

THESIS

VALUING WATER:
A NORMATIVE ANALYSIS OF PRIOR APPROPRIATION

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ABSTRACT

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This thesis aims to provide a normative evaluation of the Western U.S. water law of prior appropriation through a contextual analysis of water value pluralism. The first chapter begins with a preliminary account of the major justificatory arguments made in defense of prior appropriation, followed by two critiques that undermine some proposed advantages of the water policy. The purpose of this analysis is to elucidate the normative claims that underlie many of the arguments within this debate but which fail to be made explicit. It becomes clear that these normative claims assume a utilitarian criterion for resource distribution, according to which water is primarily viewed as an economic good with a monetary value. The second chapter challenges the legitimacy of this assumption by introducing non-monetary water values, with attention to the particular social and cultural contexts in which they emerge. Through a review of four economic proxies, these non-monetary water values are shown to be incommensurable with monetary valuations. Finally, the third chapter offers a theoretical framework for the incorporation of non-monetary water values into resource distribution decisions. From this normative analysis, it is concluded that a necessary condition for achieving just resource distribution decisions is for prior appropriation to incorporate value pluralism by recognizing the legitimacy of non-monetary water values.

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DEDICATION

I would like to dedicate this work to my father for always encouraging me to enjoy the realm of ideas.

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CHAPTER ONE: PRIOR APPROPRIATION

Introduction

In spite of the fact that water is a fundamental condition for life and serves as an indispensable resource for any type of social or economic development (Catley-Carlson 2011, xxi), as well as a necessary component in maintaining ecological health (Postel and Richter 2003, 2-3), very little philosophical analysis has been done to evaluate the numerous normative issues that are present in the use and valuing of water. The majority of water assessments are driven by either policy or economic analysis, concerned primarily with descriptive hydrological bounds and criteria of economic efficiency (Walsh 2011). This descriptive discourse conceals and, at times, implicitly assumes normative conceptions about water management (Merchant 2010). The following analysis will be primarily focused on evaluating the justification of the doctrine of prior appropriation, a water policy that is particular to the American West. Elucidating the normative claims that underpin arguments both in favor of and against prior appropriation will give rise to more general questions concerning water values.

The first half of the following chapter will present three arguments that support prior appropriation. The first justification of prior appropriation is a historical analysis provided by David Schorr, in which he evaluates the principles of distributive justice that shaped the inception of the water law. An objection will be raised against Schorr's analysis, demonstrating how internal conflicts within the theoretical structure of prior appropriation threaten to undermine the realization of the principles of distributive justice that Schorr posits. The second argument that aims to justify prior appropriation is based on principles of economic efficiency. By demonstrating the normative basis of economic efficiency criteria, the nature of such

arguments is clarified so as to facilitate a critique of the assumptions upon which efficiency criteria rest. These objections, however, do not entail the outright rejection of using economic claims to justify prior appropriation; rather, the objections aim to illustrate the limitations of such analyses. The third argument made in favor of prior appropriation involves two defenses of the security provided by resource rights. The first is based on Jeremy Bentham's utilitarianism, in which security in resource rights is a necessary condition for the realization of other benefits that result from private property. To illustrate the role such security concerns have had in creating resource policy, the relation between the security of private property and claims about natural rights will be presented, particularly with respect to American law. The second security argument comes from Randy Barnett in his epistemological justification of priority in time, referred to as first-possession rules, which intend to resolve the first-order problem of knowledge. An objection, which is raised against both accounts, highlights the relationship between security and flexibility: in order to justify prior appropriation based on its ability to secure water rights, one must also justify the loss of flexibility or long-term adaptability that is a repercussion of prioritizing security.

The second half of the following analysis outlines arguments that deny the justifiability of prior appropriation. The first objection to prior appropriation is based on the economic failings of the water law, which are claimed to undermine prior appropriation's ability to produce an economically efficient allocation of water. The second objection notes prior appropriation's inability to effectively accommodate technological advancements, particularly in the case of irrigation water.

1.1 Defense of Prior Appropriation

The doctrine of prior appropriation, which is the primary means for allocating water rights in seventeen western U.S. states, is composed of two basic elements: priority in time and beneficial use. In short, rights for water use are allocated according to priority in time to those who can put a specific quantity of water to a beneficial use. In times when supply is unable to meet demand, those with senior water rights will have their water allotment fulfilled prior to or at the expense of those with junior rights. Developed during the 19th century progression towards settling and developing the West, prior appropriation originated from the “rules [that] were developed in the mining camps to allocate the available water peaceably” (Getches 1997, 78). It was then expanded to include the allocation of water for irrigation purposes and was eventually adopted as law by various state legislatures.

1.1.1 Distributive Justice and the Egalitarian Principle

Through demonstrating that the historical principles upon which the doctrine of prior appropriation was founded are based on concerns of distributive justice, David Schorr reasons that the principle of priority in time is a justified component of the water law. Due to the fact that Schorr’s claims are based on the historical context in which prior appropriation originated and developed, a brief account of the historical circumstances in which the doctrine emerged will enable a thorough evaluation of Schorr’s justification of prior appropriation.

Prior appropriation was the result of prospectors and miners travelling west in the 19th century in order to take advantage of the fortunes to be made from precious metals, particularly gold. The property customs that were already accepted and in use in gold digging camps were translated to accommodate conflicts over water appropriations. The concept of “first in time, first

in right,” which is a central feature of prior appropriation, was applied to water conflicts in the camps and represented the general “expression of the frontier ethics of individualism, initiative, and exploitation” (Schorr 2005, 7). In the case of water rights, appealing to the priority in time of appropriation claims was contrary to the doctrine of riparian rights, which dominated eastern U.S. water policy and originated from English common-property law. Eastern riparian law tied water rights to the adjacent land, giving owners of riparian land equitable water usage rights. The case of *Coffin v. Left Hand Ditch Co*, which set the precedent for prior appropriation, was an explicit “rejection of riparianism,” paving the way for a new water law in the West (Schorr 2005, 8). In particular, the case recognized the need for miners to transport water away from its source for use in mining camps, a clear deviation from the Eastern water law where water diversions were both unnecessary and prohibited without permission since water use was tied to landownership. Riparian law was deemed unsuitable for the water demands of the arid west and particularly the needs of the miners who needed to divert water away from its original source (Dellapenna, *Water Law in the Eastern United States: No Longer a Hypothetical Issue* 2005).

The account of prior appropriation that Schorr aims to controvert is the notion that this “rejection of riparianism” was ultimately a rejection of equitable natural resource use in favor of maximizing economic gains in efficiency and profit. In particular, Schorr argues that the pivotal case of *Coffin v. Left Hand Ditch Co*, which set the precedent for prior appropriation, has been misunderstood in terms of the values that it aimed to espouse. Most current evaluations of this case view it as representing “the preference for private over common property, the privatization of the public domain, [and] the facilitation of markets in natural resources” (Schorr 2005, 5). In contrast, Schorr claims that an alternative account of the evolution of property rights, with respect to the development of prior appropriation, can be understood as being guided by

principles of justice and not solely those of economic efficiency or private property (Schorr 2005). On this account, Schorr makes the case for viewing prior appropriation as an instance in which, “considerations of distributive justice...consistent with norms of fairness in distribution” were the primary motivators behind the creation and evolution of this natural resource policy (Schorr 2005, 7). Specifically, Schorr argues that the real motive for rejecting riparian rights was to prevent “riparian owners [from having a] real monopoly power in the arid West” (Schorr 2005, 11). In this way, prior appropriation secured greater equity by enabling anyone with the initiative and use for water to claim a right to it.

According to Schorr, the underlying objective of prior appropriation was to prevent the possibility of a water monopoly. This claim rests on a distinction between (a) creating criteria that identify legitimate resource users and (b) creating rules that place limitations on resource use. The former focus is concerned with identifying legitimate resource users, while the latter point, which Schorr claims was more central to the original rules of prior appropriation than the former, identifies thresholds that no individual, despite the legitimacy of their claim, are allowed to pass. For instance, in the former case, one individual could fulfill the criteria needed to be recognized as a legitimate resource user and thus make as many claims to that resource as they wish. As long as the requisite criteria are fulfilled it does not matter how equitably resources are distributed. If, however, there were a limit imposed on the number of legitimate claims one could make, then a more equitable distribution of water use could be ensured. Placing limitations on the number of claims any single individual can make prevents the monopolization of that resource.

Schorr substantiates his claim about such anti-monopolistic objectives by referencing the original Gregory code, a set of resource regulations that originated from the Gregory Diggings

mining camp in 1859 and later formed the basis of the prior appropriation water law. According to Schorr, the original Gregory code “made no mention at all of how water was to be allocated...virtually every Colorado miners’ code did have, however, limitations on the size and number of mining claims that might be staked by any one miner” (Schorr 2005, 13). For mining claims, these regulations set a limit on the amount of wealth any one miner could accumulate; since water was a scarce but necessary resource in the mining camps, the same principles were applied to water appropriations, specifying the maximum amount of water any single claim could constitute and limiting each miner to only one claim (Schorr 2005). This focus on limitations rather than criteria is why Schorr claims the doctrine of prior appropriation, in its original conception, was primarily concerned with equity in resource use rather than efficiency: “The primary rule was that each party was entitled to a proportional share of the water” (Schorr 2005, 19). While equality in the quantity and number of claims for water appropriations could be achieved in the early days of mining and settling the west, as populations rose, and supply was unable to meet demand, prior appropriation rules required modification.

The practical concern of meeting growing water demand introduced the second principle that Schorr attributes to the formation of prior appropriation: the sufficiency principle. This secondary principle, according to Schorr, conditioned the extent of the equality principle: equality in claim size can reduce the quantity of each claim “only to a threshold level of basic sufficiency” (Schorr 2005, 19). Once demand forced the equality principle beyond this threshold, Schorr claims that the sufficiency principle would require the implementation of a new decisive measure for allocating water: priority in time. The reasoning behind the priority principle was that if the size of each claim had to be continually reduced in order to accommodate a greater number of claims being submitted, then eventually the size of each water appropriation would

become too small to adequately serve any function. To prevent such a situation, the principle of priority, as a function of the sufficiency principle, was introduced in water appropriation laws so as to maintain a sufficient claim size as mining camps grew. Schorr argues that the priority in time aspect was merely a supplemental or secondary policy to the egalitarian principle, which “retreated only when necessary to ensure sufficiency of claim size” (Schorr 2005, 20). The addition of this secondary principle, however, shows that the equality principle was not absolute, but limited by the practical need of ensuring sufficient claim size. While for Schorr this limitation is not a problem since it still “encouraged equality...by maximizing the number of people with rights in the resource” (Schorr 2005, 20), objections as to whether equality really was “encouraged” will be raised. Still, the initial reasoning that motivates Schorr’s argument seems plausible: since the number of individual water claims was able to be maximized before the sufficiency principle took effect, the primary function of preventing a water monopolization, which Schorr claims underlines the founding principles of prior appropriation, is thought to be fulfilled.

The normative principle that Schorr claims is the foundation of prior appropriation is that water use ought to be primarily distributed equally unless supply is unable to meet demand, in which case priority in time becomes the distributive principle. But if water supply is always scarce, since demand for water (almost) always outpaces water supply, then the equality principle becomes ineffective because the priority principle is always operative. This reasoning challenges Schorr’s claim that prior appropriation encourages equality, especially in light of the priority principle. If the circumstances of scarcity that condition the use of the priority principle are the norm rather than the exception, then the egalitarian principle would be continually superseded.

There is a further challenge to Schorr's justification of prior appropriation. According to Schorr, the central objective of prior appropriation was to prevent a monopoly in natural resource use. This anti-monopolistic motivation is undermined, however, when the priority principle becomes the rule rather than the exception. If the priority principle is realized a majority of the time, then those with senior water rights are able to gain a monopoly of water use over those with more junior claims by continually precluding them from fulfilling their water right. In this sense, the exception to the egalitarian principle, the priority principle, is theoretically opposed to the anti-monopolistic function of prior appropriation: an anti-monopolistic principle favors maximizing the number of people with access to a resource, while the priority principle in essence reduces the number of people with access by favoring those with historical precedence.

1.1.2 Economic Efficiency and Water as an Economic Good

Most evaluations of water resource laws are given in terms of the economics of allocation and use. For these accounts, "water is not merely a natural resource but also an economic resource" (Merrett 1997, 1). The broad normative claim that underlies such an account is that maximizing economic gains is a legitimate value when assessing water allocation. In relation to the doctrine of prior appropriation, the requirement of beneficial use, a criterion of equal significance to the priority principle, is a central focus. This analysis of the economic justification of prior appropriation will explain the beneficial use principle and its relation to the economics of water allocation.

The beneficial use requirement is one of the defining features of the doctrine of prior appropriation. When initially acquiring a water right, the primary condition determining whether one has a legitimate claim to appropriate water is the proposed societal benefit to result from the

application of appropriated water. The beneficial use criterion is described in most state water laws as the basis, measure and limit of an appropriative water right. The purpose of such a provision is to prevent water waste by defining the amount of water to which one has a right, not in terms of the maximum amount permitted or the capacity of the water diversion system, but in terms of the amount that can be put to a beneficial use (Getches 1997) (Dellapenna, Appropriative Rights Model Water Code 2007). Avoiding waste of such an essential resource was key to developing the arid West and so the beneficial use of water served to primarily aid such development objectives.

The general definition of a beneficial use is one that “serves a socially valuable purpose, including almost any use that is economically productive” (Dellapenna, Appropriative Rights Model Water Code 2007, 35). While some non-economic social benefits of water have been slowly accepted into modern applications of the law, the beneficial use principle has primarily given preference to economic benefits of water use. The economic sectors that are today relevant to demonstrating a beneficial use under prior appropriation are domestic, municipal, agricultural and industrial (Getches 1997). It was not until recently that non-economic benefits, such as recreation and ecological values, began to be incorporated as acceptable instances of beneficial use; however, “there is still a obvious bias in favor of domestic and economic uses...” (Goldfarb 1988, 37). Accounting for the rationale behind this bias, which implicitly equates social benefit with economic gain, will begin to highlight the economic justification of prior appropriation.

The predominant means for assessing the merits of a water policy is through a cost-benefit analysis. Such an analysis advances the economic goal of the most efficient allocation of resources, commonly accepted as Pareto optimality. A Pareto efficient allocation of water is achieved when no individual can be made better off, in terms of their share of the resource,

without making another worse off (Tisdell 2003). A cost-benefit analysis would then compare, among the pareto efficient allocation alternatives,¹ the advantages and disadvantages of various policy options. In using Pareto efficiency and cost-benefit analysis as a means for assessing resource allocation decisions, one can question the nature of such assessments: are they purely descriptive endeavors, designating the efficient allocations available but not arguing for the value of efficiency itself, or are they normative endeavors, which argue that efficiency is valuable and therefore something we ought to strive to achieve?

One might argue that economic efficiency and Pareto optimality are descriptive criteria that make no value judgments. Mitchell Polinsky explains this value neutral account of such criteria as, “efficiency corresponds to the “size of the pie”, while equity has to do with how it is sliced” (Polinsky, p.7). In other words, the “size of the pie” amounts to a descriptive activity in which outcomes are neither good nor bad but simply more or less efficient, resulting in a smaller or bigger “pie.” Klaus Mathis claims that this value-free account defines efficiency as “an instrument for achieving other social goals,” rather than being a goal itself (Mathis 2009, 191). Despite the initial plausibility of this explanation, characterizing cost-benefit analysis and Pareto efficiency as purely descriptive and technical instruments should be rejected since it ignores many of the value judgments that are central to such efficiency criteria. For instance, the Pareto principle doesn’t merely describe how policy decisions will impact economic development; rather, it evaluates decisions in terms of their impact on social welfare, using the notion of utility as a means of comparison (Mathis 2009).

¹ It should be noted that rarely in practice is there a policy option in which there is no individual who is not being made worse off. One could thus consider Pareto optimality to be a theoretical ideal but, in actual fact, it is more likely that a cost-benefit analysis will be the primary criterion used.

This concept of utility originally stems from Jeremy Bentham's utilitarianism, which defines the right or just option as the one that promotes the greatest amount of utility for the greatest number of people. Within economic theory, utility is a core concept that, according to John Broome, is defined as "*that which represents a person's preferences*" (Broome 1999, 21). In terms of the Pareto principle, if a decision or policy can increase an individual's utility by satisfying their personal preferences, without decreasing another individual's utility, then that decision is Pareto superior (Mathis 2009). It should be noted that this definition of Pareto efficiency and the first definition given above equivocate between the technical terms 'utility/personal preference' and the value terms 'better,' 'worse,' or 'good,' presupposing that what has utility is also good. While Broome denies that such an assumption is justified, since what one prefers is not necessarily always good, he claims that many economists still take for granted the idea that "a person always prefers what is better for her." (Broome 1999, 22). With such value assumptions underlying efficiency criteria, such as the Pareto principle or cost-benefit analysis, it is hard to deny the normative underpinnings upon which economic efficiency rests. According to this normative view of efficiency criteria, an efficient allocation of a resource is presumed to be a good or desirable allocation that positively impacts utility. Efficiency is therefore reasoned to be something valuable in itself, a social goal that policy decisions ought to strive to achieve.

Having clarified the nature of efficiency criteria by demonstrating that they do in fact make value judgments, and in this way are normative endeavors, the following question then arises: do the normative considerations of economic efficiency entail or include other values such as equity? Reference to the doctrine of prior appropriation will be productive in beginning to determine the nature of the relation between economic efficiency and equity. Lyla Mehta

explains how the beneficial use principle, which enforces the seemingly non-controversial belief that water use should not be wasteful, can conflict with an equitable distribution; if an individual's use of water is conditioned on that use being efficient, and “‘efficiency’ in this respect is understood in terms of maximizing the economic returns on each unit of water,” then water use will be biased in favor of “those who have the ability and means to use water to produce the greatest returns, thus trading off equity against efficiency” (Mehta 2006, 21). In this case, water use is determined by the criteria of economic efficiency alone, disregarding the impact such a distribution might have on equity.

