

What are the Factors Affecting Western States' Adoption  
of Laws Regarding Tribal Water Rights?

by

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## **ABSTRACT**

Faced with increasing population and demand for water, water users in western states are increasingly turning to water transfers to meet their needs. One potentially important source for transfers is tribal water rights, which are reserved based on the premise that the federal government meant to reserve water rights when creating an Indian reservation. Over time, the relationship between tribes and states has evolved to a point where states are adopting laws regarding tribal water transfers. This thesis hypothesizes that transaction costs and potential benefits affect the adoption of those laws. Empirical support is not found for the variables representing transaction costs, but some support is found for those representing potential benefits.

## Chapter 1 Introduction

The western United States is experiencing dramatic population growth. According to the U.S. Bureau of the Census, four of the five fastest growing states are in the West.<sup>1</sup> The state of Nevada has had the largest growth rate for the past nineteen years, and was followed by Arizona, Idaho, Florida and Utah in 2004. The three fastest growing metro areas are also in the West: Greeley, St. George and Las Vegas-Paradise.<sup>2</sup> Twenty of the twenty-five fastest growing large cities are in the West.<sup>3</sup> The top six are Phoenix, Los Angeles, San Antonio, Las Vegas, Fort Worth, and North Las Vegas. The population increase presents a boon to local economies, but can further strain already scarce resources. In parts of the arid West<sup>4</sup>, water is perhaps the scarcest natural resource of all.

Though the population is increasing, the supply of available water in the West is relatively fixed (Figure 1). Historically, the challenge of aridity was met with construction of dams, reservoirs, inter-basin deliveries and increased groundwater pumping. These projects have dwindled over the years as budgets are cut, environmental concerns are raised, and potential sites are fewer and further between. The dam-building era left a legacy of an augmented, though still fixed, water supply. Since the mid-1800s, this supply has been allocated through the prior appropriation system. Within this system, water right holders with the oldest appropriation date have priority over junior users, regardless of purpose. Unappropriated water is nearly impossible to find; in many

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<sup>1</sup> Based on estimates between July 2004 and July 2005.

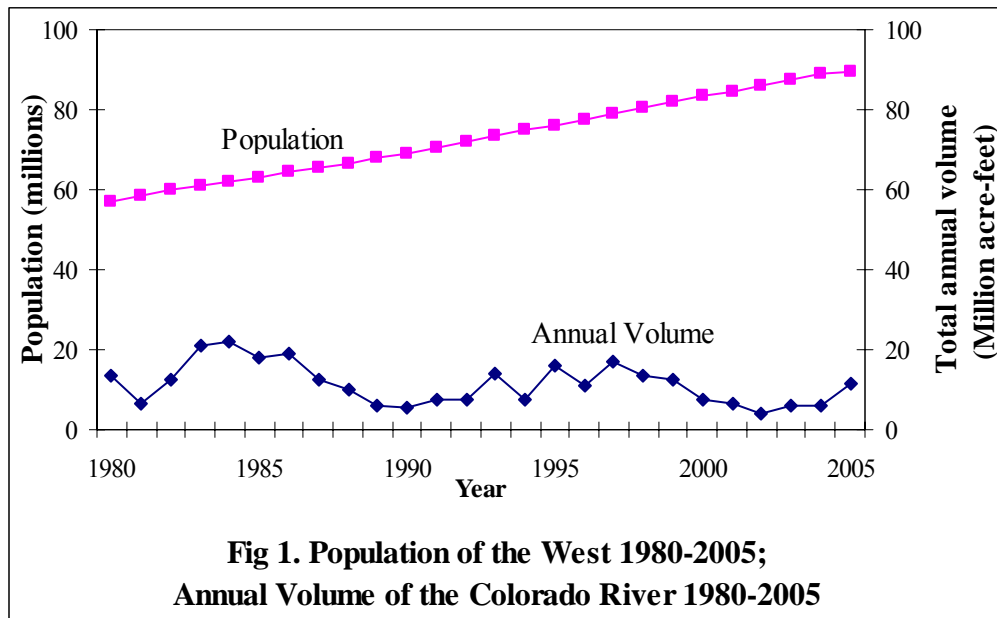
<sup>2</sup> A metro area contains at least one urbanized area of 50,000 or more people. Based on estimates between April 1, 2000 and July 1, 2003.

<sup>3</sup> A large city has a population of 100,000 or more. Measured between July 2003 and July 2004.

<sup>4</sup> The West, in this thesis, refers to the 12 western states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington and Wyoming.



cases, water bodies have been over-appropriated, leaving junior users without water in all but the wettest years.



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*Source* Bureau of Economic Analysis, Bureau of Reclamation

Increasing populations place new demands on allocation schedules. Water transfers are a means of re-allocating a valuable resource among competing parties, such as agriculture, environmental groups, developers and all levels of government. In all western states, irrigated agriculture accounts for a significant portion of total withdrawals<sup>6</sup> (Table 1). Not surprisingly, the agricultural sector was the first place those in need looked to for water transfers, and successful transfers have occurred across the West. But as time goes on, irrigators have less water they are willing and able to transfer, while the needs of cities and environmental groups continue to grow.

<sup>5</sup> Total annual volume is measured as inflows to Lake Powell.

<sup>6</sup> Withdrawals refer to both ground- and surface water removed or diverted for use.

**Table 1. Irrigation Freshwater Withdrawal in 13 Western States, 2000**

State	Irrigation's Withdrawal ( <i>Million gallons per day</i> )	Irrigation's Share of State Withdrawals ( <i>Percent</i> )
Arizona	5400	80.35
California	30500	79.42
Colorado	11400	90.48
Idaho	17100	87.69
Montana	7050	85.04
Nevada	2110	75.09
New Mexico	2860	32.60
Oregon	6080	69.30
Texas	8630	34.80
Utah	3860	81.09
Washington	3040	57.68
Wyoming	4500	91.09

Source U.S. Geological Survey 2000

Another potential source for water transfers are Indian reservations, which hold reserved water rights. Tribal water rights are 'reserved,' based on the premise that the federal government implicitly reserved water rights when creating an Indian reservation<sup>7</sup>. The priority date for tribal water rights is the date the reservation was established, which is generally senior to most other appropriators. The seniority and magnitude of their claims make them attractive for transfers to urban and/or environmental uses. Various quantification processes, such as litigation or negotiation, specify the exact quantity of the reserved right, as well as the purposes for which the right is allowed to be used, and in many cases, the rules of transfer. For instance, the Navajo Nation has the right to lease a portion of their reserved right, for municipal and industrial use within New Mexico. The Assiniboine and Sioux Tribes of the Fort Peck Reservation in Montana have the right to transfer a limited amount of their reserved water right, as long as all off-reservation transfers comply with state law. Several tribes have successfully negotiated transfers,

<sup>7</sup> Tribal reserved water rights refer only to those reserved implicitly at the time of the reservation's creation. Tribes and tribal members may also hold state-permitted water rights, which undergo the same processes to which other private users are subject.

including the Jicarilla Apache Tribe of New Mexico and the Ak-Chin Tribe of Arizona. The former leased 3,000 acre-feet per year to the city of Santa Fe for fifty years. The Ak-Chin Tribe leased water to a Phoenix developer for 99 years. In many instances however, restrictions placed on off-reservation transfers, combined with slowly changing state water laws, inhibit a tribe's ability to proceed with transfers.

