy-54th.pdf>

Water Rights in Montana Handbook. (2014) Montana Department of Natural Resources and Conservation, Legislative Environmental Quality Council, and Montana University System Water Center.

Wilkinson, Charles F. Western Water Law in Transition. University of Colorado Law Review (1985).

Williams, Ted. June 27, 2016. Recovery: Saving Grayling with a Carrot and Stick. The Nature Conservancy's *Cool Green Science: Smarter by Nature Blog*. Accessed on March 18, 2018 at <https://blog.nature.org/science/2016/06/27/recovery-saving-grayling-carrot-stick-cooperation-ranching-endangered-fish/>

Wondolleck, Julia M. and Steven L. Yafee. 2003. Ch. 3 The Challenge of Collaboration in *Making Collaboration Work: Lessons from Innovation in Natural Resource Management* 2000 Washington, D.C.: Island Press.

Ziemer, Laura, Stan Bradshaw and Meg Casey. (2016). Changing Changes; A Road Map for Montana's Water Management. *Water Law Review*, Volume 14: 47-93.