Beyond the particular considerations of prior appropriation, the criterion of Pareto efficiency could result in inequitable resource allocations. Specifically, there are some assumptions made about the background social conditions in which a Pareto efficient allocation takes place. Such conditions could undermine the equity of such a distribution if they are not considered. Pareto optimality “rests on the assumption that the global distribution of welfare, within which the Paretian judgment is being made is at least acceptable, if not optimal” (Tisdell 2003, 404). A Pareto allocation is a valuable tool for assessing the distribution of a resource only when other aspects of social welfare, such as income, education, political participation and other goods of society are also distributed equitably. But when large disparities exist within a given society so that there is an unacceptably large gap between the disadvantaged and the advantaged, then Pareto efficiency is incapable of producing an optimal distribution because the Pareto principle assumes that the initial social conditions are just. As noted above, when efficiency is prioritized without regard for fairness or equity, it is possible to arrive at a ‘just’ distribution “even when some people are rolling in luxury and others are near starvation, as long as the starvers cannot be made better off without cutting into the pleasures of the rich” (Sen 1970, 22).

This scenario shows that equity is not a necessary requirement for a Pareto distribution since the criterion of not making others worse off does not always produce an equitable allocation of resources when large inequalities already exist.

In recognizing the normative limitations of an economically efficient account of prior appropriation, it should be noted that even though efficiency does not entail equity, the two are not necessarily opposed to one another. John Tisdell explains that when “there are a number of alternative distributions of the resource that will satisfy efficiency criteria, then some further criterion, such as social justice, is necessary to isolate a unique “optimal” distribution” (Tisdell 2003, 404). In this sense, efficiency supplies the various policy alternatives, which a given theory of distributive justice, such as a utilitarian principle, can then adjudicate among. In contrast, “the interrelated nature of efficiency and equity can result in conflict over their attainment that requires a trade off of one of these objectives against the other” (Tisdell 2003, 403). This aspect of the relationship between efficiency and equity reveals a significant disadvantage to justifying prior appropriation based solely on claims of economic efficiency. Specifically, overreliance on economic efficiency conceals the fact that increasing efficiency is at times accomplished at the expense of equity.

For instance, arguments in favor of creating a water market justify abandoning the current distribution system of government-administered water rights on the basis that it produces an inefficient allocation of water (Anderson and Snyder 1997). In particular to the doctrine of prior appropriation, it is argued that the restrictions placed on the transferability of water rights, through the beneficial use requirement, the use-it-or-lose-it rule, as well as other state regulations, are detrimental to an efficient water allocation (Anderson and Snyder 1997, 79). By removing these impediments to the transferability of water rights, a market could exist, which

“would facilitate the movement of water from low-value activities to higher-value ones, thus resulting in a more efficient deployment of the resource” (Glennon 2005, 1884). What these claims fail to recognize, however, is that even if the market alternative would create a more efficient water allocation than prior appropriation in its current form, that fact alone does not entail that a water market ought to replace prior appropriation; gains in efficiency do not guarantee equity. Without taking into consideration values such as equity, it becomes possible to overlook the impact that increased economic efficiency would have on a just distribution.

While arguments defending prior appropriation are similarly based on economic efficiency, they also attempt to include other normative concerns such as social benefits or welfare. For instance, for a water use to be considered legitimate, one must show that such use will result in some social benefit, normally quantified in terms of economic efficiency. This emphasis on efficiency is demonstrated through the beneficial use criterion, which encourages efficient use by limiting wasteful appropriations. However, despite the fact that the doctrine of prior appropriation claims to advance social benefits, in practice, it “primarily protects the economic interests of private property rights to water...generally without the burden of proof for protecting the public interest” (Whittlesey and Huffaker 1995, 1202). When public interest is defined in terms of economic efficiency, which some claim is achieved by prioritizing individual private interests (Demsetz 1967), it becomes possible for socially beneficial allocations to be relegated to a status of secondary importance. For instance, if the most efficient use of water in the West is the generation of hydropower, and this use came at the expense of ecological health, which not only resulted in habitat and wildlife loss but also negatively impacted agriculture and human health, then the most economically efficient use of water would actually be detrimental to social welfare.

It is important to note that in arguing against economic efficiency as a basis for justifying prior appropriation, this analysis is not advocating that economic efficiency ought to be abandoned as a criterion for assessing a water policy; rather, the crucial premise being advanced is that economic efficiency alone is not sufficient for normatively justifying a policy like prior appropriation, without consideration of other values such as equity. Nonetheless, employing efficiency criteria in policy decisions is an important evaluative measure that should not be wholly replaced by non-economic values like equity. One reason for the irreplaceable status of economic considerations is that “choices...have economic consequences even if they are made on non-economic grounds” (Meyers and Tarlock 1971, 45). More importantly, economic consequences are normatively significant: changes in one’s economic status can impact one’s ability to fulfill their basic human needs, which would, consequently, negatively influence their welfare. Accordingly, the normative considerations of both economic efficiency and equity are important factors to include when making resource allocation decisions, especially when a resource as complex and multifaceted as water is of concern.

1.1.3 Security and Water Rights

One of the main advantages attributed to prior appropriation, and in particular to the priority principle, is the security that is provided by the ownership of a water right, especially when that right is recognized as having seniority. Having reliable access to water is beneficial in many ways, but in particular, it enables one to invest in infrastructure, technology and the development of one’s venture without the risk of unpredictable access to water supplies. Yet security for the sake of investment and development alone does not answer the normative question of why a water law ought to provide a sense of security in one’s right to water. In answering this question, two accounts, each of which provides a unique theoretical basis for the

need to ensure security in resource rights, will be outlined and evaluated in relation to the doctrine of prior appropriation. In the first account, John Tisdell interprets Jeremy Bentham's utilitarian theory in terms of its relation to prior appropriation, and specifically the role that priority has in promoting a just resource distribution system by creating a certainty of tenure. Randy Barnett gives the second account in his epistemological justification of first-possession rules. An overview of both accounts will help answer whether there is a normative justification for the priority principle and the security it yields.

The concept of security is central to Bentham's utilitarian system of distributive justice. It is the condition upon which the realization of the benefits of property rights – subsistence, abundance and equality – rest. These benefits each require the security of a property right tenure and, according to Tisdell, this security is achieved in the doctrine of prior appropriation (Tisdell 2003). The benefit of subsistence, whereby “producers can expect to receive the fruits of their labor,” is realized by security in tenure because without a guarantee that tomorrow one would still have a right to a given resource, there is no incentive to invest in the development of that resource today. Security in property rights promotes abundance in the productive use of a resource by disincentivizing wasteful use that would ultimately undermine one's own self-interest. It is thus the concern of the law not to explicitly promote subsistence and abundance but to indirectly provide for them through establishing the primacy of security in resource rights.

In relation to the doctrine of prior appropriation, Tisdell argues that the “first-in-time, first-in-right” precept would likely garner utilitarian support by the fact that it provides security to those with senior water rights. “When a right is awarded to the first occupant, he or she will have security and will not suffer the pain of attack from successive claims upon the water” (Tisdell 2003, 408). This policy would seem to correspond well with Bentham's philosophy in

which he argues that the pain from successive claims is greater than “the disappointment of future claims” (Tisdell 2003, 408). And if the central objective of Bentham’s utilitarianism is to minimize pains and maximize pleasures, a law that favors actions that cause fewer pains is to be considered justified. Tisdell does, however, note that security is maintained using the priority principle “at the expense of equality and so does not promote equality of fortunes” (Tisdell 2003, 408). In times of drought or when demand for water is greater than water supplies, those with seniority water rights are able to accumulate wealth at the expense of those with more junior water rights. For Bentham, however, this greater concern for security over equality would be justified since he “argued that when equality and security come into conflict, equality must give way” (Tisdell 2003, 408).

The utilitarian principles that ground Bentham’s support of the security yielded by private property rights can be found throughout American law. Reflecting on the principles of natural law, “proponents of strong private property regimes argue that the drive to acquire is a universal rule grounded in human nature” (Tarlock, *Prior Appropriation: Rule, Principle, or Rhetoric* 2000, 885). Oliver Wendell Holmes Jr., an associate justice on the U.S. Supreme Court, defended the notion of priority-in-time, priority-in-right by citing this natural element of acquisition:

[i]t is in the nature of man’s mind. A thing which you have enjoyed and used as your own for a long time, whether property or opinion, takes root in your being and cannot be torn away without your resenting the act and trying to defend yourself, however you came by it. (Holmes, qtd Tarlock, *Prior Appropriation: Rule, Principle, or Rhetoric*, 2000, 886)

The right of first appropriators is based on their expectation that they will continue to have legitimate control over their resource. This expectation is based on our desire for security, which is rooted in our human nature. Accordingly, the priority principle is being justified on the basis that it fulfills these expectations of first appropriators. This is a just policy, according to

utilitarian principles, since Bentham claims that we should not adopt schemes that would systematically frustrate our deep-rooted desires, such as our desire for security. Such frustrated desires would result in increased miseries and pains, and therefore not maximizing a greater amount of good for the greatest number of people.

In addition to utilitarian and natural law justifications of the security of resource rights, Randy Barnett provides an epistemological justification for the priority principle, referred to as first-possession rules. Barnett first presents what he calls the first-order problem of knowledge, which specifically “concerns the knowledge of how to use physical resources in the world” (Barnett 1998, 29). First-possession rules are claimed by Barnett to be a solution to the first-order problem of knowledge. Before analyzing exactly how first-possession rules resolve the first-order problem of knowledge, it is necessary to elucidate the factors that generate this epistemological problem.

According to Barnett, there are two general characteristics about our choices in resource use that result in the first-order problem of knowledge: our choices are holistic and dynamic. In regards to the former, individual choices about how to use physical resources are not self-contained; every choice to use a resource one way rather than another has an impact on the choices of others; “indeed the pervasive norm is that everyone’s actions potentially affect others” (Barnett 1998, 37). In reflecting upon this network of choices that defines resource use, Barnett remarks: “given the number of possible choices persons might make, the number of persons making choices, and the physical proximity of each to the others, it is remarkable that the world is not in complete chaos” (Barnett 1998, 29). These interactions of resource use decisions create a compounding effect that undermine each individual’s ability to have complete knowledge to inform and optimize the choices they make. This interconnectedness of resource use decisions is

explicitly evident in water resources as decisions upstream have an impact on the available options downstream. Thus, the ability to make the most optimal decision in resource use requires knowledge of how other individuals use resources.

The knowledge problem becomes even more complicated and seemingly insurmountable by the fact that knowledge is not static but dynamic, “more like a turbulent stream than a tranquil pool” (Barnett 1998, 36). The dynamic and ever-changing nature of our knowledge is the result of both changes in the world and changes in our conceptual understanding of the world. Even if the physical state of affairs in the world remained static, “our knowledge of the world changes as we develop better conceptual tools with which to grasp it” (Barnett 1998, 37). As a result, the problem of knowledge is not simply a problem that can be eventually resolved over time as we increase our ‘knowledge pool’. Rather, the holistic and dynamic nature of our knowledge that informs our choices in resource use creates a problem that lacks an absolute solution; instead of continually trying to reduce the gaps in our knowledge, we create laws that act to minimize the symptoms of the problem of knowledge by establishing rules that systematize and order our resource use.

One way in which laws produce a social ordering that counteracts the variability and uncertainty created by the problem of knowledge is by making explicit the fact that one’s resource decisions have an impact on the resource decisions of others. The rule of first-possession justifies chronological priority on the basis that preserving the social order compensates for the first-order problem of knowledge. To demonstrate this, Barnett describes a scenario in which Anne, a first-possessor of a resource, in this case, a section of a seabed, accepts the opportunity costs of her time and energy for the trade-off of coming to control this resource (Barnett 1998, 69). What is unique about Ann’s actions, as a first-possessor, is that they

“do not disturb the order of actions in her society; her actions do not interfere with the actions of others” (Barnett 1998, 69). However, if a second individual, Ben, wishes to also control the use of the seabed, then his actions will be wholly different from Ann’s since “Ben’s claim...does threaten to dispossess Ann’s previously lodged claim, entailing a loss of her prior investment of time and resources and the defeat of her previously formulated plans that depend upon her continued possession of the resource” (Barnett 1998, 70). It is in this way that Ben’s actions to control the resource are markedly different from Ann’s actions; in order for Ben to legitimately claim control of the resource, he must recognize the opportunity costs that Ann incurred when she initially took control of the resource. Ann, however, as first-possessor, did not need to take into account any impacts her actions might have on another individual, only the impact they would have on her time and energy.

Through this scenario, Barnett argues that the first-order problem of knowledge is addressed by the rule of first-possession due to the information that is revealed through the possibility of exchanges between first-possessor and subsequent claimants. For instance, if Ann decides to transfer her possession of the seabed to Ben in exchange for some resource that Ben is offering, then this exchange is evidence that each person accepts that they “could put the resource that each gains rights over to better use than what each gives up in exchange” (Barnett 1998, 71). For Ann, the exchange represents her recognition that she could put to better use the good that Ben is willing to give her than the seabed floor, which she currently possesses. While the same is also true for Ben, his side of the exchange has an additional feature; the good that he agrees to trade for the seabed floor also represents an implicit recognition of the opportunity costs that Ann accepted as the initial possessor. Such information is not acquired prior to the exchange but is *revealed* through the activity of the exchange (Barnett 1998). It is this revealing

of information that is central to the knowledge problem: the rule of first-possessor does not require that information about the opportunity costs of being first possessor is known prior to the exchange; rather, the exchange actually reveals information.

For Barnett, not only does the rule of first-possession work to maintain the social order through revealing information about how one's decision for resource use impacts others, it also addresses other "pervasive social problems," such as communicating justice and providing a sense of stability, as Bentham also advocated. For Barnett, the stability of the rule of first-possession "also addresses the important problem of incentives. [For instance] Ann will have the incentive to use her knowledge only if she can be assured that she will not be dispossessed by latecomers" (Barnett 1998, 71). Comparable to the benefits of securing rights to a resource that Bentham outlined, Barnett cites the incentives created by the rule of first-possession that encourage individuals to invest their time and energy in acquiring a new, un-owned resource. For Barnett, all of these reasons together justify the rule of first-possession, noting that "the more different problems are handled by a purported right the more confident we can be that this right is justified" (Barnett 1998, 71). Since the rule of first-possession, equivalent to the priority principle in the doctrine of prior appropriation, addresses the problem of knowledge as well as other pervasive social problems, like the problem of incentives, it gains greater legitimacy on the basis that it effectively resolves these various social issues.

Both Tisdell's Benthamite account and Barnett's epistemological argument provide strong reasons to favor the priority principle of the doctrine of prior appropriation, based on the fact that it establishes a sense of security for those who hold rights – the more senior the right the more security it provides – to water use. However, in defending the benefits of the security provided by property rights, one could fail to recognize that such security comes at the expense

of other qualities: flexibility and adaptability. In particular, the security provided by the priority principle can be detrimental to the long-term viability of the doctrine of prior appropriation since it hinders the ability of the law to adapt to changing values and conditions. Maintaining the status quo by ensuring that those with the oldest appropriation rights are given the benefit of security through their rights, it becomes difficult to appropriate water to potentially more beneficial and efficient uses. In this way, “the principle defect of prior appropriation is the result of its primary value. The absolute security of a water right held by the senior appropriators makes it very difficult to establish new uses” (Goldfarb 1988, 40). While the benefits of secure water rights supports the justifiability of the priority principle, without also providing arguments that defend the tradeoff of adaptability, this justification might fail to provide compelling reasons to accept the greater value of security.

1.1.4 Summary

In this overview of arguments made in favor of the doctrine of prior appropriation, it has been shown that there are normative considerations used to justify the water law. First, David Schorr provided an historical justification of prior appropriation, in which he argued that the principles of distributive justice and equality were the primary motives behind the formation and formalization of the law. The second justification of prior appropriation was the economic claim that the water law promotes an efficient allocation of water by stipulating that legitimate water use be conditioned by the economic value that it yields. Counterarguments against the legitimacy of Pareto efficiency, as well as the limitations of economic justifications, undermined the comprehensiveness of such arguments. Lastly, utilitarian and libertarian accounts cite the security provided by water rights as a basis for the justification of prior appropriation. In particular, the benefits of investment, incentives to appropriate and the communication of

resource value information all offer support towards the legitimacy of the priority principle and the water rights it secures. In response, it was noted that the benefits of security came at the expense of the flexibility and adaptability of the water law; without a justification for this tradeoff, such arguments provided insufficient reasons to justify the doctrine of prior appropriation.

1.2 Critique of Prior Appropriation

Some arguments that challenge the justifiability of prior appropriation identify the practical shortcomings of the doctrine as reasons to reform or replace it. Two critiques presented here address the economic and technological deficiencies of the law. These are primarily practical assessments of the doctrine, noting its failure to produce economically efficient allocations, in part due to hydro-technological advancements. The following chapter will provide a more in depth analysis of a valuational critique of prior appropriation, evaluating the diverse, non-monetary water values that fail to be incorporated in prior appropriation.

1.2.1 Economic Critique

Mason Gaffney offers a critique of the economic shortcomings of the doctrine of prior appropriation, claiming that there are two “basic economizing principles [that] are denied” by the priority principle of the doctrine: marginal productivity and pooling of risk (Gaffney 1969, 140). The priority principle undermines marginal productivity by the fact that “the junior appropriator who loses all his water obviously loses marginal units of high productivity, while the senior retains marginal units of low productivity” (Gaffney 1969, 140). In other words, units of water that could go towards a more productive use are instead being used to fulfill the senior water right.