The objective of this thesis is to empirically analyze the factors leading to the adoption of state laws regarding tribal water rights. The legal systems of three sovereigns may claim subject matter jurisdiction over tribal reserved water rights: the federal government, individual tribes, and respective states. While changes to any of these legal environments are important, of particular interest with respect to transfers of tribal water rights are state legal environments, because of increased tribal-state interaction in the water rights arena. The legal environment encompasses state statutory law, judicial decisions and administrative rules that affect tribal water right transfers, and is studied because it has the opportunity to either facilitate or hinder potentially important transfers.

Tribal water rights are only one area addressed by state water law. Characteristics of western states' water law, from the period of 1987-2005, may be classified into 9 categories:

1. Definition of a water right;
2. Restrictions on the holder's use of that water;
3. Provisions for loss or limitation of the water right;
4. Right to transfer water right;
5. Conditions for the transfer of a water rights;
6. Conservation measures;
7. Regulatory procedures and mechanisms;
8. Tribal water rights and;
9. Miscellaneous characteristics.

Each category is composed of unique characteristics. The four characteristics

related to tribal water transfers are whether or not tribal water rights are allowed to be used off-reservation, whether transfers to non-Indians and non-tribal entities are allowed, whether the approval of a federal agency is required for a transfer and if the rights of Indians are protected in a transfer to non-Indians. Of significance for this thesis are states having laws regarding tribal water rights, and that these laws only relate to the transfer of those rights. This thesis will empirically analyze the factors affecting states' adoption of laws regarding tribal water rights.

At this point, a brief discussion on the different types of laws is instructive. Black's Law Dictionary defines common law as "the body of those principles and rules of action, relating to the government and security of persons and property, which derive their authority solely from usages and customs of immemorial antiquity, or from the judgments and decrees of the courts recognizing, affirming, and enforcing such usages and customs" (pages 250-251). This is in contrast to the particular laws created by the legislative bodies of a government, which are known as statutory or legislative law. Regulations are issued by agencies to carry out the intent of law, and while not officially a type of law, do have the force of law (Black et al, 1983).

## **Chapter 2 Tribal Water Rights: A Brief History**

Tribal reserved water rights are a unique product of the shared history of the American Indian, the United States and the prior appropriation doctrine. Brief discussions of their relative histories are presented to acquaint the reader with the framework within which tribal reserved water rights evolved.

### **2.1 Federal Indian Policy and Reserved Water Rights**

The federal government recognized the sovereignty of Indian tribes as early as 1778, when the first treaty was signed with the Delaware tribe. This, and subsequent treaties, were recognized first in the Articles of Confederation, and then the U.S. Constitution. In the latter, past and future treaties were deemed to be “supreme law of the land” giving them precedence over state law.<sup>8</sup> The Constitution also gave the President the power to make future treaties, subject to the approval of the Senate,<sup>9</sup> and gave Congress “the power to regulate commerce with foreign nations, and among the several states, and with the Indian tribes.”<sup>10</sup> The Articles of Confederation had allowed for the states and federal government to share authority over Indian affairs, but the Constitution gave sole authority to the federal government.

The United States signed hundreds of treaties in the century following the American Revolution, including new treaties with tribes that had previously signed treaties with European powers. In accord with the previous colonizers, the United States generally followed the international doctrines of discovery and conquest: the colonizing nation has sovereign rights, but the conquered peoples are not stripped of all their rights. In early treaties and legislation dealing with the tribes, the United States continued to

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<sup>8</sup> Article 6, Clause 2

<sup>9</sup> Article 2, Section 2, Clause 2

<sup>10</sup> Article 1, Section 8, Clause 3

treat tribes as separate sovereigns.

Indian tribes faced early clashes with non-Indians moving into their territory, and newly-created states testing the boundaries of their sovereignty. A series of Supreme Court decisions responded to these conflicts, and laid the foundation for federal Indian law. Known as the ‘Marshall trilogy,’ in honor of their author, Chief Justice John Marshall, the cases left no doubt as to who was the ultimate sovereign in Indian country. In *Johnson v. M’Intosh* (1823), the Court held that Indians’ rights to their land were good against all third parties, but those rights were maintained only at the behest of the United States. The tribes had a right of occupancy to their reservation, but title to the property was held by the United States. In *Cherokee Nation v. Georgia* (1833), the Court held the tribes to be “domestic dependent nations.” In *Worcester v. Georgia* (1831), the Court held the laws of a state did not apply within a reservation, as Indian reservations represented separate nations over which states did not have jurisdiction. These three decisions established the dependence of the tribes on the federal government while similarly asserting their independence from state laws. The definition of Indian tribes as wards of the federal government initiated the fiduciary responsibility the United States holds with respect to protection of tribal resources and aid in their development. Further proof that the trust relationship had diminished Indian tribes’ status as sovereign entities came in 1849, when the Indian Office was moved from the War Department to the Department of the Interior.

In the 1800s, as non-Indians continued to move further westward in increasing numbers, the federal government chose several paths. Initially, tribes were removed from their tribal lands and sent west of the Mississippi. Tribes already there had their lands

reduced in size. As this policy proved unsuccessful at ending battles over land control between Indians and non-Indians, the United States fully embraced the reservation system in the 1850s. Indian tribes ceded most of their land in return for a smaller reserved area under Indian governance that the United States was responsible for protecting. The majority of the reservations fell in the area now defined by the western United States, though the size and number of reservations differ greatly by state (Table 2). Some aspects of the reservation, such as purpose and physical boundaries, were specifically defined at its inception. One attribute not specified has since proven to be both difficult in resolution and of paramount importance to the future of the West: water rights.

**Table 2. Number and Size of Indian Reservations across Western States**

State	Number of Reservations	Area of all Indian Reservations within a State's borders ( <i>Square miles</i> )	Reservations' Share of State Land ( <i>Percent</i> )
Arizona	23	40627.1	35.75
California	99	889.0	0.57
Colorado	2	1959.2	1.89
Idaho	5	2608.1	3.15
Montana	7	13194.0	9.06
Nevada	22	4660.5	3.84
New Mexico	26	3445.0	3.14
Oregon	8	1330.6	1.39
Texas	2	7.2	0.002
Utah	7	6847.7	8.34
Washington	27	5017.0	7.54
Wyoming	1	3471.4	3.58

*Source* U.S. Bureau of the Census, 2005

Reservations served dual purposes from the perspective of the federal government: they provided territories within which tribes were both autonomous and separate, and opportunities to promote assimilation through agriculture practices and Christianity. Assimilation formally overtook separatism as the preferred federal Indian

policy when the General Allotment Act was passed in 1887. The failure of the assimilation and allotment era officially ended with the passage of The Indian Reorganization Act (IRA) of 1934. Commonly referred to as the Indian New Deal, the IRA shifted federal Indian policy back to supporting tribal self-governance.

Two judicial decisions with important repercussions for tribal water rights came during the allotment era, early in the twentieth century. In *U.S. v. Winans* (1905), the Supreme Court held treaties to be a grant of rights from Indian tribes, rather than a grant of rights to them. Tribes reserved those rights not granted. Absent an express abrogation of those powers by Congress, those rights remain with the tribes. In 1908, the Supreme Court recognized the reserved water rights of Indian reservations in *U.S. v. Winters*. The Court ruled that when the federal government created an Indian reservation, the government implicitly reserved water sufficient to fulfill the purposes of the reservation. The accompanying priority date is that of the original reservation. The Winters doctrine, as the decision became known, did not discuss the quantity of water to which a reservation was entitled.

Judicial enunciation of reserved water rights did not necessarily translate into use of those rights by tribes. Irrigation projects were too costly for individual tribes to undertake, and their interests were generally not included in projects authorized by the Bureau of Reclamation. Meanwhile, non-Indians continued to claim water rights, and states continued to issue permits, without regard for tribal reserved water rights. Tribes were left with water rights that amounted to little more than a piece of paper. Where and how to determine the exact quantity of a tribe's reserved right was left unsettled until a half-century later.



In 1952, a seemingly innocuous rider was attached to an appropriations bill. The rider, now known as the McCarran Amendment, waived the sovereign immunity of the United States in general stream adjudications. Since the federal government is trustee of Indian resources, their reserved water rights became subject to state adjudications. If the United States, or an Indian reservation, chose not to participate in adjudication, they risked the loss of any potential claims. The McCarran Amendment allowed state legal systems to begin exerting control over tribal water rights, and was upheld by the Supreme Court in subsequent cases.<sup>11</sup>

In *Arizona v. California* (1963), the practically irrigable acreage (PIA) standard was enumerated as the standard for quantifying tribal reserved water rights. For reservations established with an agricultural purpose, the quantity of reserved water a tribe receives depends on the amount of practically irrigable acreage the reservation contains. Reserved rights are not limited by current population and reservation needs, but protect future uses as well. The Supreme Court also allowed for a tribal water right, once quantified, to be put to uses other than those for which it was reserved. The PIA standard was rejected by the Arizona Supreme Court in 2001 in favor of a quantification standard that addressed reservations as permanent homelands,<sup>12</sup> but this has yet to be applied universally.

The McCarran Amendment and the decision in *Arizona v. California* answered the questions of where and how to quantify a tribal reserved water right, but many more were left unanswered, such as whether possessory ownership of tribal reserved water

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<sup>11</sup> *Colorado River Water Conservation District v. United States*, 424 U.S. 800 (1976) and *Arizona v. San Carlos Apache Tribe of Arizona*, 463 U.S. 545 (1983)

<sup>12</sup> *In re the General Adjudication of All Rights to Use Water in the Gila River System and Source*. 35 P.3d 68 (Arizona 2001).

vests with the state or tribe and who would administer the water once quantified. A further understanding of western water law is necessary before these questions can be examined.

## **2.2 The Prior Appropriation Doctrine**

As settlement of the United States progressed, different regions chose different water allocation systems based on resource scarcity. East of the hundredth meridian, the riparian system prevailed, under which a landowner abutting a waterway had the right to reasonable use of that water. The system of prior appropriation developed in the nineteenth-century mining camps of California, necessitated by the inherent variability and uncertainty in water stocks. The Colorado Supreme Court upheld prior appropriation as a legal doctrine in 1882.<sup>13</sup>

Nine western states use a ‘pure’ prior appropriation approach to water allocation.<sup>14</sup> Several other states use a hybrid system of prior appropriation with recognized riparian rights that pre-date the prior appropriation system.<sup>15</sup> Regardless of approach, water rights remain as usufructs; a right holder has the right to divert and use the water, but does not have possessory ownership. These usufructary rights, separated from land ownership, are valuable in their own right. The state retains ownership of the water, and manages it for the benefit of the public interest.

The phrase “first in time, first in rights” characterizes the basic rule of prior appropriation. The first person to put the water to use has the right to continue using it to the exclusion of other potential users. In times of drought, the water right holder with the earliest priority date receives their full allocation before those right holders with junior

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<sup>13</sup> *Coffin et al v. The Left Hand Ditch Company* 6 Colo. 443 (1882).

<sup>14</sup> Alaska, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming

<sup>15</sup> Examples are California, Oregon, South Dakota, Texas and Washington.

priority dates may appropriate. The priority date for tribal reserved water rights is the date the reservation was established, usually making them the most senior rights in the basin. Once quantified, tribal water rights are relatively stable; during times of shortage, they would be among the last to lose their appropriation.

In order for a user to obtain a priority date under a state's water system, three conditions must typically be met. Notice of intent to appropriate must be given to the public authority (Getches, 1997). Historically, the next step was physical diversion of the water, but many jurisdictions now allow for instream flows (Getches, 1997). The final step is to put the water to beneficial use (Getches, 1997).<sup>16</sup> Unlike the riparian doctrine, water use is not restricted to lands bordering waterways. A water right is 'perfected' after these three conditions are met, though this is not free license to use the water. The water right stipulates the beneficial use, the point of diversion, the priority date, the maximum amount to be used, where the water will be used and the use-related requirements. The water right holder may not deviate from those conditions without permission from the state.

A perfected water right may only be cancelled due to forfeiture or abandonment. The former must have a proven record of nonuse, typically for a period of five years. The right may be abandoned if intent and act of abandonment can be proven. Two general exemptions to cancellation are water rights held by municipalities and Indian reservations.

The prior appropriation system allows for water rights to be transferred through sale, lease or exchange. The litmus test for transfers is the 'no harm' rule. Regardless of

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<sup>16</sup> States have varying definitions of beneficial use, but generally include domestic, municipal, agricultural, recreation, fish and wildlife. Water storage is also allowed.

priority date, a transfer may not cause impairment to any other appropriator on the body of water. Different jurisdictions provide varying levels of protection for environmental, economic and social effects in the public interest. The transfer may change the point of diversion, type of use, place of use and point of return. As an already scarce resource reaches the point of full and over- appropriation, water transfers represent an important method of re-allocation between users. Across the West, water markets have developed to facilitate transfers between willing buyers and sellers. The ability of Indian tribes to participate in these exchanges has important implications for Indian and non-Indian water users alike.