The second principle, pooling of risk, indicates how risk is allocated among water right owners. Since water rights are fulfilled according to priority in time, the risk of not having access to a supply of water that is necessary to realize returns on one's investment is unequally distributed: "when water falls low, the juniors drop out first and lose everything before the next senior appropriator loses anything. In result, there is no pooling of risk whatever" (Gaffney 1969, 140). The unequal distribution of risk means that those with junior water rights have such an uncertain supply of water that it becomes almost "unusable" (Gaffney 1969, 140). In planning for future investments, junior water right holders cannot assume that their right will be fulfilled, while senior right holders carry almost no risk in their water allocations. This would undermine the security of a junior water right, a claimed advantage of private rights. Since the doctrine of prior appropriation denies these two central principles of economic efficiency, Gaffney claims that this undermines its effectiveness.

1.2.2 Technological Critique

Ray Huffaker, *et al.*, demonstrate that there are practical limitations to the accommodation of technological advances within the doctrine of prior appropriation. According to the authors, the security provided by water rights is compromised with the adoption of efficiency-improving technologies in irrigation appropriations. Consequently, the authors argue that prior appropriation ought to be modified to favor the flexibility afforded by a water market, rather than try to maintain the "protection that the prior appropriation doctrine was able to provide historically" (Huffaker, Whittlesey and Hamilton 2000, 269). In short, Huffaker, *et al.*, assert that because technological advancements in water-efficiency come at the expense of the security of water rights – one of the primary advantages of prior appropriation, historically –

changes ought to be made to the doctrine that accommodate these improvements, while delivering the benefit of flexibility to compensate for the loss of security.

Typically, increasing the efficiency of water use is viewed as beneficial both for society and for the individual right holders; more water remains within the public domain, allowing for the expansion of non-consumptive uses and in-stream flows, while the water right holder is dependent on a smaller supply of water, decreasing risk in times of drought. However, Huffaker, *et al.*, demonstrate how prior appropriation is unable to accommodate these new technologies, since it does not recognize the impact they have on the hydrologic system and junior appropriators. Prior to the introduction of these efficiency-improving technologies, inefficient water use resulted in large irrigation return flows that would then increase the supply of water available for other appropriators. However, irrigators who have adopted these technologies, and thus require less water for the same level of crop production, “fear that the unused portion of the original water duty will be forfeited subject to the ‘use it or lose it’ criterion.² They therefore contend that the unused portion constitutes conserved water that they can spread over additional land...” (Huffaker, Whittlesey and Hamilton 2000, 268). A consequence is that “irrigation return flows are reduced, and...efficiency-improving irrigators are allowed to ‘enlarge their uses’ to the detriment of use-dependent appropriators” (Huffaker, Whittlesey and Hamilton 2000, 268). Senior water right holders receive all of the benefits when they adopt water efficient technologies through expanding the use of their water, which results in a water supply reduction for junior appropriators, who were previously dependent on the return flows from inefficient uses.

² The use-it-or-lose-it criterion specifies that non-use of one’s water right can subject the right to forfeiture due to failure to use the right for a period of time.

It is important to emphasize that the doctrine of prior appropriation itself does not promote these instances of expanded uses that result from ‘conserved’ water; but, according to Huffaker, *et al.*, the expansion of water rights has been protected through political processes, which then set a precedent for later cases (Huffaker, Whittlesey and Hamilton 2000, 268). For instance, in the case of *Estate of Steed v. New Escalante Irrigation Co.*, the Steed estate’s appropriative water right depended on the return flows that resulted from New Escalante’s inefficient use. However, once New Escalante switched to a more efficient irrigation technology, which reduced their return flows, the Steed estate’s water right was compromised. When contested, “the court refused to protect the Steed estate’s vested water right after concluding that it was a use-dependency based on a previously wasteful irrigator practice” (Huffaker, Whittlesey and Hamilton 2000, 269). The law favored the protection of the more senior water right holder, likely in adherence to the beneficial use doctrine, which discourages wasteful water use. Since the Steed estate’s water right was dependent on previously inefficient water uses, the court decided to promote the continued efficient use by New Escalante, at the expense of the Steed estate’s more junior water right.

In response to this case and others like it, Huffaker, *et al.*, conclude that the strategy of continuing to restrict the transferability of water rights so as to maintain their security is an undesirable course of action (Huffaker, Whittlesey and Hamilton 2000, 270). Such a strategy would prevent prior appropriation from adapting to social and technological changes, leaving it outdated and ill-suited to meet future water needs. Rather, adjusting prior appropriation to function in a market environment would provide greater flexibility that would be, according to Huffaker, *et al.*, more consistent with both how the doctrine currently operates and how water rights have always been legally recognized:

This move towards the ‘flexibility’ end of the ‘security-flexibility’ continuum is consistent with the decreased level of security under which traditional rights holders operate in the modern era because of the widespread technological improvements within the agricultural sector. It is also consistent with the legal nature of the rights themselves ...the right-holder does not own the body of water itself, but is limited to a usufructory right. As owner of the water itself, the public reserves the right to condition private water use so that it is consistent with public values... (Huffaker, Whittlesey and Hamilton 2000, 270)

Instead of fighting against the threat that technological advancements pose to the security of water rights, Huffaker, *et al.*, argue that the doctrine ought to be modified to reflect the trend towards flexibility.

The nature of this objection to the justification of prior appropriation concerns the internal consistency of the doctrine in the context that it is currently implemented. The doctrine proposes to offer security through water rights, yet because of the impact of efficiency-improving technologies on return flows, fewer water rights actually provide this security. This inconsistency between the proposed benefits and the actual benefits of the doctrine is what Huffaker, *et al.*, are primarily concerned with. In order to evaluate the legitimacy of the market solution proposed by Huffaker, *et al.*, it is necessary to clarify the normative grounds upon which their claims likely rest. Since their solution proposes increased consistency – promising the benefit of flexibility through a water market and not security – it is reasonable to assume that for a law to be justified, according to Huffaker, *et al.*, it ought to maintain a consistency between the formal function of the law and its realized effects. Because the implementation of prior appropriation no longer corresponds to its original justification – the security of water rights – it can no longer be considered justified and ought to be modified or replaced.

If this particular instance of inconsistency were the problematic feature of prior appropriation for Huffaker, *et al.*, then a relevant response would object to the necessity of having

such consistency between the form of a law and its implementation. Such a response is provided by Dan Tarlock, who gives a defense of prior appropriation by arguing that the adaptability of the doctrine is one of its advantages, which is facilitated by what he describes as a growing “gap between the form of the doctrine and the actual allocation of water” (Tarlock, *The Future of Prior Appropriation in the New West* 2002, 775). Tarlock contends that in order to appreciate the changes that the doctrine of prior appropriation has undergone as the West transformed, “from a livestock grazing, mining, and dry farming economy to an increasingly large-scale irrigation society with urban oases,” it is necessary to focus on the application and function of prior appropriation and not the formal written word of the law (Tarlock 2002, 770). To support his claims, Tarlock cites the historical developments that have taken place in the West since the formation of prior appropriation, which “ultimately undermined it” (Tarlock 2002, 770). The first was the Reclamation Act, from the 1890s to the mid-1970’s, during which time large carry-over storage facilities and dams were constructed in order to create a buffer supply of water during times of drought. The impact these storage options had on prior appropriation were significant:

Dams [and storage facilities] made it increasingly unnecessary to enforce water rights in the rigorous manner that the doctrine suggests and helped produce the culture of non-enforcement of the beneficial use doctrine... Water rights became more of a general water entitlement to use water rather than the right to a specific quantity used in a non-wasteful manner as specified by the formal doctrine. (Tarlock 2002, 771)

A consequence of this trend throughout the 20th century to treat water rights more as water entitlements than strictly defined appropriative claims, is that prior appropriation became more of a shadow doctrine that was rarely enforced (Tarlock 2002).

Tarlock attributes the further widening of this gap between the form and practice of prior appropriation to two occurrences: 1) a lag in the response of prior appropriation states to

changing societal values and 2) a growing urban population. Such a slow response to changing societal values would not alone influence the gap between the form and practice. The real cause was the reaction to this lag by the federal government: regulatory programs concerned with “pollution abatement and the conservation of endangered species...give the federal government the power to assert regulatory water rights...[which] threatens to displace partially the law of prior appropriation” (Tarlock 2002, 772). In essence, the state authority upon which prior appropriation depends was undermined by federal programs that tried to make up for the lack of response from states to changing values.

In terms of the second occurrence, prior appropriation was no longer suitable for meeting the changing water needs of a growing western urban population. Prior appropriation was not initially designed to accommodate the water needs of large urban populations since there were no major cities in the West until the second half of the 20th century. Rather, “at its core, prior appropriation is a law of irrigation rights, but irrigated agriculture’s future is one of stable or declining acreage” (Tarlock 2002, 772). Growing urban competition for resources in the West continued to diminish the important role prior appropriation historically had, as the doctrine failed to suitably deal with rural vs. urban water conflicts.

According to Tarlock, these two developments have and will continue to “produce changes in prior appropriation, but the changes will be more subtle because they will be more ones of practice than of form” (Tarlock 2002, 773). In establishing this social and political context for his defense of prior appropriation, Tarlock is implicitly responding to critics of prior appropriation who claim that it “locks too much water into inefficient agricultural uses and does not make enough water available for growing cities and ecosystem restoration” (Tarlock 2002, 775). Since prior appropriation is based on historical precedence, critics fear that the doctrine

will be unable to adjust to a changing West with large urban growth that depends on a reliable supply of water. While this concern is a “powerful one,” Tarlock dismisses that idea that it “supports the abolition or even substantial modification of the doctrine,” due to the flexibility provided by the widening gap between the form and practice of the doctrine (Tarlock 2002, 775).

Contrary to Huffaker, *et al.*, Tarlock argues that the form of the doctrine will be able to stay relatively the same, while still fulfilling three functions in its new role: as a means of resolving small-scale conflicts; a worst case enforcement scenario to be avoided through cooperation and creative solutions; and a rule of compensation for contested transfers (Tarlock 2002, 775). In response to the concerns of Huffaker, *et al.*, regarding the conflict between the form and practice of the law, Tarlock, in contrast, argues that such a gap is and has been the primary advantage of the law, since it allows the doctrine to accommodate the needs of the new West.

1.2.3 Summary

Critiques of the doctrine of prior appropriation claim that the various economic and technological failings of the Western water law provide strong reasons to oppose the continued enforcement of the doctrine. Mason Gaffney argued that the two foundational principles of economics - marginal productivity and pooling of risk – were violated by prior appropriation. Huffaker, *et al.*, provided a technological critique that demonstrated how the loss of security in water rights, due to efficiency improvements, ought to be compensated for by the benefits of flexibility in a water market. In response, Tarlock presented a counterargument to the need for consistency between the form and practice of the law. In essence, Tarlock argues that flexibility

can be attained from the distance that exists between the practice and the form of the doctrine, without requiring that a water market replace prior appropriation.

In the following chapter, an overview of the various non-monetary water values that exist will demonstrate that such values are incommensurable to economic water valuations and that prior appropriation fails to accurately capture such value plurality.

CHAPTER TWO: THE SOCIAL AND CULTURAL CONTEXT OF NON-MONETARY WATER VALUES

“Symbolic, religious and lifestyle meanings of water are among the diverse values that are poorly captured in any kind of utilitarian calculus. Yet they must be included in deliberation for equity to be served.” (Ingram, Whiteley and Perry 2008, 10)

Introduction

As was demonstrated in Chapter I, the U.S. Western water law of prior appropriation emphasizes the primacy of water’s monetary value in the process of establishing water rights; however, by viewing water as, first and foremost, an economic good, prior appropriation is limited in its ability to capture the various non-monetary water values that exist. The following chapter will provide a contextual exposition of these non-monetary water values, primarily as they relate to particular Native American tribes and traditional acequia communities. The aim of such an analysis is not to advocate that these non-monetary water values are preferable or “normatively superior” to their economic counterparts (Ingram, Whiteley and Perry 2008, 11); rather, the central thesis of this analysis is that recognition and preservation of water value plurality is crucial to the justifiability of a water policy, like the doctrine of prior appropriation.

After presenting various non-monetary water values, four economic proxies will be evaluated to determine whether any viable options are available that could accurately capture these non-monetary values, in terms of their economic equivalencies. If no economic proxies successfully represent these non-monetary water values, then this shortcoming will substantiate the claim that such water values are incommensurable. To be clear, value incommensurability does not mean that monetary and non-monetary water values are somehow contradictory or

antithetical to each other; for such comparative relations to be postulated, i.e., for one to even know that one value is antithetical to another value, there would have to be a shared standard by which to relate the various value systems. On the contrary, the standards by which economic and non-economic values are judged differ to the extent that one value cannot be translated into another while still presenting a faithful representation of the original value. As Sarah Trainor describes in her account of incommensurable natural resource values: “Entities are incommensurable when they cannot be accurately measured along some common cardinal scale using a single metric unit of value” (Trainor 2006, 5). Consequently, if non-monetary water values are incommensurable with monetary water values, then reductive efforts that use a single economic standard will inevitably fail to capture or accurately represent certain non-monetary water values.

2.1 Non-Monetary Water Values

The categories of non-monetary water values will be explicated from within the specific contexts out of which they manifest. This contextual analysis, therefore, rests on the belief that these personal, cultural, historical, sacred, ancestral, and livelihood values cannot be fully understood or given an authentic account without reference to the specific social conditions that shaped these water values. In other words, these values are contextual in a way that their meaning can only be understood within the social and cultural context that they manifest. Relevant case studies will be given to demonstrate the conflicts that arise when the dominant water value system aims to ascribe a monetary value to water that is not recognized by a community or tribe as representative of the value water has for them. Not only are such reductive efforts inherently limited in their ability to represent the plurality of water values, but they are also, at times, culturally biased: “the range of values is determined by one – Western scientific –

culture, and the ‘valuation’ is undertaken through one perspective. It represents one culture having a conversation with itself about its own values” (Gibbs 2006, 76). By limiting what counts as a legitimate value to only economic values, resource allocation policies, like the doctrine of prior appropriation, inherently prioritize certain cultural value systems over the values of other cultures.

2.1.1 Water Heterogeneity

This first category of non-monetary water value is unique, in that it does not refer to a specific source of value, but rather designates a perspective that recognizes and appreciates a differentiation of water according to its physical hydrological properties and histories. According to this perspective, the value of rainwater differs from the value of river water, which differs from spring water, and so on, since each water has a different source or hydrological history that accounts for its specific value. Such a perspective is in contrast to an economic water value, in which a single unit of water is equivalent to any other unit of water.³ Every unit of water is substitutable according to an economic value system, reducing water to a homogeneous value that does not distinguish among the geo-hydrological histories of each unit of water. On the contrary, this unique perspective views the geo-hydrological histories of water as constitutive of its value. To know the value of a unit of water is to know where it is from, its source, and in some instances, its journey.

Because water is heterogeneous from within this value perspective, water is not viewed in the singular but as plural: *waters*. Eran Feitelson discusses this distinction between the singular and plural of water as reflecting modern versus pre-modern views. The modern perspective on

³ It should be noted that freshwater does not have the same economic value as saltwater or polluted water. Rather, the comparison assumes the same hydro-chemical composition.

water identifies its chemical composition as its unifying and essential feature, so that water is treated as a unitary substance (Feitelson 2012, 53). He notes, however, that this has not always been the normative perspective; pre-modern perspectives differentiated among waters according to their sources and movements so that not all “liquids composed of H₂O should indeed be treated equally” (Feitelson 2012, 53). While Feitelson describes this normative notion of water pluralism in terms of abstract policies and water management decisions, the following analysis will argue that prior to such assessments, one must first comprehend the social contexts in which water pluralism or water heterogeneity plays a central role. Knowledge of the significant features of the social context will enable a more accurate representation of the water valuation system that issues from this perspective of water heterogeneity.

The water values of the Hopi Indian tribe of northeastern Arizona, historically and currently, are emblematic of this type of water heterogeneous perspective, in which there is a recognition of and appreciation for the differential values of waters. According to the Hopi tribe, water from natural springs has significant value that is represented by the term, *paahu*, which designates such waters as “the prototypical water sources” (Whiteley and Masayesva 1998, 13). While the springs supply the Hopi with their main source of drinking water, as well as the irrigation of their livestock, they also represent symbolic values that derive from the narrative of the Hopi cosmogony. According to the Hopi creation story, they first lived below a layer of the earth, “where they were incomplete creatures, undergoing several phases of metamorphosis or gestation before finally emerging as fully human beings” (Loftin 2003, 4). This genesis narrative pervades all Hopi sacred traditions, signifying the particular significance that spring waters represent to the Hopi as waters that also emerge from below the earth. It is thus the history of the

water, traveling below the ground before bubbling up, that gives these springs the particular value they have for the Hopi tribe.

Another instance of the water heterogeneous perspective is the value of rainwater for the Hopi tribe. While rainwater is, of course, essential to watering their crops, it also has exceptional significance due to the fact that the Hopi believe that when tribal members die, they become clouds. Accordingly, “arriving clouds are returning ancestors, their rain both communion with and blessing of the living” (Whiteley and Masayesva 1998, 15). Thus, rain does not just have an instrumental value for the Hopi, but its history of originating from the clouds, their ancestors, gives it meaning that is unique to rainwater.

2.1.2 Personal Identity Value of Water

This analysis will be restricted to two cases in which water has a distinctive value that derives from its formative role in shaping one’s personal identity: (1) personal names that make specific reference to water, and (2) the role that water plays in shaping one’s personal identity as a community member. In the first case, the value of water derives from the complex ways in which a name significantly shapes one’s personal identity. In the second case, the frame of reference for determining those aspects that are fundamental to one’s personal identity is expanded to include social and communal relations and the water systems that maintain them. In this way, to understand the forces that contributed to the formation of one’s personal identity is to understand the communal and cultural relationships that inform that identity.