### **2.3 Tribal Water Rights, State Appropriation Systems and a New Federalism**

This section will discuss how tribal water rights fit under the different legal systems of the federal government and different state governments. It will also discuss the absence of federal law regarding the marketing of tribal water rights, the very issue that state water laws do address.

The PIA standard set out in *Arizona v. California* (1963) provided the impetus for many tribes to seek quantification of their water rights within general stream adjudications. Some tribes have chosen to litigate their water rights in state court; others have negotiated with the state and other water users. For many tribes, the process includes both litigation and negotiation. Since the 1960s, twenty-one tribal reserved water claims have been fully adjudicated, and many more are in the process. Table 3 provides a summary of selected tribal water rights settlements; a full chronological list of tribal water settlement and cases is provided in Appendix 1. Those that come to a conclusion via settlement, rather than litigation, must be agreed to by all parties involved.

Settlements usually put forward projects to be funded by the federal or state government, so Congress or the state legislature must take the next step and appropriate funds for these projects. Although the parties negotiating the settlement may agree to a solution, the process is not over until the respective legislative bodies have ratified the settlements. The process is sequential in nature; while the legislative bodies are not the origin of these settlements, their adoption of the settlements as law marks an end to the process.

**Table 3. Summary of Selected Tribal Water Rights Settlements**

Indian Tribe(s)	State	Quantity of right (acre-feet annually)	Year settled	Notes
San Xavier and Schuk Toak districts, Tohono O'odham Nation	AZ	66,000	1982, 1992, 2004	Limited off-reservation leasing allowed
Assiniboine and Sioux Tribes	MT	1,050,472	1985	Limited off-reservation leasing allowed
Shoshone and Bannock Tribes	ID	581,331	1990	Establishment of water bank allowed
Northern Cheyenne Tribe	MT	91,330	1992	Most off-reservation leases are subject to state law
San Carlos Apache Tribe	AZ	77,435	1992	Limited off-reservation leasing allowed
Jicarilla Apache Tribe	NM	40,000	1992	Rights to market water off-reservation guaranteed
Gila River Indian Community	AZ	655,000	2004	Right to sell or lease water off-reservation limited to in-state
Nez Perce	ID	50,000	2004	Off-reservation leasing allowed

*Source* Colby, Thorson and Britton (2005)

The quantity of the reserved right is one question of many to be answered. Two sovereigns, the United States and Indian tribes, hold special rights to a resource owned by another sovereign, the state. Once quantified, does the state or tribe administer the tribal water right? The water allocation system in the West relies on the highly-structured prior appropriation doctrine. Though quantification takes place in state courts, it is done according to federal water law, allowing reserved rights special characteristics that may

not fit neatly in the state's allocation system. Within this system, water rights exist once they have been put to a state-defined beneficial use, and are subject to cancellation after a period of non-use. The conditions of the permit may not be changed without state permission. Reserved rights however, exist regardless of whether they have been put to use, and cannot be cancelled. Future needs of the reservation may change the size of the water right, although the priority date would remain the same. A reserved right exists separately from the state system, but the state must account for the reserved right in order to manage other rights. The federal government has some authority to regulate tribal water rights, but their administration has generally fallen to tribes and states because of the unwillingness of the federal government to exercise their regulatory power. State courts that adjudicate tribal water rights have the power to "execute, enforce, construe and interpret" their decisions (Cohen et al, 2005, pg 1202). Though states cannot explicitly regulate tribal water rights used on the reservation, they can monitor and enforce them through state courts.

Section 7 of the General Allotment Act allows the Secretary of the Interior to regulate water for irrigation purposes to ensure equitable distribution of water from water projects administered by the Department of the Interior. Such regulations have never been created (Cohen et al, 2005).

In 1975, the Secretary of the Interior placed a moratorium on the approval of tribal water codes. The moratorium will expire when new guidelines for approval are finalized, which have yet to be produced. Tribes whose constitutions require such approval still have two options to develop tribal water codes: they may negotiate an agreement with the state or amend their constitutions. Both options still require approval

by the Department of the Interior or via congressional legislation, but such approval is typically granted (Breckenridge, 2006). The moratorium does not affect tribes whose constitutions do not require the Secretary's approval of resource regulations. Relatively few tribal water codes exist, perhaps due to the costs associated with developing and administering tribal water codes and the small number of reservations that have finished the quantification process.

Federal law has also not addressed tribes' ability to market their quantified water rights. It has been hypothesized that the Nonintercourse Act<sup>17</sup> requires the consent of the Secretary of the Interior in order to market these rights, but there is not an explicit federal statute (Royster and Blumm, 2002). The absence of such consent led the Wyoming Supreme Court to disallow any marketing for the Wind River Reservation (Cohen et al, 2005). However, congressional approval of tribal water settlements generally includes water marketing provisions. One theory suggests that the main concern for the federal government should be whether the Indians are treated fairly in water marketing transactions, since requisite federal approval for alienation of Indian property stems from the intent to defend Indian rights against infringement by non-Indians (Getches and Van de Wetering, 2005). Another suggests the federal government retains power over interstate tribal water marketing under the Indian Commerce Clause, to the exclusion of the states (Seldin, 1999), and yet another posits that Congress never intended the McCarran Amendment to apply to tribal water rights, and their adjudication and subsequent administration should have remained in federal court (McElroy and Davis, 1995). Despite the proliferation of theories, federal Indian policy has remained silent on the topic. The 9<sup>th</sup> Circuit Court of Appeals ruled that the Secretary does not have

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<sup>17</sup> 25 U.S.C. § 177

authority to convey tribal water rights in 1964<sup>18</sup>, but this decision does not apply uniformly and has not been addressed by the Supreme Court. States have stepped into the legal void by adopting laws regarding tribal water marketing, usually as part of the approval of negotiated settlements.

The federal government's inability to produce rules regulating tribal water codes and tribal water marketing was only one piece of their relationship with Indian tribes. The era of the Indian New Deal ended with World War II, and a period focused on terminating the federal-tribal relationship began. In the late 1960s, President Johnson brought attention to 'The Forgotten American' and a new, lasting, era in federal Indian policy began. Since then, the federal government has focused on supporting tribal self-determination. The executive branch and Congress have since continued to emphasize a government-to-government relationship between tribes and the federal government, though the judiciary has taken a different approach. Coinciding with the term of Chief Justice William Rehnquist, the Supreme Court has consistently limited the jurisdiction and sovereignty of Indian tribes.<sup>19</sup>

As tribes worked to achieve economic independence, jurisdictional conflicts between states and tribes regarding gaming led to the passage of the Indian Gaming Regulatory Act (IGRA)<sup>20</sup> in 1988. IGRA served as a compromise between state and tribal sovereignty, requiring good faith negotiations from both parties to develop gaming compacts. Prior to the passage of IGRA, the tribes had pursued self-determination under the direction of the federal government, largely to the exclusion of state governments.

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<sup>18</sup> *United State v. Ahtanum Irrigation District* 330 F2d.897, 903 (9<sup>th</sup> Circuit 1964).

<sup>19</sup> See Johnson and Martinis (1995) and Getches (1996) for a discussion of Chief Justice Rehnquist's effect on federal Indian law.

<sup>20</sup> IGRA followed *California v. Cabazon Band of Indians* 480 U.S. 202 (1987), in which the Supreme Court supported Congress' regulatory power over Indian tribes.



IGRA began a new era of federal Indian policy that largely removed the federal government from the process, known as forced federalism (Boehmke and Witmer, 2002). Tribes and states are required to negotiate compacts on a government-to-government basis; the federal government is usually responsible for approving the compact (Boehmke and Witmer, 2002).

IGRA was a major shift in federal Indian policy, but it was also a formalization of developing trends. Though President Reagan supported a government-to-government relationship between tribes and the federal government, his administrations largely focused on reducing federal involvement in state and local governments (Pagano and Bowman, 1989). His administration also promoted negotiation as the method of quantifying tribal water rights rather than litigating, and provided financial support to effect these negotiations. Over time, tribes had also become more independent as a result of the policy of self-determination and increased economic self-sufficiency.

States' adoption of laws regarding tribal water rights is a product of the increased interaction between tribes and states over the last few decades. The objective of this thesis is to empirically analyze the factors leading to the adoption of these laws. They are studied because of their ability to hinder or facilitate transfer of a valuable property right.

## **Chapter 3 Literature Review**

Recall, the purpose of this thesis is to empirically examine the factors affecting the adoption of state water law regarding tribal water rights. The arid West faces increasing population, and therefore increasing demand for water, while water supplies remain constant. Tribal water rights represent a potentially important source for water transfers to meet increased demand in other sectors. This section discusses the relevant academic literature.

### **3.1 Tribal Water Rights**

A substantial amount of legal research has been done in this area, and continues to be done as tribal water rights play an increasingly important and complicated role in western water allocation schedules. However, empirical analyses of their legal rights are scarce.

Shurts (2000) provides a detailed analysis of the inception of tribal water rights at the turn of the twentieth century. Though generally accepted that the Winters Doctrine lay dormant between 1908 and 1963, Shurts argues that it was actively being put to use. However, its activity was dominated by non-Indians putting it to use for non-Indian water rights. Though tribal water rights did receive attention during this period, it pales in comparison to that received by non-Indian water rights.

As more and more reservations sought to quantify their reserved rights, scholars speculated on the possibilities created by tribal control over such valuable resources. Early on, the potential for transfers from tribal reserved water rights to other users was recognized as an important opportunity for tribes. Leaphart, in 1972, was among the first to see the potential in those transfers, and his opinion was echoed by Storey (1988),

Crammond (1996), Jones (2001), Royster (1994), Liu (1995), and Seldin (1999).

To date, 21 reserved rights' claims have been successfully quantified, and others are in the process. One of the best-known examples is that of the Wind River Reservation. In 1977, the state of Wyoming initiated a general stream adjudication of the Big Horn River, encompassing more than 20,000 water users (Roncalio, 1993). The Special Master appointed by the state found a reserved water right for several purposes, including agriculture, wildlife and aesthetics, fishing, industrial, municipal and domestic. The district court, and the Supreme Court of Wyoming, disallowed any reserved right except for the purposes of agriculture, following the PIA standard. Domestic and municipal uses were subsumed under the agricultural right. The Wyoming Supreme Court also held that the tribes' reserved rights did not extend to groundwater, and the decision was affirmed by the Supreme Court in 1989. The tribes have a right to 500,000 acre-feet annually, an apportionment large enough for the city of Tucson, Arizona. The tribe was unable to put that water to immediate use, and entered into a deferral agreement with the state of Wyoming in 1989. The state provided a \$2 million compensation fund, \$1 million for repair and expansion of the reservation water delivery system and forgave a percentage of oil and gas severance taxes it collected from the reservation in order to protect non-Indian water users. The agreement expired in 1990 and was not renewed (Kropf, 2005). The tribes and state have returned to the courts several times for further clarification of several issues.

Another example is the Gila River Adjudication in Arizona, which also began in the 1970s. This adjudication encompasses over 70,000 claims, and has several distinguishing characteristics. The Arizona Supreme Court found that reserved rights

extend to groundwater. The court rejected the PIA standard in a subsequent decision, instead finding that the purpose of the reservation was to provide a permanent homeland for the tribe, resulting in a reserved water right of 653,500 acre-feet annually (Smith and Colby, 2007). The final settlement was incorporated into the larger Arizona Water Settlements Act of 2004. This innovative piece of legislation was accompanied by more than 85 side agreements, some of which detailed tribal water leases to nearby Arizona cities such as Goodyear, Peoria, Phoenix and Chandler, and businesses such as Phelps-Dodge Corporation (Bark, 2006). For example, Phelps Dodge currently holds a 50-year lease for 12,000 acre-feet of the tribe's water, for which they paid a price of \$4.8 million. The side agreement also contains provisions for renewal. These agreements benefit both parties, and were critical to securing broad support for the AWSA (Bark, 2006).

The complexities of these and other settlements, along with detailed summaries of the various settlement processes, are presented in Colby, Thorson and Britton (2005), Cosens (1997), Checchio and Colby (1993), Burton (1991) and Sly (1988). All highlight the impact of tribal water rights for the future of the West and recognize that a tribe's ability to transfer those rights is an important tool for re-allocation among competing uses.

### **3.2 Property Rights**

Water rights, whether held by a tribe or another entity, are property rights, and their transfers are addressed as such. Demsetz (1967) argues that property rights are social institutions that allow a right holder certain expectations based on the particular right in question. Demsetz also addresses the transfer of bundles of property rights, asserting that the value of the transfer is dependent on the value of the rights in the

bundle. This argument may be applied to tribal water rights in several ways. A quantification settlement is effectively a transfer of rights between parties. The value of the transfer depends on the rights included in that bundle: quantification settlements are more valuable when they contain rights for transfer. If the tribe does transfer that right, any restrictions placed on the transfer will lower its value.