The impact that one’s personal name has within Native American tribal culture is distinct from the meaning of names within a Western European culture. Names are viewed primarily as designators, according to a Western perspective. They make reference to a certain person but

they do not necessarily carry with them any information about the person as an individual. In contrast to this Western understanding of names, and more generally words, many Native American tribes ascribe a much stronger relationship to the identity between a name and the person or thing it refers to; the speaking of a name is thought to “actualize that reality” so that, for instance, “if one were to speak the Lakota words *Wanble Galeshka*, or Spotted Eagle, one would experience an immediate contact with the specific powers of that most revered being” (Brown and Cousins 2001, 44). Thus, words are not merely symbols but have a more robust metaphysical role in actualizing the reality that they reference.

Within Native American culture, the naming of a child is of great significance, as it will importantly determine who they will become. For instance, the Kiowa author, N. Scott Momaday, describes the relationship between oneself and one’s name, explaining, “a man’s life proceeds from his name, in the way that a river proceeds from its source” (Momaday 1976, xi). Names, in this sense, are not merely the signifiers of the person named but are in some way constitutive of the person they identify: “...as Momaday observes, it is through one’s name that one’s identity is achieved; people become their names” (Brown and Cousins 2001, 44). The implications that personal names have to one’s self-identity are signified by the fact that, at least within Hopi culture, “there is a clear desire to avoid duplicates...[since] for the receiver, a name confers a unique individual identity” (Whiteley, Hopitutungwni: "Hopi Names" as Literature 1992, 219). Since each person is unique, each name must also be unique.

Due to the fact that names carry such power, it is natural that tribes in which water plays a significant cultural role, such as the Hopi, there would be numerous personal names that make reference to different aspects of water. According to Peter Whiteley and Vernon Masayesva, about half of all Hopi names refer to water. Some examples of such names are: “Paahongva,

Water Standing Up (after the tiny columns of water that leap up from raindrops splashing on a pond or puddle); Paanömtiwa, Water Covering Up (perhaps covering a cornfield after a rain); Paatala, Water Light, referring to the reflected light on a water's surface, particularly in the dark" (Whiteley and Masayesva, *The Use and Abuse of Aquifers: Can the Hopi Indians Survive Multinational Mining?* 1998, 17). Such names not only speak to the unique knowledge and celebration of the various unique aspects of water, but they also connect, spiritually, the individual bearing the name to the natural feature that the name summons or manifests.

The second case of water's personal identity value relates to the way in which communal relations have a formative influence on one's identity. It is the relationships one has with other community members that form an essential feature of how one self-identifies. When water plays a crucial role in creating and maintaining those relational ties, it acquires a certain value from its ability to stabilize a sense of personal identity. This personal-communal identity value of water is evident in case of the *acequia* community of San Luis Valley.

The term '*acequia*' refers to the network of earthen ditches that distribute water to members of a community who all contribute to the maintenance of those ditches. Such communal water distribution systems originate from Hispano settlers in the American Southwest prior to American colonization (Hicks and Peña 2003, 388). One such community exists in the San Luis Valley in south-central Colorado. While the community has an identity as a whole, to be discussed in the following section, the identities of the individual members that are part of that community are shaped by their membership: "Significantly, members of the Valley's acequias understand themselves predominately in terms of their connection to each other, to the community ditch, and to their role in meeting community needs" (Arnold, *San Luis Valley and the Moral Economy of Water* 2008, 41). Within this community, water plays an essential role in

maintaining these relationships that unite the community: "...members [are] bound to one another in relationships still formed around and sustained by the mutual administration of water" (Arnold, *San Luis Valley and the Moral Economy of Water* 2008, 41). Without the acequia distribution system, these individuals would lose a sense of their self-identity that is intricately tied to the existence of the community. While the role that water plays in these communities is, in one way, to fulfill the practical of need for irrigation; in another way, "water also signifies a sense of attachment and mutual obligation by which they recognize themselves as members of a community" (Arnold 2008, 41). Water is the vehicle through which one's identity as a member of a community is realized and stabilized.

2.1.3 Community-Cultural Value of Water

While the value of water in the previous section concerned the forming of one's personal identity, the value of water as it relates to the identity of a community and culture is extended to a collective identity. The role that water plays in forming communal-cultural identities is similar to the case of individual identity, in the sense that it maintains relationships among community members; yet, water's cultural value is also derived in ways that go beyond maintaining relational ties. Water also plays an essential part in sustaining cultural traditions or ways of life that are indispensable to the unity and continuation of a community.

One instance in which a cultural identity is intimately linked to a water source is the Lummi Nation in northwestern Washington State. The Lummi reservation is located alongside the mouth of the Nooksack River, whose water it shares with the neighboring town of Bellingham (Greaves, *Contextualizing the Environmental Struggle* 2001, 38). For the Lummi Nation, the salmon that they fish from the Nooksack River do not simply supply a source of

sustenance; the salmon also represent a central feature of their cultural identity. Tribal members refer to themselves as the salmon people, which they believe gives them both “a historic right and obligation to protect the children of Salmon Woman” (Russo 2002, 100). However, due to over-allocation of water rights by the city of Bellingham and non-Indian landowners, as well as pollution from nearby logging operations, the salmon populations of the Nooksack have declined rapidly (Russo 2002, 106).

According to the Lummi Nation and its tribal members striving to preserve traditional Lummi spiritual and cultural beliefs, any threat to the salmon populations in the Nooksack are equivalent to threats to Lummi culture. This link between their cultural heritage and the salmon of the Nooksack is so strong that it endows the water with a significant value: “the Lummi Nation’s cultural survival is predicated on guaranteeing that river water from the Nooksack will always be there” (Greaves, *Water Rights in the Pacific Northwest* 1998, 41). The water in the Nooksack River is valuable not just because it enables the Lummi to profit from a salmon fishery, but also because it is the foundation upon which their cultural identity, as the children of the salmon woman, depends. While the economically valuable logging operations that pollute the river and the domestic needs of the town of Bellingham represent other water values, when considering conflicting water needs in the Nooksack River, the cultural value of the water to the Lummi Nation must be taken into consideration.

Another example of the communal and cultural value of water can be found in acequia communities. While the role that water has in forming the individual identities of members of the community was discussed above, water also impacts the identity of the community as a whole, shaping and perpetuating the values that unite the community. A case study in which the San Luis Valley acequia community struggled to prevent private sales of the valley’s water will help

illustrate the unique value that water has in shaping the community's identity. The case study not only demonstrates the critical role that such communal values have in successfully preserving the community's water, but it also shows how the acequia water values are incongruent with the economic values that challenge the future of the community.

The core value that distinguishes traditional acequia communities from other, more modern, water management and distribution systems is their emphasis on equity. No member of the community has a greater or more prior right to water; all partake in maintaining the ditches that deliver the water and all equally receive the benefits of this work. This principle of equity that pervades all activities performed by acequia members is what holds the community together, giving its members a "sense of shared fate and purpose" (Arnold, *San Luis Valley and the Moral Economy of Water* 2008, 52). The equitable allocation of water establishes and maintains this shared sense of fate that unites the community, creating a communal identity.

While the San Luis Valley acequia community has had many confrontations with efforts to sell their water to nearby cities, the communal campaign against the American Water Development Inc (AWDI) exemplifies the clash between the value of water recognized by the community and economic valuations of the Valley's water. From 1978 to 1995, Canadian industrialist, Maurice Strong, owned Baca Ranch that lies within the San Luis Valley (Arnold 2008, 46). Founding AWDI specifically for the purpose of selling the water below his property, Strong was met with formidable resistance by Valley residents who formed the Citizens of San Luis Valley Water (CSLVW) to "mobilize opposition to AWDI" (Arnold 2008, 48). Through a grassroots movement and legal petitions against AWDI, the Valley residents successfully prevented the private sale of water.

According to Thomas Arnold's analysis of CSLVW's successful campaign against AWDI, the practical consequences of removing water from the Valley was not the primary motive to prevent the sale of water. Rather, the fact that AWDI valued water as "nothing more than an article of commerce and speculation" conflicted with the community's view (Arnold 2008, 48). Water not only served the community's irrigation needs but was also "the foundation of values (e.g., identity and community) unrelated to price, and properly considered not for sale" (Arnold 2008, 48). AWDI's valuation of water as exclusively an economic good was taken as offensive by the Valley residents, who understood the value of water to be based on its role in preserving communal equity, from which the core of the community's identity is formed.

Water's non-monetary value is made even more evident in a previous case also in the San Luis Valley. Battle Mountain Gold, a Texas mining corporation, offered the San Luis People's Ditch (the official local acequia management organization) \$50,000 for the temporary use of acequia water (Hicks and Peña 2003, 454). Despite the fact that there was more than enough water to make the transfer and still accommodate the irrigation needs of the acequia farmers, the offer was rejected on multiple occasions. In a statement from the majordomo of the San Luis People's Ditch, the decision to decline the offer was based on the water's non-monetary value: "You cannot sell the water and separate it from the land. The water belongs to the community. It is not for sale" (Hicks and Peña 2003, 454). In contrast to the case against AWDI's proposal for the private sale of San Luis Valley water, in which there would have been negative consequences for both members of the acequia and the surrounding environment, there were no such negative consequences in the case with Battle Mountain Gold. On the contrary, water supplies were plentiful enough to make a temporary sale of water with minimal or no impact on the acequia

irrigators or Valley residents.⁴ In the absence of such practical considerations, the values of the acequia community still took precedence over economic valuations of water.

For both the Lummi Nation and the San Luis Valley acequia community, the value of water derives from the critical role it has in forming and maintaining the identity of the community as a whole. For the Lummi Nation, having enough water in the Nooksack River to maintain salmon populations was a necessary condition to the survival of their culture. The threat of insufficient water to support salmon populations was seen as equivalent to threats against the Lummi Nation and their cultural identity. For the San Luis Valley acequia community, the value of water that derived from its role in preserving the community's identity and core values was in conflict with efforts to monetize their water. Through numerous disputes, the community demonstrated that the priority of the communal value of water is not simply an idealistic notion or "mere memories of a cultural heritage...that has long since past" (Hicks and Peña 2003, 454). Instead, efforts to sell the water for economic gain were consistently opposed, due to the fact that such efforts ignored the communal value of the water. No economic gain could compensate for the loss of communal values, such as group equity, which maintained the community's identity.

2.1.4 Historical Value of Water

The historical value of water stems from water's capacity to preserve traditional accounts or narratives through representing events, values, customs or ways of life, which are historically significant. This notion of the historical value of water differs from the historical aspects of prior

⁴ Ecological impacts would have been possible but not from the decline in available water; any ecological damage would have likely been the result of Battle Mountain Gold's intention to use the water "during the construction of a gold mine and cyanide leach vat milling facility located in the Rito Seco Creek watershed about six miles northeast of the town of San Luis" (Hicks & Pena, 2003, p. 454).

appropriation in crucial ways. Prior appropriation recognizes the importance of historical water usage through its principle of ‘first in time, first in right,’ which gives seniority to those with the oldest water rights. The role that historical water use plays in prior appropriation is one of justifying economic advantage through ownership of one’s right to water. Ownership is thus the primary objective to be achieved through historical claims.

On the contrary, water’s historical value, in the sense discussed here, stems from water’s capacity as a representative or symbolic object to evoke memories or narratives, which are viewed as important to be remembered. An example of such historical value, unrelated to water, is Plymouth Rock, which represents the founding of America with the arrival of the Mayflower Pilgrims. The historical value of Plymouth Rock is not concerned with ownership, but a historically significant event that is deemed worthy of remembrance. It is in this sense that water’s historical value differs from the historical value of water according to prior appropriation. One’s senior water right is deemed valuable because it has an economic value that can be given a monetary price. Conversely, there is no monetary value attached to Plymouth Rock; rather, it has cultural, historical, and emotional value that has no obvious monetary representation.

One example in which water has a historical value is Rice Lake in northeastern Wisconsin, where the Sokaogon Chippewa, a band of Lake Superior Chippewa, settled. According to Anishinabe historical legend – which includes the three tribes of Ojibwe, Ottawa, and Potawatomi – a migration was made to the Great Lakes region centuries ago, in response to a prophesy. The following is a Chippewa tribal member’s personal account of this narrative:

We [Anishinabe] left our homes on the eastern shores of Turtle Island a millennium ago after prophets told us we would be destroyed if we did not move. He said there would be

seven stopping places along our journey. The Megis Shell would appear and guide us to our new home to where the “food grows on water”...The journey took five hundred years...The main body of Anishinabe, though, kept moving until they came to the place described by the prophets as our final destination, Mo-nin-wun-a-kaun-ing (Madeline Island in the Apostle Chain of Lake Superior). As promised, we found the food that grows on water, Manomin (wild rice). (Loew 1997, 714-715)

According to this account of the migration of the Anishinabe people, their journey to their current home along the Great Lakes of Wisconsin was a prophesy that came true and is believed to be the reason for their continued existence today. The narrator and author of this account, Patty Loew, does explain that “archaeological evidence support[s] the theory that the Chippewa left their homes on the Atlantic seaboard in the fifteenth century...a gradual movement that probably took two centuries,” before they reached their current location around the Great Lakes (Loew 1997, 715). However, the support of archaeological evidence to substantiate the Chippewa historical narrative should not in itself be the validation of the historical value that the region, and in particular, Rice Lake, has for the tribe. What is significant is that according to Loew, “the migration legend remains the vital center of the Chippewa remembered past” (Loew 1997, 715). For the Chippewa tribes, living around these prophetic lakes, where “food grows on water,” is essential to not only respect the journey and sacrifices made by their ancestors, but also to continue living the history that is fundamental to their tribal identity.

With this brief understanding of the historical significance that the region has for the Chippewa tribes, it should be evident that the wild rice that initially brought them to the Great Lakes is not only a means of sustenance but also a reliving of history. In particular, Rice Lake, where the Mole Lake band of the Sokaogon Chippewa harvest wild rice every year, represents their history, which is recounted through their legends, songs and ceremonies (Reynolds 2003). When zinc and copper deposits were discovered two miles upstream from Rice Lake in the mid-

1970s, the threat that mining posed to the Sokaogon tribes was not merely the loss of their primary food source but also the loss of the historical value of water that motivated two centuries of tribal migration, which is central to their cultural identity (Reynolds 2003, 152). The development of Crandon mine, with the aim of extracting millions of tons of toxic heavy metals, would have polluted Rice Lake and the surrounding watershed, preventing the Sokaogon tribes from living off the land in the way they had since first arriving centuries ago.

The Sokaogon fought the operation of Crandon mine starting in the mid-1980s, eventually persuading the EPA to approve, under the Clean Water Act, “strict tribal water quality standards...that would prevent the approval of any upstream discharge permits needed for mining that threatened the degradation of reservation water quality” (Reynolds 2003, 153). While this forestalled mining applications, it wasn’t until 2003 that the threat of Crandon mine was eventually concluded, when the Sokaogon purchased the Nicolet Mineral Company and its mineral rights, along with 4,800 acres of land. The now tribally-owned mining company withdrew the pending mining permit applications and divided the land among local Chippewa tribes (Reynolds 2003, 158). The success of the Sokaogon to preserve their historical heritage through protecting Rice Lake from the economic interests of Crandon mine demonstrates the historical value of Rice Lake.

2.1.5 Sacred Value of Water

The type of water value that many associate with non-monetary water values is the sacredness of water. The Hopi tribe presents a clear case in which part of the value of water derives from its sacredness. As should be clear from earlier descriptions of the role water plays for the Hopi, water is an indispensable part of all Hopi religious life. In fact, Vernon Masayesva,

Hopi leader of the Coyote Clan, claims, “it is hard to imagine anything more sacred – as substance or as symbol – than water in Hopi religious thought and practice” (Whiteley and Masayesva 1998, 14). One way in which water acquires a sense of sacredness for the Hopi is that spring and groundwater are considered to be the homes of certain deities. In particular, Paaloloqangw, or Plumed Water-Snake, is the patron of water from both the earth and the sky, and is the deity worshiped in multiple Hopi ceremonies. For instance, during the Flute ceremony, which “is specifically devoted to the consecration and regeneration of major springs... the *Lenmongqi*, head of the Flute society, dives to the bottom of a particularly sacred spring to plant prayer sticks for Paaloloqangw” (Whiteley and Masayesva 1998, 15). As the Flute ceremony demonstrates, not only are these particular springs considered to be the homes of deities, but they also play a central and necessary role in religious practices. Without these springs, Hopi religious life could not continue.

The sacredness of water also relates, in a significant way, to what it means to be a Hopi. This relationship is best understood through the Hopi creation story, in which it was already described that the Hopi emerged from below a layer of the earth into this current world. But upon their emergence, the Hopi entered into a covenant with the deity Maasaw, who instructed the Hopi to take on the responsibility of caring for the earth and its resources (Whiteley and Masayesva 1998, 26). These instructions of ethical conduct, specifying how the Hopi are to interact with their natural surroundings, are not abstract concepts but practical principles, deeply engrained in all Hopi members so that “such [ethical] behavior is a significant measure of whether one is worthy of the name *Hopi*” (Whiteley and Masayesva, *The Use and Abuse of Aquifers: Can the Hopi Indians Survive Multinational Mining?* 1998, 26). In fact, Masayesva explains that this ethical conduct is a more authentic representation of what it means to be a

Hopi: “*Hopi* is more than simply an ethnic identity descriptor; in use, it carries specific implications of ethical engagement... The oft-heard opposite, *qahopi* (“un-Hopi,” “badly behaved”), used to chastise transgression of behavioral rules, highlights the ethical dimension of the concept of Hopi-ness” (Whiteley and Masayesva 1998, 32, fn. 9). Thus, to earn the name ‘Hopi’ is to keep one’s covenant with Maasaw and care for the earth, and in particular, the earth’s waters that are considered to be especially imbued with sacred power.