The value of a property right is linked to the certainty with which its owner may expect to receive the associated benefit stream (Barzel, 1997). Nature is the initial source of a water right holder's uncertainty, but several legal aspects of the right may add to this. The earlier the priority date of the water right, the more certain the right holder is of the value of the bundle. A water right that has been perfected and adjudicated is also more certain than those that are not. The greater the degree of uncertainty associated with a water right, the less valuable it is, other things constant. The early priority dates associated with tribal water rights decrease some of their uncertainty, but their anomalous position within the legal environment can increase uncertainty. These problems can be addressed in the quantification settlements.

Anderson and Hill (2004) provide a closer look at property rights as they developed in the western United States. They argue that property rights will become more secure when the benefits from a right are increased, or when costs of establishing that right are lowered. They also argue that the establishment of local rules regarding property rights will be effective since the relative stake in the outcome is high. This is reflected in the trend toward tribal-state cooperative settlements. Early settlements through litigation were costly and bitter, and the resulting judicial decisions proved difficult to implement 'on the ground' (Roncalio, 1993). All parties have enormous

interests invested in water claims, and negotiated settlements may balance these interests more easily than a court bound by precedent.

### **3.3 Water Transfers**

This section discusses water transfers within the framework of the prior appropriation system. A water right may be transferred through sale, lease or exchange, depending on the terms of the contract. Transfers must generally pass the 'no harm' rule. Regardless of priority date, a transfer may not cause impairment to any other appropriator on the body of water. The transfer may change the point of diversion, type and place of use, and point of return. In several jurisdictions, water markets have developed to facilitate transfers.

Water rights, whether held by a tribe or another entity, are property rights. A property right is the right of access, or expectation of that right, to the stream of benefits from an asset. Property rights are protected by legal and social institutions, and are often described as a bundle of sticks. The rights to sell, lease, use and mortgage the property interest are all possible sticks in the bundle. A water right has a limited bundle in most states. The right includes the right of use, but not full ownership. Transfers, with restrictions, are sometimes included.

Burness and Quirk (1980) examine the inefficiencies of restrictions on water transfers, and argue for the introduction of competitive markets to allocate water. They argue that scenarios often seen as shortages are nothing more than the effect of restricted water transfers. Goodman (2000) argues that temporary transfers provide an efficient, low-cost alternative to building costly reservoirs.

Jones (2001) and Colby (1988) provide analyses of state-specific challenges with

respect to water transfers. Jones (2001) argues that Idaho's water transfer process needs to be simplified in order for more efficient transfers to occur. Colby (1988) examines water law as the determinant of net economic benefits associated with water transfers, concluding that a balance must be struck in terms of state regulation. Reisner and Bates (1990) provide a brief, state-by-state summary of water marketing in the 1980s in the western United States. Colorado was the first to embrace water markets, due in part to an energy boom. California and the Pacific Northwest states were not as active in the early years. In Wyoming, rigidity of the law discouraged transfers, and Idaho preferred a water banking system allowing for limited-term leases. Each state approached water transfers differently, resulting in a variety of legal frameworks.

Yoskowitz (2001), Haddad (2000) and Anderson and Snyder (1997) advocate for water markets as a mechanism for increased efficiency in water allocation. Haddad (2000) makes a series of recommendations for developing a water market, such as full public provision of information, an emphasis on flexibility and active, neutral management of oversight institutions. Anderson and Snyder (1997) argue that water markets send efficient price signals to producers and consumers, based on evidence from around the West.

Gould provides an overview of transfers within the prior appropriation framework, noting inefficiencies and opportunities for change, as well as the significance of tribal water rights for the future. Crammond (1993) examines leases for instream flows, and argues that states should relinquish control over water leasing in order for transactions to occur more efficiently. This is as true for tribal water rights as for other water rights; restrictions placed on any water transfers increase the associated transaction

costs.

### **3.4 Institutional Incentives**

Changes to the legal environment of tribal water rights take place within relevant legal institutions. Legislators, agency administrators and judges face incentives affecting their decisions. This section explores those incentives.

Legislators are professional politicians selected from the general citizenry. Once elected, the next election is constantly in the future. In order to protect their seat, politicians must cater to important interest groups. With respect to tribal water rights, these interest groups could be the tribes themselves, irrigation districts, municipalities, environmental groups or other branches of the federal government that may be affected by the tribe's ability to transfer the right.

Government bureaucrats provide the manpower of state agencies. Bureaucrats have incentives to protect their positions and their agencies' budget. Those policies that increase their budget, or provide certainty in future employment, are likely to be supported by the agency. Increasing the probability of the transfer of tribal water rights is likely to increase the workload of a state water agency.

The judiciary faces incentives that may be less clear than the other two legal sectors, but they are present nonetheless. When self-interest is too great, the judiciary allows for judges to recuse themselves from a case. When judges are sufficiently distant from a case, it is assumed that bias is removed from the process, and the case is decided on its merits before the law. Justice O'Connor recused herself when the Wind River tribes went before the Supreme Court, but not before writing a draft opinion that would have significantly altered the PIA standard by including a sensitivity analysis. An Idaho



judge chose not to recuse himself from the adjudication involving the Nez Perce Tribe, though he held related water rights. The judiciary is often a reactive agent. After a change has occurred in a legislative law or administrative rule, it may be brought before the judiciary for review. Though judges are not elected and are technically unbiased, they are appointed by elected officials.

Changes to the legal environment regarding tribal water rights are not infrequent. States are adjusting their water laws to accommodate the changing structure of demand. As each new Indian water settlement is finalized, all water right holders must adjust. But certain accommodations and adjustments can take the West only so far; with a fixed water supply, re-allocation mechanisms, such as water transfers, must be supported by policymakers. This thesis will add to the current literature by producing an empirical analysis of the factors affecting the adoption of state water laws regarding tribal water rights.

### **3.5 State Policy Innovation**

Few empirical studies regarding state-tribal interaction exist. However, one study in particular, from the state policy innovation area of political science, examines these interactions in gaming jurisdiction negotiations. Boehmke and Witmer (2004) perform an event-count analysis to determine the factors influencing successful gaming compacts across the United States in the years following the passage of IGRA. Their results show tribal characteristics with respect to states, as well as state political and economic conditions, to be significant with respect to successful negotiations between tribes and states. Boehmke and Witmer also find empirical support for the effect of policy diffusion across neighboring states due to economic competition. Berry (1994) argues for

including explanatory variables that reflect the internal determinants of a state, as well as variables that reflect the diffusion of law when addressing state policy innovation, such as is done in Berry and Berry (1990) when examining the factors leading to the adoption of state lotteries. Berry and Berry also find empirical support for the effect of policy diffusion across neighboring states due to economic competition. This thesis will add to the literature by empirically analyzing an area of policy innovation previously unexamined.