The persistent and seemingly urgent need to protect and care for the earth’s waters stems from the inextricable union between the sacred and the living, the spiritual and the natural, which are seen as really one and the same (Loftin 2003). This unity is difficult to comprehend from a Western perspective, in which the natural and supernatural are dualities that are easily distinguishable and necessarily distinct from within a techno-scientific perspective; to be of natural origins is to be devoid of supernatural properties. Yet, for many Native American tribes, and particularly the Hopi, the two cannot be separated: “...there is no such dichotomy between the practical and the religious” (Loftin 2003, xxiv). The sacredness of water, in this way, is the same as its practical value as a source and sustainer of life. This is particularly evident with the conjunction of the sacredness and the ecological abundance of springs: “Doves, dragonflies, ducks, cranes, frogs, sand-grass, cattails, reeds, cottonwoods, willows, and numerous other species concentrate at these locations – simultaneously the index and the manifestation of abundant, water-charged life” (Whiteley and Masayesva 1998, 14). The sacred value of water is not just identified with its symbolic role in Hopi legend and mythology. Water is sacred because of its life-giving force. At the same time, because “the Hopi experience of the sacred is intrinsically linked with practical life-giving matters,” the reciprocal is inherently implied: the life-giving force of water results from its sacredness (Loftin 2003, 57).

This cursory understanding of the sacred value of water for the Hopi tribe helps to illuminate the conflict between the Hopi tribe and the Peabody Western Coal Company. In the 1960's Peabody Western Coal (now Peabody Energy) signed contracts with the Navajo and Hopi tribes for mineral rights and use of aquifer water to be used for coal slurry, which would be pumped through pipes hundreds of miles away (Whiteley and Masayesva 1998). While the negotiations and contracts that were signed were highly controversial at the time, the negative impact that groundwater extractions subsequently had on the Hopi sacred springs gave rise to impassioned protest by Hopi tribal members who fought to protect their waters. While Peabody claimed that the decrease in spring water was not the result of water extracted for slurry but drought conditions in the region, numerous investigations showed otherwise and Peabody eventually admitted that it was taking water from aquifers that fed Hopi springs (Whiteley and Masayesva 1998). However, some were skeptical about the Hopi protests against the activities of Peabody that were desecrating their sacred springs; since "80 percent of the Hopi Tribe's annual operating revenue is supplied by coal royalties and water lease fees from Peabody," some believed that the spring water might not actually be sacred to the Hopi since they were willing to sell it for profit (Hammer 2002).

There are, however, two responses to this skepticism: (1) the Hopi council members who originally signed the leases were uninformed about the activities of Peabody Coal and were essentially "duped" by their attorneys, and (2) the decision to lease the water was either not uniformly agreed upon or if it was, then such decisions are not believed to impact the sacredness of the water. While the first response is more of a factual issue as to whether or not the original council members were fully informed, the second response points to an important matter about water valuations that is occasionally overlooked. The skeptical account of the Hopi vs. Peabody

controversy assumes that if the tribe leased their water for monetary profit, then the tribe must not genuinely view their water as sacred. This skeptical conclusion rests on two false assumptions: (1) if someone is willing to sell an object or resource, then that object or resource must not be viewed as sacred to that person, and (2) values are uniformly held within the tribe.

The first assumption claims that if one is willing to sell something for monetary compensation, then that willingness must be mutually exclusive to that object being viewed as sacred. While this dichotomy may be true in some cases, it is not necessarily always the true. As Belk and Wallendorf explain in their analysis of sacred and profane objects and the meaning of money: “A sacred object may have potential use value, but that is not the primary reason it is valued” (Belk and Wallendorf 1990, 41). For instance, a wedding ring may be viewed as primarily valuable in terms of its symbolic significance for a couple’s marriage and that this value may transcend its monetary value; yet, it seems plausible that this symbolic value isn’t necessarily cheapened or nullified if sold. Extenuating circumstances or needs could have necessitated the sale. Nonetheless, it seems possible that the Hopi tribe’s decision to sell their water to Peabody Coal does not necessarily undermine their claims that spring water is sacred to them.

In terms of the second assumption, it is clear that values vary within a tribe and while some may accept monetary compensation for their water, other tribal members will continue to be opposed to such economic valuations. Even though the council members who originally signed the water leases were meant to represent the views of the tribe, as a whole, many Hopi disagreed with the decisions of the council. Such internal disagreement is evidenced by the Black Mesa Trust, a grassroots organization, founded in 1998 by Vernon Masayesva, former council chairman, with the intention of fighting Peabody Coal “from outside the [Hopi] government”

(Reily 2004). Black Mesa Trust was therefore not only opposed to Peabody's operation of Black Mesa Mine but also challenging the Hopi government and its water decisions. With regard to such value diversity within the Hopi tribe, the skepticism towards Hopi assertions about the sacredness of water is unjustified, since decisions made by a select few tribal members, whether they were elected representatives or not, do not necessarily reflect the values of every tribal member.

Objections to Peabody's use of aquifer water, on the basis that it undermined Hopi religious practices by drying up their sacred springs, were made clear on numerous occasions, especially after the formation of the Black Mesa Trust. In an article published in the LA Times, Masayesva articulated this opposition by citing traditional Hopi beliefs about their covenant with Maasaw:

The fundamental principle in our science that they [Peabody] need to understand is that, as Hopis, we have a sacred covenant with the person that was here a long time before our ancestors arrived... This person told us... if you take care of this land and use its resources in the best possible way, you will be here a long time... When we turned something sacred, our water, into a commodity that you sell, this is where our water problems began. This is our knowledge. This is our science. But they say this is just an Indian story because we can't measure that, quantify that, can't put it into your computer. (Reily 2004)

As Masayesva makes clear, the Hopi understanding of the world, their science, is dismissed by a western scientific paradigm, which could arguably include a utilitarian cost-benefit approach to resource management, because such "Indian stories... can't be measured." This dissonance between these two value systems substantiates the claim that non-monetary water values, such as water's sacredness, are incommensurable with economic valuations; the emphasis that economic value systems place on the need to measure or quantify would exclude the immeasurable, such as the sacred. The standards by which each value system is judged, in this case, the ability to

measure, differ so as to preclude an accurate representation of the sacred value of water in monetary terms.

While it is difficult to draw definitive conclusions about whether the sacred value of water had any impact on final decisions concerning Peabody's Black Mesa mine, the combination of public opposition and new air pollution requirements resulted in the closure of the mine in December 2005 (Zarsky 2006). Nonetheless, the case of the Hopi tribe vs. Peabody Coal illustrates the incommensurability of the sacred and economic value of water. Objections to the sale of Hopi water were not concerned with whether or not Peabody's payments to the Hopi tribe had undervalued their water; rather, Hopi opposition to Black Mesa mine was based on the belief that monetary valuations could never fully capture the sacred value of water.

2.1.6 Ancestral Value of Water

The value of water that derives from water's connection with ancestral spirits is importantly distinct from its sacred value. Concerns over the use of water that cite the relevance of respecting ancestral spirits can ostensibly appear to be a matter of sacred or religious consideration. It is a reasonable assumption that ancestral value is equivalent to sacred value, in part, because of the association between the manner in which one commemorates their ancestors and the religion with which they identify. However, the connection is not necessary and, in this case, separating the two sources of water value is constructive for specific reasons. For one, separating ancestral value from religious value enables a greater comprehension of ancestral value by making it more accessible to those resistant to "supernatural" claims based on religious or spiritual beliefs. In this way, ancestral value becomes universal: *everyone* has ancestors. Even those who deny an afterlife or the existence of spirits will likely feel a sense of duty to respect

the wishes and memories of their relatives. With regard to this minimal sense of responsibility to the deceased, it is possible to begin to comprehend the ancestral value of water and its incommensurability with economic valuations.

The ancestral value of water can be categorized, from a western perspective, to be either a “symbolic” or an “actual” value. With full awareness of the cultural bias that produces this distinction, which will later be rejected, for the moment, it will prove useful. Water’s ancestral value could be categorized as symbolic in the case of the Hopi belief that “when people die, in part they become clouds...[so that] arriving clouds are returning ancestors, their rain both communion with and blessing of the living” (Whiteley and Masayesva 1998, 15). Rain and the waters it replenishes symbolically represent blessings bestowed upon the living by their ancestors. On the other hand, the ancestral value of water is perceived, from a western point of view, as actual when a body of water is the actual burial grounds of a population’s ancestors. For instance, Salt Lake in northwestern New Mexico has ancestral value for the Zuni tribe, as the site of over 500 ancestral burials (Zarsky 2006). This distinction, as already noted, is based on a western emphasis on the physical, or as Masayesva described, what can be quantified and measured. A physical burial site is deemed more real or actual since it can be the object of scientific investigation. On the contrary, since there is no evidence that rain represents communication with ancestral spirits because clouds are not believed to be the remains of the deceased, this would be considered a symbolic ancestral value.

This distinction, however, collapses when considered from a non-western perspective. According to the Hopi, the distinction between the physical and the symbolic or spiritual is insignificant, especially in the case of the living and the deceased, since “the two worlds, the afterlife and the here and now, are inseparable...In fact, one of the last things spoken to a

deceased Hopi at his or her funeral is a plea to return soon to the village as a cloud person to bless the living with the spiritual substance” of rainwater (Loftin 2003, 58). Without a sharp division between the physical present and the immaterial afterlife, there is no reason to consider the experience of rain, as an instance of communion with one’s ancestors, to be any less real than the Zuni burial grounds at Salt Lake.

Moreover, the Hopi understanding of ritual and its relation to time reinforces the lack of such a dichotomy. When performing rituals that were established by their ancestors in the ancient past, they do not feel as though they are only performing it as it was originally performed, but also *when* it was originally performed. This conception of ritual and time undermines the western understanding of time as necessarily linear. By performing rituals, the Hopi, “in this sense...overcome the problem of death (time) by symbolically reactualizing the timeless time when [the ritual] originated” (Loftin 2003, 58). Ancestors are thus experienced in the present in a profound sense. Without the conceptual limitations of physicality and linear time, the ancestral value of water is perceived as real and presently significant to one’s treatment of water, which necessarily embodies both the blessings from the dead and the ultimate life-giving force.

Denying the ability to justifiably distinguish between a “symbolic” ancestral value and an “actual” ancestral value is not meant to prioritize the Hopi ancestral value over the Zuni. Rather, the aim is to demonstrate that both represent legitimate value claims. Understanding the lack of such a dichotomy is important to fully grasp the extent to which economic valuations are incommensurable with ancestral values. Even from a western perspective, most would agree that requests to place a monetary value on a burial site, such as Salt Lake, are insensitive to the type of value such places have. However, such conclusions are not as readily made in the case of

symbolic ancestral objects, such as rain for the Hopi, since such a sharp distinction is made between the physical and the spiritual: rain is a physical resource whereas ancestors are spiritual (or immaterial).

Yet this preference given to the ancestral value of burial grounds, as opposed to the ancestral value of rain, is inconsistently applied. While the spiritual significance of a physical burial ground is considered to be sheltered from economic valuations, the spiritual significance of physical rain is not. Both instances link the spiritual with certain physical features, yet only one – physical burial grounds – is recognized as worthy of protection from utilitarian calculations of economic value. One could argue that the inconsistency stems from the fact that water has multiple uses and satisfies many needs, creating a demand for a limited supply that makes it naturally suitable for economic valuations, whereas burial sites have no practical uses and thus do not fit into the economic model of supply and demand. On the contrary, such a rationale wrongly assumes that burial grounds have no economic value compared to the value of water; as parcels of land, burial grounds have numerous potential economic values such as housing, mining, agriculture or any other possible land use. Yet these instrumental land uses are thought to be intuitively inappropriate for burial sites, barring their development. The consecration of burial sites might result from the fact that all of the major monotheistic religious traditions, such as Christianity or Judaism, consider burial sites to have ancestral value but do not consider water or clouds to be sacred in the same manner. With regard to such considerations, the preference to respect “actual” burial grounds and not “symbolic” ancestral objects is unfounded if one is to be impartial to a spiritual or religious background.

In addition, even if burial sites had no economic value, this dichotomy still assumes a form of value singularity in which objects are capable of constituting only one set or type of

value: burial sites are spiritual places, whereas water is an economic good. The evidence cited in this analysis of non-monetary water values emphatically controverts this assumption that because water has an economic value, then it must be nothing more than an economic good. Just because water can have a monetary value does not mean that it necessarily does, nor always should be understood in monetary terms. The inclination to protect the ancestral value of water from economic valuations in the case of Hopi rain should be comparable to the protection offered to the Zuni burial grounds at Salt Lake.

2.1.7 Livelihood Value of Water

The value of water that derives from its role in securing one's livelihood seems to ostensibly be compatible with an economic valuation of water. The water that a farmer uses to irrigate his crops has an economic value that can be determined and calculated into the costs of managing the land. However, the sense of livelihood discussed here is not concerned with one's means of financial support or source of income; such understandings misconstrue livelihood as primarily an instrumental activity, a means to a monetary end. On the contrary, the concept of livelihood to be used in this analysis is a richer, more personal account of one's vocation and the value that water has in sustaining such activities.

Contrasting this sense of livelihood with the conception of subsistence will help illustrate this unique non-economic value of water. Subsistence primarily refers to one's physical survival, simplified to one's material requirements and the means to satisfy those needs. The value of one's livelihood, on the other hand, could include or entail the fulfillment of such material needs; however, livelihood value is conceptually broader than such subsistence needs. Livelihood elicits a sense of agency, a sense of control and purpose in regards to one's future. One can, in this

sense, fulfill their subsistence needs while not experiencing the sense of agency that accompanies a livelihood. The Marxian notion of alienation from one's labor highlights such a situation in which one has a source of income but feels no attachment to or personal involvement in the activity that supplies his or her financial means. The additional value one derives from engaging in an activity that not only enables them to meet their more basic, material needs but also satisfies their more complex, and intangible psychological needs is the livelihood value of water that is not captured by economic valuations.

The already cited case of the Lummi Nation and their salmon fisheries is a clear example of the livelihood value of water. While fishing for salmon did provide economic gains for the Lummi Nation, the fisheries were also the Lummi Nation's livelihood, representing a secure future for the tribe's way of life. The Lummi Nation's ability to engage in their livelihood, and thus control the cultural survival of the tribe, was shown to be predicated on a sufficient level of water in the Nooksack River needed to sustain salmon populations. Without the Nooksack River, the Lummi Nation's salmon fisheries would cease to exist, and with them, the Lummi Nation's sense of self-determination. The salmon fisheries provided the Lummi Nation with a sense of autonomy and self-reliance, preserving a traditional way of life, while ensuring that future tribal members will also have the same sense of agency when practicing the vocation of their ancestors.

The livelihood value of water is also apparent in the acequia communities, where water represents a necessary component of one's ability to practice his or her livelihood. There are features of the acequia water management system that ensure each individual within the community experiences, in very practical ways, their personal involvement in the future of the community. For one, the members of the acequia community are referred to as *parciantes*, or

participants, signifying that it is each individual's personal responsibility to engage in the communal activities, so as to contribute to the success of the acequia community as a whole. All *parciantes* partake in the annual spring ditch clean-up, maintaining the network of earthen ditches that bring water for irrigation. However, an important aspect of an acequia livelihood is the passing down of specialized knowledge: "...the *parciantes* must also continuously work at reproducing the highly specialized artisan knowledge that is necessary for skillful practice of flood irrigation with gravity-driven ditches" (Hicks and Peña 2003, 461). Experienced community members mentor younger *parciantes* for years, teaching them the complexity of the acequia system. This mentoring process is even incorporated into traditional rituals, such as *El cambio de agua* or the changing of the water, where through "experiential knowledge...lifelong mentoring relationships" are formed and play an important role in maintaining community cohesion and solidarity (Hicks and Peña 2003, 461).

The essential role that this generational transmission of knowledge of the whole system has for acequia farmers can be contrasted with a Marxian critique of the capitalist system in which workers are replaceable components, due to the fact that specialized knowledge is not needed to operate the parts of the whole: "...the speed with which machine work is learnt by young people does away with the need to bring up a special class of worker for exclusive employment by machinery...the very simplicity of the work allows a rapid and constant turnover of the individuals burdened with this drudgery" (Marx 1976, 546). While it might take decades for a *parciantes* to learn the skills he or she needs to successfully operate the acequia technology, the labor of the factory worker that Marx describes is so limited and simplistic that the worker is easily replaceable. This difference is made more apparent when Marx contrasts the work of a craftsman with that of a factory worker: "In handicrafts and manufacture, the worker makes use

of a tool; in the factory, the machine makes use of him...In manufacture the workers are the parts of a living mechanism. In the factory we have a lifeless mechanism which is independent of the workers, who are incorporated into it as its living appendages” (Marx 1976, 546). Marx explains the impact that such incorporation has on the identity of the individual, where “...the individual himself is divided up, and transformed into the automatic motor of a detailed operation” (Marx 1976, 481). The factory worker loses a sense of his human wholeness and individuality, taking on the identity of the “lifeless mechanism” into which he is now incorporated. On the contrary, the craftsman is part of a living system that reinforces his humanity and integrity. The craftsman makes use of a tool, maintaining his human identity while engaging in his work. The factory worker is unable to preserve his distinctiveness as he becomes incorporated into the machinery.

The disparity between the two forms of work exemplifies the difference between a livelihood and a subsistence; the members of an acequia community are not just engaged in an activity that represents a means to an end; they are essential “parts of a living mechanism,” – the acequia community – and their indispensable role in this living system furnishes their work with meaning and purpose. In contrast, Marx’s factory workers engage in a subsistence activity; their work represents only a means to an end, a way of meeting their most basic needs but never fulfilling more complex human needs such as integrity, dignity, a sense of belonging, or self-worth. Satisfying these needs is important to recognizing one’s life’s work as meaningful and satisfying. Thus, when the value of water is reduced to an economic value, it no longer represents these quintessential human needs that result from engagement in one’s livelihood rather than simply working for an income. The value of water for the fishermen of the Lummi Nation and the acequia farmers is more than its monetary value that is incorporated into the costs

of earning a living. Water represents their ability to do meaningful work that supplies them with a sense of agency and control over their lives.

2.2 Economic Proxies

Before it can be concluded that these non-monetary water values are incommensurable with economic water valuations, it is necessary to review the possible methods for capturing these values through economic proxies. Miriam Hammer offers an overview of such proxies, claiming that since, “we live in an economic world...for society to make the best decisions regarding the use of resources, it is essential to be able to compare the impacts of different uses on the same criteria” (Hammer 2002, 14). While this assumption will be raised and challenged below, for now it serves as a prime motivator for using economic proxies. This fact is worth noting, since one could argue that efforts to monetize non-monetary values are somehow malignant in intent, trying to impose the values of the dominant culture for purposes of acculturation. Contrary to such objections, this analysis will initially assume that the motivation behind economic proxies is essentially neutral or benevolent.

Prior to evaluating the various economic proxies in which non-monetary values are translated into monetary values, Hammer notes that an alternative, and often-overlooked strategy is available: translate all values into non-monetary terms (Hammer 2002). While this “could be labor intensive...there will be no danger of greater attention and weight being given to one culture’s values, or to one expression of values over another” (Hammer 2002, 19). However, since Hammer does not go into detail as to how such a translation could be accomplished, the practicalities of assessing all benefits and costs in terms of non-monetary values will have to be

considered on a case-by-case basis. Despite the intriguing possibilities of such an endeavor, it is beyond the scope of this current analysis.

Hammer outlines four possible economic proxies that can be used for capturing non-monetary natural resource values: Replacement Value Method (RVM), an adaptation of the Habitat Equivalency Analysis (HEA), Stated Preference Methods (SPM), and the Hedonic/Implicit Price Method (HIPM). Before using any one of these methods for official records, Hammer notes that consent from the tribe or community to partially value the relevant resource should first be obtained, since “some methods may be strongly objected to by some, if not many tribes” (Hammer 2002, 19). Once consent is given, these economic proxies can be used either by themselves or in combination to derive an economic proxy value.

2.2.1 Replacement Value Method

The RVM derives an economic proxy value for a resource, such as water, by calculating the market value of the foods and resources that could be used to replace the current foods and resources that depend on it. To determine these replacement values over an extended period of time, “each project year’s costs and replacement values are discounted back to the start year of the project...and these discounted costs are then summed to arrive at a total replacement value for the resources” (Hammer 2002, 19). For instance, if the water from a particular lake was needed for a five year construction project, and the water from that lake was used to only grow corn and for drinking water for a 200 person community, the value of that water could be calculated by assessing the market value of corn and drinking water, multiplied by the annual per capita needs of the community, plus any additional costs imposed by the project. This value is

then summed, and the chosen discount rate applied, to derive the total replacement value of the water resource.

While the advantage of such a method is its evident simplicity, its drawbacks are significant. Hammer notes three limitations of the RVM: (1) it cannot capture some important “use” values such as the quality of certain goods that may not be available in their substituted market goods (i.e., “the greater nutrition provided by game meats over domestically raised meats”), (2) if there are no substitutive goods on the market it will be unable to capture their value, and (3) it cannot calculate non-use values such as social or spiritual values of resources. Given these limitations, it can be concluded that the RVM will result in resource values that fall far short of the value of water discussed in the previous section. Specifically, it would not be able to account for the heterogeneous value of water since the RVM would view every unit of water as substitutable with every other unit of water: drinking water from a spring would be equivalent to drinking water from a bottle shipped from another region. Moreover, since all of the water values discussed were in one way or another “non-use” values, the RVM would not be able to capture the historical, sacred, ancestral, livelihood, or personal and communal identity values of water. It is possible that the RVM could partially capture the livelihood value of water, since the livelihood value includes the monetary value of the products that result from the activities of engaging in one’s livelihood. However, this value would be less than the total value of water that plays an essential role in preserving one’s livelihood. Due to these significant limitations of the RVM, it is unlikely to even begin to capture the full value of water in terms of the non-monetary water values discussed.

2.2.2 Habitat Equivalency Analysis

The second method is a revised version of the Habitat Equivalency Analysis (HEA), which is applied to assess the cost of lost ecosystem services due to pollution. The HEA method calculates the amount of land and/or water impacted by pollution and the percent of ecosystem services lost as a result. This percentage is then calculated for every year during the recovery process, until as much recovery as is expected has occurred, which is identified as the final year. Like the RVM, the value of these losses is then calculated by determining how much recovery land and/or water is needed in each year to compensate for the lost ecosystem services. These discounted replacement costs are then totaled to arrive at the HEA value (Hammer 2002).

In its revised version, HEA “interprets ‘habitat’ as traditional tribal land and water resources...[and the] ‘ecosystem services’ lost or gained needs to be re-interpreted as a percentage of ‘societal services’ lost or gained” (Hammer 2002, 21). To illustrate such a calculation, consider the loss of Hopi sacred spring water due to pumping from Peabody Coal. In this case, the HEA method would be applied in the following way: each year in which Peabody pumped water from aquifers that fed Hopi springs, the percentage of “societal services” lost could be considered to be the number of religious ceremonies that the Hopi were unable to perform due to dry springs. Out of the total number of ceremonies the Hopi perform each year, these lost ceremonies can be calculated as a percentage that increases or decreases each year that Peabody pumped aquifer water. One would then have to determine how much land and/or water resources are needed to replace the lost religious ceremonies every year at a discounted rate. The cost of the replacement land and/or water resources would be the economic equivalent of the value of the lost water, as derived from the percentage of lost religious ceremonies.

Hammer notes some adjustments that may need to be made on a case-by-case basis when using this method, some of which indicate the limitations of the HEA method. The HEA method first assumes that the value of the “ecosystem services” or “societal services” is constant through time. However, it is possible that some religious ceremonies hold more importance in different years for the Hopi. In this case, Hammer notes that “adjustments to the valuations on a per-year basis will need to be made” (Hammer 2002, 21). Exactly how these adjustments are to be made is unclear since quantifying the relative significance of a religious ceremony might be problematic. Secondly, the HEA method assumes that the cost of the replacement land and/or water resources is equivalent to the actual value of the original resources. This original value is determined by their impact on Tribal health and well-being. While Hammer notes that inflationary adjustments should be made in the case where the cost of replacement resources is not equivalent to the value of the original resources, there could be issues with making this adjustment. As with many Native American reservations, the Hopi reservation land is of low value. Furthermore, this low value is sometimes exacerbated by the fact that the Bureau of Indian Affairs has historically sold mineral leasing rights, causing many of the reservation lands to be polluted (Hammer 2002). Consequently, due to this low original value, the cost of the equivalent replacement land and/or water resources will also be low, resulting in a small HEA valuation that would likely fail to capture the value of those resources for the tribe.

In addition, there are numerous issues concerning whether or not a percentage of lost societal services actually captures the cultural or sacred value of water. For one, this method assumes that ceremonies themselves are valuable, whereas ceremonies are usually experienced as acknowledging or honoring values. While ceremonies might be valuable they are not values themselves. However, even if ceremonies are values themselves, the method is still problematic.

Quantifying cultural practices, as a percentage, may misconstrue their actual value to those who practice them. In particular to the case of Hopi water, it is questionable as to whether the percentage of lost societal services will be able to capture the personal identity value of water, such as the Hopi personal names. It seems unlikely that a percentage could represent such personal identity value of water, even if it is assumed that a percentage could represent the communal identity value through lost religious ceremonies. Nonetheless, the method quantifies lost societal services as a proxy for cultural values, but it does not capture the specific non-monetary water values that those ceremonies acknowledge.

Moreover, there is still the issue that relying on replacement resources to determine a proxy value assumes that water is inherently substitutable for any equivalent quality and quantity of water. In this case, it is assumed that the value of the lost spring water can be found by calculating the value of an equivalent quantity and quality of water, which will likely be bottled water shipped onto the reservation. However, from within the perspective of water heterogeneity, water shipped to the reservation is likely to be of lower value than spring water to the Hopi, since spring water has significant symbolic importance, as a gift from the deities. The journey or hydrologic history of the water is an essential factor in determining its value. Water is not interchangeable in the way it is assumed to be by these economic proxies, which use replacement values, such as the RVM and HEA.

2.2.3 Stated Preference Methods

A Stated Preference Method (SPM) obtains an economic proxy by gathering information acquired through surveys and questionnaires, in which members of a tribe or community are asked “either how much they would be willing to pay for an amenity they do not have, (called

Willingness to Pay or WTP) or how much money they would insist upon receiving for an amenity they would give up, (called Willingness to Accept or WTA)” (Hammer 2002, 21). Both questions are part of a SPM called the Contingent Valuation Method (CVM), which has an advantage over both the RVM and HEA methods since the CVM is able to capture both use and non-use values through surveys responses.

While Hammer notes some practical difficulties with the CVM, such as the time and resources needed to administer the surveys, as well as their limited applicability for legal use in courts, there are some other, more delicate difficulties with the CVM. Since the resource value that results from the CVM is based on surveys, it has been noted that there needs to be a sense of trust between the researcher and the members of the tribe or community, in order to obtain genuine responses upon which a value can be derived. For instance, in a CVM study conducted by Murray *et al.*, that assessed natural resource values of Aboriginal bands in Northern Saskatchewan and Northern Alberta, it was noted that of the six researchers collecting data, five were Aboriginal and four spoke Cree, the native language of the respondents. While the study does not expand on how the backgrounds of the researchers impacted the study, it can be assumed that both the ease of communication and the shared ethnic backgrounds were factors that positively influenced a sense of trust between the tribal members and the researchers. In addition, the study does note that holding casual meetings with the Band Council members to report on their findings had a beneficial influence: “[band councilors] were reasonably comfortable that the study was not merely extracting data from the Band members and that they would benefit from the findings. This sharing of data was important to confirm the nature of the findings and to develop rapport for possible future work” (Murray, et al. 1995, 16). The ability to accurately determine an economic proxy value for the natural resources of the aboriginal band is

predicated on the respondents trusting that the researchers will not use their responses against them or for purposes members of the tribe would find inappropriate.

In particular to the WTP or WTA versions of the CVM, there is no assurance as to whether responses will be given or, if they are, whether responses would be able to capture less tangible water values such as personal identity or sacred value. In the first case, individuals could either not respond to surveys or provide protest responses, in which individuals might claim that there is no monetary value that they would be willing to pay or willing to accept in exchange for a resource (Jones, Sophoulis and Malesios 2008). Such responses are likely to be to the disadvantage of the respondents since economists interpret them as representing one of two possibilities: “Either the value of the resource to American Indians is zero or it is infinite” (Hammer 2002, 5). Unfortunately, economic valuations struggle to rationalize infinite value, which would “imply that everything else may be sacrificed in favor of the infinitely-valued resource” (Hammer 2002, 5-6). Consequently, it is more likely that the refusal to cite a monetary value for a resource will be interpreted as that resource having no value for the particular community being queried. There is, however, a different conclusion that can be drawn from this dynamic between protest responses and their economic interpretations: the standards by which monetary and non-monetary valuations are judged differ in a way that prevents accurate translations of the values. If value incommensurability were acknowledged and embraced, then the conclusions drawn from these reductive economic interpretations would likely not be accepted as accurate descriptions of resource value.

In the second scenario, where responders attempt to provide a genuine monetary value, it is still doubtful as to whether such a value accurately represents the non-monetary value or values of water. Take for instance the Hopi personal names and the acequia personal-communal

identity, both of which demonstrate the value of water that derives from its role in forming one's personal identity. In these cases it becomes difficult to see how one could answer the amount of money they would be willing to pay or willing to accept payment for their water. A more universally relatable analogy can be made to demonstrate the incoherence of the WTP or WTA techniques for this type of value: one's role within their family, as a brother, father, sister, or mother, is formative to their self-identity. The value of those relationships that create this identity does not just derive from one's affection towards their family members; some of the value derives from the impact such relationships have on one's identity: part of my identity is predicated on my familial ties.

Yet, to ask someone to place a monetary value on these relational ties that are formative to one's self-identity would be to misinterpret or fail to accurately comprehend the type of value involved. If one were asked what they would be willing to pay or accept to continue being a mother, it is reasonable to expect that most mothers would take no monetary compensation, since there is no monetary price that could capture the value of being a mother. That isn't to say that one's identity, as a mother, is valueless; rather, its value cannot be assessed on an economic scale. The personal identity value of water in the cases of the Hopi personal names or the acequia community membership is comparable to one's familial identity. In each case, specific aspects of one's self-identity fundamentally depend on a water source. Yet to request that one place a monetary value on water, either in the form of how much they would be willing to pay or how much they would require to be paid, will likely not receive an answer that accurately represents the genuine value of the water, just as the mother would accept no monetary compensation for continuing to be a mother. Efforts to translate such non-monetary values through quantifying their economic proxies will ultimately fail. If non-responses, protest responses and genuine

responses are all likely to result in an inaccurate valuation, then it seems reasonable to conclude that the wrong questions are being asked and not that the wrong answers are being given.

2.2.4 Implicit Price/Hedonic Method

The last method for obtaining an economic proxy may come closer to quantifying the total value of resources for Native American tribes or other traditional communities, according to Hammer. The implicit price/hedonic method is motivated by the following theory: "...if American Indians choose *not* to live like their non-American Indian neighbors, then the value of this American Indian lifestyle must be at least as large as the wages necessary for non-American Indians to maintain their lifestyles in the same area" (Hammer 2002, 22-23). In other words, the forgone wages that result from living a certain lifestyle rather than another are considered to be the minimum value that the chosen lifestyle has for those who prefer it. Hammer notes that the advantage such a method has over others, especially the methods based on replacement values, "is that it acknowledges that choice of lifestyle expresses a value beyond simple physical survival" (Hammer 2002, 23). Such an advantage would be most pronounced in the case of the value of water for acequia communities or the Lummi Nation, since part of that value derives from water's role in preserving their livelihood, either as farmers or salmon fishermen. The implicit price/hedonic method accounts for this livelihood value by comparing it to "the wage foregone in a more market-oriented economy" (Duffield 1997, 105). From this wage difference, it can be calculated that the livelihood value of water for acequia farmers or Lummi fishermen is the difference in pay that they would make if they worked for large-scale agriculture or commercial fisheries. To forego these wages implies that they value their livelihood at least as much as, if not more, than the wages they could be earning.

There is an inherent problem with using the implicit price/hedonic method as a means of deriving the livelihood value of water: even if using foregone wages as a proxy reflected the actual livelihood value, it would still not capture the specific value water has in sustaining that livelihood. This problem is two-fold. First, the implicit price/hedonic method is based on some fundamental assumptions about the reasoning process that precedes one's choice of occupation. It assumes that in choosing an occupation, one is aware of all the employment options available to them. Thus, for an individual to rationally chose an occupation that pays less than another must mean that the occupation of choice is more valuable. This conclusion, however, fails to consider the many other factors that influence the decision made: one could be, and very likely is, unaware of other occupational opportunities; the higher paying options could have undesirable factors such as pervasive racism, sexism, or other features of discrimination. Overall, the ideal conditions that the method assumes are unlikely to be even approximately reflective of the actual circumstances that factor into one's decision.

Nonetheless, even if one were to assume such ideal conditions, as economists usually do, the economic proxy still will not result in the value relevant here. The implicit price/hedonic method results in a general value of one's livelihood but not the particular value that water has in sustaining and preserving that livelihood. The value of one's livelihood is not equivalent to the livelihood value of water, which is the value relevant to this analysis. Furthermore, even if the specific livelihood value of water were to be captured through this method, there are no strong reasons to believe that this method could capture any of the other non-monetary water values discussed.

Finally, even if all of the above problems were capable of being resolved, there is something about the implicit price/hedonic method in particular, and most economic proxies in

general, that seems inherently unfair: use of a proxy typically causes one value to be dependent on forces or mechanism unrelated to that value. For instance, the implicit price/hedonic method makes the value of one's livelihood dependent on the wages of more market-driven occupations. The wages in these occupations, however, are themselves the product of market forces that affect the supply and demand of occupations. Consequently, if the wages of large commercial fisheries or agriculture dropped significantly, then the livelihood value would also drop since there would be a smaller discrepancy between the earnings of the Lummi fishermen or the acequia farmers and their market equivalents. This drop in livelihood value, however, does not reflect a change in how the Lummi fishermen or the acequia farmers value their livelihood. The change in livelihood value is the indirect result of the influence of market forces on the wages of the occupational equivalents. The fact that the livelihood value would fluctuate according to such unrelated forces seems intuitively unfair and unreliable.

From the numerous issues that result from the use of these economic proxies, it seems plausible to conclude that reductive efforts that try to quantify these non-monetary values will likely be unsuccessful. With so many complications and flaws that plague the various methods used to obtain an economic proxy, the prospect of achieving results that are satisfactory to all parties involved seems limited. Thus, with respect to Miriam Hammer's initial assumption that it is necessary, for practical reasons, to use a single standard upon which values are assessed for making optimal resource decisions is challenged by this investigation's central thesis of value incommensurability. Rather than pursue inherently faulty efforts to obtain economic proxies for non-monetary water values, one can accept the limitations of a cost-benefit analysis – since such an analysis requires a single standard of measurement – and make natural resource decisions that take into account all of the relevant values. Furthermore, when non-monetary water values are

translated through economic proxies, they lose their connection to the social and cultural contexts out of which they emerge. By accepting the fact that water values are not only incommensurable but also contextual, i.e., the meaning of the value can only be understood within a social or cultural context, one is forced to take account of the social circumstances that are necessary for gaining an accurate understanding of the non-monetary values when resolving water conflicts.