### **3.6 Forced Federalism**

The passage of the Indian Gaming Regulatory Act (IGRA) in 1988 officially began a new era of federal Indian policy which largely removed the federal government from the arena. Tribes and states are required to negotiate compacts on a government-to-government basis; the federal government is usually responsible for approving the compact. This section will review the relevant literature.

Corntassel and Witmer (2000) were the first to formally refer to forced federalism as a new era, followed by Boehmke and Witmer (2002). Jarding (2004) analyzes the nature of the relationships between states and tribes. She defines their relationship as one of relational federalism, “a situation in which power and responsibility for governance are shared among different units, but without either clear territorial boundaries or a clear national-subnational division of governmental power. In a relational federalist situation, there are relationships among governing units that share power, but the situation is fluid and dynamic, rather than clearly agreed upon or set forth in defining documents” (p. 295). Jarding finds that elected state officials are more likely to clash with tribes, though bureaucratic state officials have a more cooperative relationship. Jarding also notes the

need for future research given the non-uniformity exhibited across state-tribal relationships.

Cornell and Taylor (2000) discuss the devolution of decision-making power from the federal government to states and tribes that has resulted in increased sovereignty for both. They note the resulting increase in tribal power has contributed to increased legal conflicts between tribes and states.

Many authors have noted the increase in tribal-state negotiations: Wilkins (2007), Gibbs (1999), Getches (1993), Folk-Williams (1988), Getches, Wilkinson and Williams (1998), Kalt and Singer (2004) and Royster and Blumm (2002). Various reasons for the increase are discussed, such as the cost, both temporal and financial, of litigation. The increasing hostility of the Supreme Court toward tribal sovereignty has also played a role in tribe's willingness to negotiate. The federal government has increasingly treated tribes as states in legislation such as the Clean Water Act, and the competition for federal resources to carry out these laws has grown. National legislation may not take into considerations an individual tribe's characteristics, whereas a compact between one state and one tribe can be adjusted based on their own needs. Very few empirical studies have been done regarding the federalist relationships between tribes and states in any arena: this thesis will add to the literature by undertaking an empirical analysis of forced federalism as it relates to tribal water rights and state water laws.

### **3.7 Law and Economics**

This section will discuss the law and economics of legal change. As tribes and states continue to negotiate and litigate with respect to water rights, the potential for legal change is present.

Mattei (1997) discusses legal change as a function of economic efficiency: efficient legal rules will be adopted following social change. In the same vein, Rubin (1977) and Priest (1977) both posit that social costs increase as the inefficiencies of a law increase, leading to a higher probability of being challenged in the future. The more efficient laws are less likely to be challenged, and are more likely to survive. Backhaus (1998) finds that the development of statutory law will be largely efficient, though legislators still face incentives to produce ‘mildly inefficient’ statutes that redistribute income between interest groups.

Landes and Posner (1980) hypothesize that “if the common law is an instrument by which society reduces divergences between private and social costs, and otherwise promotes the efficient allocation of resources, it should follow that changes in economic conditions-in relative values- will lead to changes in common law rules” (pg 367). As the value of water in the West increases, so too does the need to create a degree of certainty in water rights. Prior to quantification, tribal water rights are poorly defined. Quantification and the adoption of states laws regarding tribal water rights increase certainty associated with these and other water rights.

Several authors specifically address the economics of water law development. Rose (1990) contrasts the development of water law in the eastern and western United States, concluding that the individually consumptive uses of water in the West, in addition to scarcity conditions, led the region to develop a system with stronger individual property rights than that which developed in the East. Kanazawa (1998) analyzes the development of surface water law in California, stating that “water law will evolve predictably in response to changes in the economic value of water” (page 168).

Demand for water has diversified and increased in recent years, increasing the value of water. Kanazawa (1999) concludes that the development of groundwater law in California largely followed the same efficient path. This thesis will add to the literature by empirically analyzing the factors leading to changes in a narrow section of state water law regarding tribal water rights.

### **3.8 Supply and Demand for Legal Change**

Shavell (2004) explains that strong property rights will be demanded when their benefits offset the associated costs. A model will be developed in this section for the supply and demand of state laws regarding tribal water rights.

Water right holders, such as tribes, agricultural users or municipalities, will demand increased certainty in their property rights when the potential benefits of doing so outweigh the costs. In the case of tribal water rights, quantification is needed to ascertain their amount. Those quantification settlements are adopted by states as law, lending certainty to other water rights in the process. Demand for those laws is a function of the costs associated with adopting them as well as the benefits their adoption could provide, or

$$\text{Demand for legal change} = F(\text{transaction costs, potential benefits})$$

The transaction costs affecting consumers of legal change include the opportunity cost of time spent in quantification settlements, as well as legal fees. The potential benefit is greater access and control over a valuable resource.

The suppliers of legal change face a similar tradeoff between costs and benefits, though costs for suppliers refer to the costs borne by the state in negotiations and resource spent adopting the subsequent laws. Benefits, aside from social benefit, may

accrue to the individuals adopting the law, such as increased voter support for agreeable legislators.

Supply of legal change = F (transaction costs, potential benefits)

Both supply and demand are a function of costs and benefits. The likelihood of a change in the law is then a function of those costs and benefits affecting the consumers and suppliers, or:

Probability (Change in the law) = F (transaction costs, potential benefits)

This basic relationship leads to two propositions that will be empirically tested in this thesis:

Proposition 1: As transaction costs increase, fewer laws will be adopted.

The actual cost of adopting a law includes many things, and may be influenced by political factors and the degree to which tribes and states are used to dealing with each other in addition to the financial costs. New, innovative laws are also more expensive; if another state has previously developed and implemented a law, the cost to other states will lessen.

Proposition 2: As potential benefits increase, more laws will be adopted.

The benefits of a more certain water right will outweigh the costs only in some cases. Where parties have pushed to quantify these rights, a result of which are state-approved settlements, the benefits of doing so were larger than the costs.

The purpose of this thesis is to empirically analyze the factors leading to state adoption of laws regarding tribal water rights. The above propositions will be empirically tested to examine their validity.

## Chapter 4 Data

The objective of this thesis is to empirically analyze the factors leading to the adoption of state laws regarding tribal water rights. This section provides an overview of the data used in the analysis.

### 4.1 The Dependent Variable

The dependent variable is a measure of the state's water law with respect to tribal water rights. There are four legal characteristics of tribal water rights that state water law reflects:

1. FED\_APP: Requires the approval of a federal agency for transfer of tribal water rights;
2. NON\_TRIBE: Allows transfer of Indian water rights to non-Indians and non-tribal entities;
3. PROTECT: Protects water-related rights of Indians regarding transfers to non-Indians;
4. OFF\_RES: Permits tribal water rights to be used off-reservation;

Each of these characteristics is measured across 12 western states from 1987-2005, and across statutory and judicial law and administrative regulations. A dependent variable (ALL\_LAW) is created to encompass all three; if there was a change in any characteristic in statutory or judicial law or administrative regulations during a given year, the ALL\_LAW variable captures this by taking a 'one' value.