2.3 Legitimizing Value Pluralism

Through an understanding of water values as both contextual and incommensurable one is lead to the conclusion that water values are irreducibly plural. Yet, this pluralist position necessitates justification about the legitimacy of plural water values; what makes a value legitimate or worthy of consideration when making water distribution decisions? The following evaluation will propose reasons why these water values are at least minimally legitimate as well as why the reductive economic assumption about water value is not justified.

Arguing for value pluralism within resource distribution decisions requires the identification of standards by which values are accepted as legitimate since pluralism, unlike value relativism, does not entail that every value is legitimate or ought to be considered. One argument for considering such non-monetary water values to be legitimate is based on the concept of burden of proof. Specifically, it is reasonable to assume that if an individual or community genuinely value water for particular non-monetary reasons that form an essential basis of an identity, cultural traditions or sacred practices, then the value ought to be presumed to be legitimate unless proven otherwise. For instance, if it can be shown that a water value is based on sacred beliefs that were not genuinely held but were constructed for strategic reasons, then the

legitimacy of that value should be called into question. In such a scenario, one would claim a right to water based on disingenuous religious beliefs for the strategic purpose of acquiring water resources. However, until such strategic or deceptive motives are verified, the burden of establishing the legitimacy of value claims ought to be placed on those who contest their legitimacy.

In addition, principles of consistency should guide legitimacy claims about water values. If one is to deny the legitimacy of Hopi claims about the sacred value of water, then such a rejection ought to be consistent in terms of the legitimacy of other sacred water values, such as the sacred value of baptismal water for Christians, or mikvah baths for Jews, or the Ganges for Hindus. To remain consistent, one must argue that such sacred water values, regardless of the religion or belief, are always illegitimate when considering resource distribution decisions. To illustrate the consequences that such a position would entail, consider the case of the Ganges: if, hypothetically, there were project proposals for the development of hydropower on the Ganges that would negatively impact the river and, consequently, effectively prevent the practice of certain religious customs, considerations regarding such proposals would be justified in excluding the sacred value of the water as a relevant factor. Granted, it is feasible for one to endorse this position and consistently deny the legitimacy of sacred water values; however, such an extreme stance is likely to be countered with strong, compelling reasons why such sacred water values are legitimate. Most would agree that this sacred aspect of the value of the water ought to be considered, especially when such value is threatened by potential development projects. But to accept the legitimacy of the sacred value of the Ganges for Hindus entails that other sacred water values also ought to be presumed to be legitimate unless shown otherwise, as noted above.

This issue of consistency was noted in the discussion on the ancestral value of water, in which it was shown that there are no distinct reasons for recognizing the legitimacy of the ancestral value of water in the case of Zuni burial sites near Salt lake that also justify denying the legitimacy of such values in the case of rainwater for the Hopi. If the individuals or community genuinely hold either form of the ancestral value of water, then it is inconsistent to deny the legitimacy of one and not the other.

Finally, not only are there compelling reasons for accepting these contextual, non-monetary water values as legitimate, but also there are no justifiable grounds for the reductive assumption that the only legitimate water value is its economic value. While some might argue, like Miriam Hammer, that there are practical reasons for reducing the value of water to its economic value, there are no normative reasons why this economic value is the *only* legitimate value. Thus, in the absence of arguments that justify the reductive economic assumption about the value of water and the illegitimacy of all other non-monetary water values, considerations about the legitimacy of water values should instead prioritize issues of justice that are salient in such matters. Specifically, the systematic privileging of certain dominant values to the detriment or exclusion of values that are primarily held by minority populations or disadvantaged communities is an issue of justice, particularly within a democratic society that strongly identifies with principles of inclusion and representation. Such issues of justice are made central when there is a plurality of legitimate water values that require fair consideration in resource distribution decisions.

From the conclusion that water values are irreducibly plural and worthy of consideration, the final chapter of this analysis will argue that there are means for adjudicating among these

water values and that doing so results in more just water allocation decisions than the value reductionism of prior appropriation.

CHAPTER THREE: CONTEXTUAL WATER VALUES AND DISTRIBUTIVE CRITERIA

“No one particular meaning defines a complex good. Consequently, just arrangements sustain the complexity to which all aspects of a complex good otherwise contribute....Complex equity opposes reductionism.” (Arnold, San Luis Valley and the Moral Economy of Water 2008, 53)

Introduction

Accepting water value pluralism will not, in itself, lead to a more just allocation of water resources. There is still the issue of how resource policy or other decision-making processes integrate and adjudicate among these values. To show that there are ways in which value pluralism can result in fair outcomes, three questions must first be answered: 1) How does value pluralism impact the current system for valuing and allocating resources? 2) How does the incorporation of value pluralism into resource allocation criteria make policies, like prior appropriation, more just? 3) What theories have been proposed for incorporating value pluralism into decision-making processes? Once these three questions are answered, it will be argued that a necessary condition for any water policy to be considered just is the capacity to at least recognize and incorporate into decision-making processes the various incommensurable and contextual water values.

In regards to the first question, this analysis will introduce the pluralistic framework of Joachim Blatter, Helen Ingram and Suzanne Levesque to demonstrate how value pluralism impacts the dominant valuation system. The second question concerning the justice of value pluralism will make use of Thomas Arnold’s conception of complex equity. This notion is not itself the criterion upon which water allocation decisions are based. Rather, it evaluates whether

or not the relevant distributive justice criterion, such as the utilitarian principle, is itself a just standard for allocating social complex goods, i.e., those resources that instantiate a plurality of values and social meanings, such as water. In answering the third question, this analysis will not exclusively or unreservedly endorse any single theory of procedural justice, as most have numerous theoretical complications that require further research. Nonetheless, an overview of various procedural justice theories, including Arnold's principle of due process, as well as deliberative democracy theories, will demonstrate that there are ways of addressing value pluralism that will result in fair outcomes.

3.1 Contextual Approach to Water Values

By accepting the legitimacy of water value pluralism and, consequently, denying the conceptualization of water as exclusively an economic good, this analysis implicitly challenges the sufficiency of the dominant utilitarian system of economic valuation by introducing and explicating modes of valuing that are commonly overlooked or dismissed as insignificant. Similarly, Joachim Blatter, Helen Ingram and Suzanne Levesque describe a pluralist approach to valuing resources that they propose as supplementary to the conventional legal, technical and economic analyses that currently dominate water resource management and conflict evaluations. These dominant frameworks epitomize what the authors characterize as “the modern (individualistic, rational, and utilitarian) perspective on water” in which the meanings of water are “narrow [and] bounded” (Blatter, Ingram and Levesque 2001, 32). According to these reductive perspectives, water is nothing more than a natural resource with a specific physical-chemical makeup that is recognized as having a monetary value.

The pluralist account of water values advocated for by both the authors, as well as this current analysis, does not explicitly aim to replace the legal, technical or economic valuational frameworks for water. Rather, such an account is meant to “complement rather than to supplant modern approaches” (Blatter, Ingram and Doughman, *Emerging Approaches to Comprehend Changing Global Contexts* 2001, 4). While value pluralism is not fundamentally a confrontational position, as it is primarily based on the claim that economic valuations ought to be supplemented by plural contextual valuations, it nonetheless poses an implicit challenge by disputing the adequacy of value systems that are inherently incapable of integrating value pluralism. In explaining this pluralist account, the authors note: “we nevertheless realize that our endeavor represents a direct challenge to modern scholarship on a more abstract methodological level,” since the approach requires any water analysis to “first understand the meaning of water as it exists in a particular local place or social context. Only then can the scholar apply specific explanatory approaches” (Blatter, Ingram and Doughman 2001, 4). Even introducing a contextual form of value pluralism implies that the various legal, economic and technical explanatory approaches to water use and distribution decisions are not sufficient, on their own, for providing accurate accounts of water conflicts. Thus, value pluralism inherently challenges the dominant value system by supplementing it with a contextual account of incommensurable values.

While Blatter, Ingram and Levesque contrast the pluralistic value approach with three distinct frameworks for analyzing water conflict and management – political, technological and economic – specific attention will be paid to the economic analysis of water, as it is most pertinent to many of the arguments made in favor of prior appropriation. With regard to the economic framework, the authors corroborate the central premise argued throughout this

analysis: not only does water instantiate a plurality of values as “an essential component of the creation of identities of traditional and new communities,” but those water values are also incommensurable with their economic counterparts (Blatter, Ingram and Levesque 2001, 34). A consequence of accepting incommensurable water values is that “since the various meanings and values of water cannot be conceptualized within one single dimension, the economic rationale for Pareto optimality is stripped of its legitimacy as a “fair” and rational principle for allocation” (Blatter, Ingram and Levesque 2001, 34).

As was demonstrated in the first chapter, economic arguments in favor of prior appropriation depend, in part, on the rationality of a Pareto optimal distribution. However, accepting that water values cannot be conceptualized within a single dimension or by a shared standard has repercussions for those attempts that try to justify prior appropriation based solely on its ability to achieve an economically efficient allocation. If one accepts that water instantiates a plurality of values, some of which are incommensurable with economic values, then the use of Pareto optimality to exclusively justify a water decision becomes unwarranted. Since Pareto optimality wrongly assumes that water values are commensurable, its use as the sole justificatory measure for a water policy is insufficient. Such consequences demonstrate the impact that the inclusion of the value pluralist approach has on the reductive economic perspective of water values.

For these reasons, the contextual non-monetary water values illustrated above call into question the extent to which the reductive account represents a comprehensive understanding of the relevant water values. The Hopi tribe views water as an intrinsic part of their cultural and personal identity, distinguishing among different water sources the various sacred and ancestral values that they represent. The conflict over the Nooksack River illustrates the social

significance that water has in preserving the Lummi culture and way of life as salmon fishermen. The acequia community's struggle to defend their water from economic speculation demonstrates water's role in sustaining a community identity and livelihood. The historical value of Rice Lake to the Sokaogon Chippewa shows water's temporal link to the migratory prophecies that define the tribe's cultural identity. The ancestral value of Salt Lake for the Zuni Tribe illustrates water's connection to one's familial history, reaffirming the values of the past. Each of these cases and numerous others implicitly challenge the dominant water value system by undermining the assumption that economic valuations are universally applicable.

3.2 Arnold's moral economy and the principle of complex equity

Thus far, it has been assumed that incorporating values that are not captured by a resource allocation criterion would make a water policy, like prior appropriation, more just. This assumption, however, requires further explanation since one could challenge whether non-monetary water values are relevant to resource allocation decisions. In other words, one could accept that water instantiates a plurality of values, while still denying that those values are decisive factors that ought to be considered by resource policies. In addition to the arguments already provided concerning the legitimacy of water values, such objections will be responded to through use of Arnold's notion of complex equity.

As a principle of justice, complex equity rests on the more basic notion of a complex social good. The term 'good' is broadly construed as those "objects and qualities whose possession or consumption confers some kind of benefit and satisfies human needs and wants" (Arnold, *Rethinking Moral Economy* 2001, 90). While many goods that fall within this definition are conventionally identified by their material or commercial nature, there are social

goods that confer, what Arnold refers to as, more “abstract” benefits, such as “opportunities, powers, rights, security, community, and well-being” (Arnold 2001, 90). Despite the fact that the distinction between the two types of goods is not absolute, since all goods are in some way social – “any identification of an object as a good unavoidably draws on culturally constructed and culturally transmitted ideas about human needs, wants, and benefits” – social goods are prominently identified with these more abstract social benefits, which “extends beyond their purely material or commercial properties” (Arnold 2001, 90-91). In addition, part of Arnold’s substantive view of social goods is the claim that they are complex, i.e., plural, so that even if a social good does have an economic value, it will still “harbor more than one kind of meaning and value” (Arnold 2001, 92). Therefore, complex social goods represent a plurality of values, which, unlike commercial goods, do not make essential reference to an economic value.

Moreover, the values and meanings of complex social goods are “not always perfectly compatible,” which can give rise to conflicts that do not primarily pertain to concerns over “more favorable allocations or greater material gain...[but] what *kind* of value should prevail in particular, often changing situations” (Arnold 2001, 92). With regards to such value conflicts, Arnold argues, “water in the arid American West is a particularly good illustration” of a complex social good:

...westerners conceive and cherish water in terms beyond those of mere economic utility. It is not simply a liquid with certain physical properties, a thing unto itself, a commodity whose value is realized only or essentially in economic exchange. Water symbolizes inherently desirable states of affairs achieved and experienced only in concert with others...Because of these deeply valued and clustered senses of community and self, water issues turn on far more than questions of how to allocate efficiently an increasingly scarce yet increasingly valuable resource. (Arnold 2001, 93)

As a complex social good that instantiates a plurality of values in a particularly arid environment, western water is prone to allocation conflicts. According to Arnold, when evaluating such

conflicts, one should ask “which water-related value should prevail and why in given situations” (Arnold 2001, 93). If this question fails to be asked, as is presumably the case with prior appropriation, then the subsequent evaluation of the conflict will be incapable of sufficiently comprehending many of the pertinent issues and values involved, thereby producing what is likely to be perceived as an unjust outcome. However, with respect to the objection that such values might not be relevant, it is still unclear precisely why failure to consider the multiple values of water would entail an unjust outcome.

To answer this question, one must comprehend the normative nature of complex social goods. According to Arnold, one ought to account for the prevailing values in a given context since complex social goods, by their nature, “merit...official recognition [and protection] of their varied meanings and values within all effective decision-making arenas related to the good in question” (Arnold, *San Luis Valley and the Moral Economy of Water* 2008, 53). In particular, to fail to recognize water as a complex social good would be to “conceive the good incompletely and, therefore, unfairly” (Arnold 2008, 53). The fact that complex social goods merit the recognition and protection of their value pluralism gives rise to Arnold’s principle of complex equity, according to which, “justice rests on managing complex social goods in light of their multiple meanings and values, and on rendering those meanings and values their due” (Arnold 2008, 53). Consequently, resource allocation criteria that do not satisfy the principle of complex equity because they incompletely conceive of the good by failing to “regard complex social goods as complex commit a kind of injustice; they conceive the good as something other and less than what it is for many individuals and communities most directly affected” (Arnold 2008, 53). According to Arnold, such criteria would be regarded as unjust.

With regard to the conceptual framework of complex social goods described above, the following section will aim to evaluate procedural justice theories that satisfy the principle of complex equity. The analysis will first discuss Arnold's principle of due process, which provides guidelines for achieving just decision-making processes when dealing with value pluralism. After noting the limitations of this account, other deliberative democracy theories, which aim to produce fair outcomes within the context of value pluralism will be evaluated.

3.3 Procedural Justice

As a way of addressing the value pluralism of complex social goods, Arnold offers his principle of due process, which aims to provide guidelines for how decision-making processes could satisfy the principle of complex equity. Due process relates to the fairness of decision-making processes, which Arnold argues is based on the belief that "water policies are fair when they involve all affected interests, carefully consider all posed alternatives, and rest on known and good reasons" (Arnold 2008, 38). While acknowledging that in practice "water policies cannot help but favor some meanings and values over others," Arnold still claims that this "does not exempt them from the justice of giving an account" of all the values involved (Arnold 2008, 54). For this reason, Arnold offers two general recommendations for structuring decision-making processes: 1) decisions are made in open public forums and 2) they are grounded in deliberation (Arnold 2008).

In terms of the first recommendation, Arnold argues that open public forums are effective settings for facilitating the recognition of value pluralism since they "grant all affected interests a voice in the decision-making process" (Arnold 2008, 54). If the consideration of all relevant values is a necessary feature of fair decision-making, then Arnold reasons that creating a setting,

which enables those affected by a water distribution to voice their concerns, will foster more inclusive discussion. There are, however, numerous issues with this condition of participation by “all affected interests.” Some critics have discussed the practical issue of scale, noting that the standard of full participation in a decision-making process is an unachievable ideal since in large numbers rational discourse is prone to become speech-making and rhetoric (Parkinson 2003). Additionally, even if one were able to achieve sufficient participation in an open public forum, there are many pervasive social prejudices that could either inhibit individuals from voicing their opinions or prevent others from understanding or taking seriously the concerns of minorities or underprivileged groups. While many solutions have been proposed to these issues of inclusion in decision-making processes, it is worthwhile to note the numerous problems inherent in Arnold’s recommendation of an open, public forum.

The second recommendation endorses discussion grounded in deliberation. This feature of deliberation pertains to the processes that enable water policies to “rest on known and good reasons.” In other words, deliberation, which is the process of “articulating and then carefully weighting the effects of promoting one set of meanings and values rather than another,” fosters fair decisions that rest on good reasons (Arnold 2008, 54). Perhaps in response to some of the problems noted above, Arnold’s recommendation of deliberation could be conceived as a way to avoid the potential problem of an open public forum where voices are heard but not sincerely taken into consideration. Despite the fact that engaging in deliberation requires that all interests and values be weighted alongside each other so as to arrive at a fair decision, there is still the issue of scale in which rational deliberation can be frustrated when too many individuals and interests are involved.

Despite the many practical and theoretical issues involved in Arnold's theory of procedural justice, it is still useful to illustrate the principle of complex equity and due process in action. Using the case study of the water conflict in the acequia community of the San Luis Valley presented in the previous, Arnold evaluates the underlying reasons that efforts to privatize and sell the Valley's water for a monetary profit were unsuccessful. According to Arnold, such efforts failed to satisfy the principle of due process when they "assumed, rather than demonstrated, the superiority of water's status as an article of commerce" (Arnold 2008, 54). These failures do not necessarily entail the conclusion that water isn't an article of commerce; rather, Arnold argues that they demonstrate that such a conclusion was not perceived as resting on known and good reasons, a necessary condition for fair decisions achieved through deliberation. It is not impossible that, hypothetically, through deliberation in an open public forum the San Luis Valley residents and acequia farmers could have agreed to a private sale of water so long as its nature as a complex social good was respected. But by assuming that the prevailing value of water was its monetary value, proposals to sell it would have always been met with protest since, "water is much more. It is also a social good, the basis for, among other things, uniquely valued identities, relationships, and civic associations" (Arnold 2008, 55).

Through this water case study, Arnold argues that the goals of avoiding resource conflicts, achieving successful policy decisions, and managing complex social goods as they merit are in fact interconnected: "Policies that ignore or downplay one or more of the many uses, meanings, and values of water increase the chances for political conflict and defeat. Policy success is instead a matter of inclusion and balance" (Arnold 2008, 55). While evaluating water conflicts within a value framework like the principle of complex equity provides a useful perspective to understand some of the underlying value tensions, Arnold's two recommendations

for achieving procedural justice are limited by numerous complications, leaving them inadequate for ensuring just outcomes.

Nonetheless, there are other procedural justice theories, such as deliberative democracy theories, which provide ways for avoiding the reductive value account of water. A broad overview of deliberative democracy theories will introduce other options for accommodating water value pluralism into distribution decisions, albeit options still encumbered with their own theoretical and practical difficulties.

Due to the vast and diverse nature of deliberative democracy theories, for brevity, this overview will focus on a few broad conceptual elements within deliberative democracy that relate to the value pluralism of water and the principle of complex equity. A common feature among all deliberative democracy theories, according to James Bohman, is that “they all reject the reduction of politics and decision making to instrumental and strategic rationality” (Bohman 1996, 5). This shared feature of deliberative democracy theories to oppose reductive decision-making criteria is similar to Blatter, Ingram, and Levesque’s supplemental approach to resource decisions, which implicitly denies that political, technological and economic frameworks are sufficient for achieving just allocations. Both deliberative democracy theories and the pluralist approach to resource distributions reject the legitimacy of reductive decision-making processes that are based primarily on instrumental reasoning.

This rejection of reductive, instrumental criteria could relate to the fact that an important objective of deliberative democracy, according to Michael Rabinder James, is to produce “dialogues aimed at understanding other participants’ situations, beliefs, and interests, along with vigorous debates meant to assess the desirability of proposed measures” (James 2004, 4). Similar

to Arnold's recommendation of deliberation for the principle of due process, gaining an accurate understanding of the views or values of others so as to prevent any interests or concerns from being unjustifiably dismissed or trivialized is an important feature of deliberative decision-making. In this regard, James specifies, "...deliberation is legitimate to the extent that the criticism of perspectives or world-views follows their understanding" (James 2004, 52).

Although James notes various issues with this understanding requirement, such as the time and energy demands as well as the "ontological limitations...that certain beliefs or practices can only be understood through lived experience," he qualifies the requirement by acknowledge that complete understanding of another's perspective may not be attainable but "provisional understandings remain possible" (James 2004, 60). However, it is still necessary to keep in mind the limitations that are inherent in such deliberative decision-making processes and how these limitations might impact the fairness of the outcome.

Furthermore, it should be noted, at this point, that there is disagreement among theorists of justice as to whether the conditions of procedural justice are sufficient for yielding legitimate or fair outcomes. As a theorist that denies that sufficiency of procedural processes for distributive justice, James argues that even though his analysis outlines deliberative processes, "it is not a purely procedural theory...[since] an outcome of a deliberative, democratic process cannot be taken as legitimate simply because the proper procedural rules were followed. *Substantive outcomes*, like laws [or] policies...must be contextually assessed in light of the claims and situations of members of different groups" (James 2004, 5). According to justice theorists like James, even if the ideals of inclusion and deliberation are realized, this alone does not guarantee that the decision will be just. Conversely, Mark Button and David Michael Ryfe argue that the procedural justice of deliberative democracy is sufficient for generating legitimate

outcomes: “By stipulating fair procedures of public reasoning that are, in principle, open to everyone, the outcomes of a deliberative procedure will be seen as legitimate because they are the result of a process that is inclusive, voluntary, reasoned, and equal” (Button and Ryfe 1995, 27). According to Button and Ryfe, so far as the decision-making processes fulfill these standards of procedural justice, the outcomes will always be fair.

While this debate merits a more in depth evaluation, this analysis intends to remain neutral by posing the weaker claim that a just allocation of water resources is unlikely to be realized without initially ensuring that water, as a complex social good, is given its due by recognizing its contextual value pluralism. Despite all of the difficulties involved in realizing the standards specified by the procedural justice theories presented, there are avenues by which the irreducible value pluralism of water can be incorporated into resource distribution processes so as to result in fair decisions.

3.4 Summary

This analysis established the theoretical conclusions that can be drawn from the evidence of water value pluralism and identify possible practical applications for arriving at fair resource decisions. In previous chapters, it was demonstrated that there are certain water values that are not captured by the doctrine of prior appropriation and that those values are incommensurable with the economic valuations that establish water rights. This theoretical framework first introduced the pluralist approach to resource valuations proposed by Blatter, Ingram and Levesequé as a comparable analysis to the position posited here. In particular, the authors describe how a pluralist approach to water values would impact the current reductive economic approach to water values. By supplementing the economic approach with social contextual, non-

monetary water values, this alternative value perspective implicitly challenges the ability of economic valuations to sufficiently account for the value pluralism of water resources.

Next, Thomas Arnold's principle of complex equity is presented as an evaluative measure to assess the justice of distribution criteria for complex social goods, like water. Complex social goods are perceived to have value beyond mere economic valuations and therefore warrant the inclusion of such normative considerations. According to Arnold, such goods merit the recognition and protection of the multiple values that they instantiate. Further, this normative consideration should influence decision-making processes and distribution decisions. Arnold's principle of due process is presented as a practical means for recognizing and preserving value pluralism. However, the numerous complications inherent in his recommendation that fair distribution decisions be made in open, public forums where deliberation can take place, diminished the applicability of Arnold's theory of procedural justice. Following these problems, a general overview of the central features of deliberative democracy theories is given as an alternative means for achieving complex equity in decision-making processes.

While each of the procedural justice theories described have their own theoretical and practical difficulties, these problems alone do not undermine one of the basic positions argued for in this final analysis: there are ways for incorporating value pluralism into resource decision-making processes and that such processes are more fair than the value reductionism of prior appropriation. Specifically, prior appropriation fails to capture and incorporate into water use decisions legitimate non-monetary water values that are grounded in social and cultural contexts and are incommensurable with the monetary water valuations that are favored by the Western water law. Having accounted for these water values through descriptions of the particular

contexts in which they arise, a principle of justice was required to justify the inclusion of such values in resource distribution decisions. It was argued that the reductive economic approach to water values, which forms a substantial component of appropriative rights, systematically ignores the legitimacy of other, non-monetary water values that ought to be taken into consideration when allocating a complex social good. Consequently, prior appropriation, the primary resource allocation policy that determines legitimate water use in the Western U.S., fails to be justified on the basis that it insufficiently captures the value pluralism of water. It is therefore unlikely to achieve just distributions of water resources. Integrating decision-making processes that embrace water value pluralism into the doctrine of prior appropriation will enable the water policy to recognize and preserve such contextual water values so as to yield more just water allocation decisions.

REFERENCES

- Anderson, Terry L., and Pamela Snyder. 1997. *Water Markets: Priming the Invisible Pump*. Washington, D.C.: CATO Institute.
- Arnold, Thomas Clay. 2001. "Rethinking Moral Economy." *The American Political Science Review* 95, no. 1: 85-95.
- Arnold, Thomas Clay. 2008. "San Luis Valley and the Moral Economy of Water." In *Water, Place, and Equity*, by Helen Ingram, John Whiteley and Richard Perry, 37-67. Cambridge, MA: MIT Press.
- Barnett, Randy E. 1998. *The Structure of Liberty: Justice and the Rule of Law*. New York, New York: Oxford University Press.
- Belk, Russell W., and Melanie Wallendorf. 1990. "The Sacred Meanings of Money." *Journal of Economic Psychology* 11: 35-67.
- Blatter, Joachim, Helen Ingram, and Pamela Doughman. 2001. "Emerging Approaches to Comprehend Changing Global Contexts." In *Reflections on Water*, by Joachim Blatter and Helen Ingram, 3-29. Cambridge, Massachusetts: MIT Press.
- Blatter, Joachim, Helen Ingram, and Suzanne Levesque. 2001. "Expanding Perspectives on Transboundary Water." In *Reflections on Water*, by Joachim Blatter and Helen Ingram, 31-53. Cambridge, Massachusetts: MIT Press.
- Bohman, James. 1996. *Public Deliberation: Pluralism, Complexity, and Democracy*. Cambridge, Massachusetts: The MIT Press.
- Broome, John. 1999. *Ethics out of Economics*. Cambridge: Cambridge University Press.
- Brown, Joseph E, and Emily Cousins. 2001. *Teaching Spirits: Understanding the Native American Religious Traditions*. New York, New York: Oxford University Press.
- Button, Mark, and David Michael Ryfe. 1995. "What Can We Learn From the Practice of Deliberative Democracy." In *The Deliberative Democracy Handbook: Strategies for Effective Civic Engagement in the Twenty-First Century*, by John Gastil and Peter Levine, 20-33. San Francisco, California: Jossey-Bass.
- Catley-Carlson, Margaret. 2011. "Forward." In *Water Security: the Water-Food-Energy-Climate Nexus*, by World Economic Forum water initiative, edited by Dominic Waughray, xxi - xxii. Washington, D.C.: Island Press.

- Dellapenna, Joseph W. 2007. *Appropriative Rights Model Water Code*. Reston, Virginia: American Society of Civil Engineers.
- . 2005. "Water Law in the Eastern United States: No Longer a Hypothetical Issue." Edited by Sharon J. Daniels. *Proceedings of the Twenty-Sixth Annual Energy and Mineral Law Institute*. Amelia Island: Energy and Mineral Law Foundation. 367-408.
- Demsetz, Harold. 1967. "Towards a Theory of Property Rights." *The American Economic Review* 57, no. 2: 347-359.
- Duffield, John. 1997. "NonMarket Valuation and the Courts: The Case of the Exxon Valdez." *Contemporary Economic Policy* 15: 98-110.
- Feitelson, Eran. 2012. "What is water? A normative perspective." *Water Policy* 14: 52-64.
- Gaffney, Mason. 1969. "Economic Aspects of Water Resource Policy." *The American Journal of Economics and Sociology* 28, no. 2: 131-144.
- Getches, David H. 1997. *Water Law in a Nutshell*. St. Paul, MN: West Publishing Co.
- Gibbs, Leah M. 2006. "Valuing Water: variability and the Lake Eyre Basin, central Australia ." *Australian Geographer* 37, no. 1: 73-85.
- Glennon, Robert. 2005. "Water Scarcity, Marketing and Privatization." *Texas Law Review* 83, no. 7: 1873-1902.
- Goldfarb, William. 1988. *Water Law*. 2nd Edition. Chelsea, Michigan: Lewis Publishers, Inc.
- Greaves, Tom. 2001. "Contextualizing the Environmental Struggle." In *Indigenous Traditions and Ecology: The Interbeing of Cosmology and Community*, by John A. Grim, 25-46. Cambridge, Massachusetts: Harvard University Press.
- Greaves, Tom. 1998. "Water Rights in the Pacific Northwest." In *Water, Culture, and Power: Local Struggles in a Global Context*, by John M. Donahua and Barbara R. Johnston, 35-46. Washington, D.C.: Island Press.
- Hammer, Miriam Z. 2002. *Valuation of American Indian Land and Water Resources: A Guidebook*. Bureau of Reclamation, U.S. Department of the Interior, Denver: Economic and Resource Planning Team.
- Hicks, Gregory A., and Devon G. Peña. 2003. "Community Acequias in Colorado's Rio Culebra Watershed: A Customary Commons in the Domain of Prior Appropriation." *University of Colorado Law Review* 74, no. 2: 387-486.

- Huffaker, Ray, Norman Whittlesey, and Joel Hamilton. 2000. "The Role of Prior Appropriation in Allocating Water Resources into the 21st Century." *International Journal of Water Resources Development* 16, no. 2: 265-273.
- Ingram, Helen, John Whiteley, and Richard Perry. 2008. "The Importance of Equity and the Limits of Efficiency in Water Resources." In *Water, Place, & Equity*, by Helen Ingram, John Whiteley and Richard Perry, 1-32. Cambridge, MA: MIT Press.
- James, Michael Rabinder. 2004. *Deliberative Democracy and the Plural Polity*. Lawrence, Kansas: University Press of Kansas.
- Jones, Nikoleta, Costas Sophoulis, and Chrisovaladis Malesios. 2008. "Economic Valuation of Coastal Water Quality and Protest Responses: A Case Study in Mitilini, Greece." *The Journal of Socio-Economics* 37: 2478-2491.
- Loew, Patty. 1997. "Hidden Transcripts in the Chippewa Treaty Rights Struggle: A Twice Told Story. Race, Resistance, and the Politics of Power." *American Indian Quarterly* (University of Nebraska Press) 21, no. 4: 713-728.
- Loftin, John D. 2003. *Religion and Hopi Life*. 2nd Edition. Bloomington, Indiana: Indiana University Press.
- Marx, Karl. 1976. *Capital: A Critique of Political Economy*. Vol. One. Aylesbury: Penguin Books.
- Mathis, Klaus. 2009. *Efficiency Instead of Justice?: Searching for the Philosophical Foundations of the Economic Analysis of Law*. Vol. 84. New York, New York: Springer.
- Mehta, Lyla. 2006. "Water and Human Development: capabilities, entitlements and power." *Background paper for the 2006 Human Development Report 'Beyond scarcity: Power, poverty and the global water crisis'*. New York: United Nations Development Programme: 1-31.
- Merchant, Carolyn. 2010. "First First! The Changing Ethics of Ecosystem Management." In *Water Ethics: Foundational Reading for Students and Professionals*, by Peter G. Brown and Jeremy J. Schmidt, 227-240. Washington, D.C.: Island Press.
- Merrett, Stephen. 1997. *Introduction to the Economics of Water Resources: and International Perspective*. Landham, Maryland: Rowman & Littlefield Publishers, INC.
- Meyers, Charles J., and Dan A. Tarlock. 1971. *Water Resource Management: A Coursebook in Law and Public Policy*. Mineola, New Jersey: The Foundation Press, Inc.
- Momaday, N. Scott. 1976. *The Names*. New York, New York: Harper & Row, Publishers.

- Murray, E., et al. 1995. "Non-Market Valuation Biases Due to Aboriginal Cultural Characteristics in Northern Saskatchewan: The Values Structures Component." *Rural Economy 'Staff Papers'* (University of Alberta, Department of Rural Economy): 1-17.
- Parkinson, John. 2003. "Legitimacy Problems in Deliberative Democracy." *Political Studies* 51, no. 1: 180-196.
- Postel, Sandra, and Brian Richter. 2003. *Rivers for Life: Managing Water for People and Nature*. Washington, D.C: Island Press.
- Reily, Sean Patrick. 2004. "Gathering Clouds." *LA Times*, June 6: 1-6.
- Reynolds, Glenn C. 2003. "A Native American Water Ethic." *Transactions of the Wisconsin Academy of Sciences, Arts and Letters* 90: 143-161.
- Russo, Kurt. 2002. "The Lummi in Washington State." In *Endangered People of North American: Struggles to Survive and Thrive*, by Tom Greaves, 97-116. Westport, Connecticut: Greenwood Press.
- Schorr, David B. 2005. "Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights." *Ecology Law Quarterly* 32, no. 3: 3-71.
- Sen, Amartya K. 1970. *Collective Choice and Social Welfare*. San Francisco, California: Holden-Day, Inc.
- Tarlock, A. Dan. 2000. "Prior Appropriation: Rule, Principle, or Rhetoric." *North Dakota Law Review* 76: 881-910.
- Tarlock, A. Dan. 2002. "The Future of Prior Appropriation in the New West." *Natural Resources Journal* 41: 769.
- Tisdell, John G. 2003. "Equity and Social Justice in Water Doctrines." *Social Justice Research* 16, no. 4: 401-416.
- Trainor, Sarah Fleisher. 2006. "Realms of Value: Conflicting Natural Resource Values and Incommensurability." *Environmental Values* (The White Horse Press) 15: 3-29.
- Walsh, Adrian. 2011. "The Commodification of the Public Service of Water: A Normative Perspective." *Public Reason* 3, no. 2: 90-106.
- Whiteley, Peter. 1992. "Hopitutungwni: "Hopi Names" as Literature." In *On the Translation of Native American Literature*, by Brian Swann, 208-227. Washington: Smithsonian Institution Press.
- Whiteley, Peter, and Vernon Masayesva. 1998. "The Use and Abuse of Aquifers: Can the Hopi Indians Survive Multinational Mining?" In *Water, Culture, and Power: Local Struggles*

in a Global Context, by John M. Donahue and Barbara R. Johnston, 9-34. Washington, D.C.: Island Press.

Whittlesey, Norman K., and Ray G. Huffaker. 1995. "Water Policy Issues for the Twenty-First Century." *American Journal of Agricultural Economics* 77, no. 5: 1199-1203.

Zarsky, Lyuba. 2006. *Is Nothing Sacred? Corporate Responsibility for the Protection of Native American Sacred Sites*. La Honda: Sacred Land Film Project.