The individual characteristics, as shown in Table 4, do not change often: all have fewer than 20 'one' values. Table 4 also shows that the legislative branch is the most active when developing laws relating to tribal water transfers, and the administrative branch the least active. The three administrative changes were limited to the state of Arizona. The judicial branch may enter water rights compact between states and tribes as part of an official court decree, or the decisions may come from litigation relating to

**Table 4. Summary Statistics of the Dependent Variable**

	N	Frequency of a Zero Value	Frequency of a One Value	Adjusted Frequency of a One Value <sup>21</sup>
Individual Characteristics				
FED_APP	228	221	7	--
NON_TRIBE	228	217	11	--
PROTECT	228	209	19	--
OFF_RES	228	219	9	--
Types of Law/ Regulations				
Statutory	228	201	27	19
Judicial	228	210	18	12
Administrative	228	225	3	2
Final Dependent Variable				
ALL_LAW	228	180	48	29

water disputes. The legislative branch may adopt laws regarding tribal water rights as part of the sequential process tribal water rights pass through.

The dependent variable has several shortcomings. As measured, it reflects a change in a state's water laws regarding tribal water rights. It does not reflect the direction of the change, whether to a more or less permissive state, nor does it reflect the magnitude of the change. This problem is compounded since the law may change more than once per state over the time period. State water laws regarding tribal water rights are adopted following the quantification process, and the dependent variable does not reflect this sequential development. Ideally, the dependent variable would capture the direction and magnitude of the change in the laws, in addition to the process through which the law developed.

The data for the dependent variable was collected under National Science Foundation Grant No. 0317375 (Principle Investigators Alan Ker, Gary Libecap and

<sup>21</sup> The measures for the three types of law, and the final dependent variable ALL\_LAW, are a 'one' if any of the four characteristics are a 'one' for that year. Therefore, whether one or four characteristics change during a year, the dependent variable only changes once to a one.



Robert Glennon), and has been loaned to the author for use in this thesis. 71 legal variables affecting water transfers were developed to encompass all aspects of state water law; property rights theory was used in their definition and categorization. Westlaw, Lexis-Nexis and state legal databases were used to compile the data, as were treatises, periodicals and law review articles. Each of the 71 legal variables was measured across statutory, judicial and administrative law, and covers the twelve western states from 1987-2005. A complete list of those variables is presented in Appendix 2.

#### **4.2 Independent Variables**

Potential factors influencing western state's adoption of laws regarding tribal water transfers are discussed in this section. The summary statistics for these variables are found in Table 5.

Three variables are created to address transactions costs: UNIFIED, PL280 and IGRA. UNIFIED is an indicator variable that takes a one value if the governor's political party matches that controlling both houses of the state legislature. One-party government lowers the transaction costs associated with passing a law, so the expected sign is positive. Though this variable specifically applies to laws made by the legislative body of a state, it also represents the general political environment within that state, an environment that also affects administrators and judges. An ideal variable would exactly measure the transaction costs associated with passing a law.

IGRA is an indicator variable that takes a value of one for the year in which a state first negotiates a gaming compact with a tribe, and stays a one thereafter. Once states and tribes have successfully negotiated for jurisdiction in one arena, transaction costs in other areas may be lower, so the expected sign is positive. PL280 is an indicator

variable for states that assumed civil and criminal jurisdiction over tribes following the passage of Public Law 280 in 1953. The states relevant for this analysis include California, Oregon, Arizona, Idaho, Nevada, Montana and Utah. PL280 is a dummy variable coded as a one for these states. The expected sign is positive, since those states have demonstrated a willingness to assume jurisdiction over tribal affairs.

IGRA and PL280 are included in an attempt to measure the degree to which tribes and states have interacted with each other regarding jurisdictional disputes, with the assumption that a greater degree of interaction has lowered future transaction costs. This assumption was supported in Boehmke and Witmer (2004). An ideal variable would exactly measure the interaction between tribes and states, and the degree to which it affected future transaction costs. A perfect measure of transaction costs would be a financial total of the costs to all parties, given the level of interaction between tribes and states, as well as the costs associated with passing the law.

Two characteristics of Indian tribes relative to the state they fall within were also measured. RES\_SIZE measures the size of Indian reservations within a state as a percentage of a state's total size. This variable is expected to have a positive sign, since a larger reservation will require a larger quantified tribal water right, other things constant, regardless of whether the PIA or permanent homeland standard is applied. Ideally, a variable measuring the percentage of a state's water reserved to tribes would be used. However, such data won't be available until all tribal water claims are settled. The percent of the state's population that identifies as American Indian or Alaskan Native is also included (INDIAN\_PCT). The expected sign on this variable is positive, since a larger population will require more water. A larger American Indian population within a

state may also influence policymakers to address tribal water rights. This variable measures the total number of American Indians residing in a state, not just those who live on a reservation. An ideal variable, or variables, would be limited to on-reservation demand, and would also measure the political power of the Indian interest groups within a state.

Tribal water rights have some of the earliest priority dates in the West. As latecomers to water allocation and development within the state system, they may present a threat to other consumers such as agriculture and municipalities trying to maintain and attract growth. Two other variables reflecting categories of water consumers are FARM\_LAND and URBAN\_PCT. The former is a measure of the percent of state land that falls under crop and livestock acreage, wasteland, woodland, pasture, land in summer fallow, idle cropland, and land enrolled in the Conservation Reserve Program and other set aside or commodity acreage programs, and is expected to have a negative sign. As the percent of state land in the above categories grows, a state is expected to be less likely to adopt laws regarding tribal water rights. In nearly every western state, irrigated agriculture accounts for a majority of water withdrawals (Table 1). Though agricultural water rights typically also have early priority dates, their attitude toward settling tribal water claims has been contentious at times (O’Gara, 2000). URBAN\_PCT reflects the percent of a state’s population residing in a metropolitan statistical area.<sup>22</sup> A positive sign is expected, meaning that as urban populations grow, states are more likely to pass laws regarding tribal water rights. Growing urban areas have budgets to spend on leasing water from other users. Tribes with water settlements represent a new group with secure

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<sup>22</sup> Consisting of one or more counties with a core urban area of greater than 50,000 people, U.S. Bureau of the Census 2005 definition

water rights that cities have looked to in the past, and may continue to do so in the future (Bark, 2006 and Water Strategist, 2004). Ideal variables would more precisely measure the water demand associated with land in farms and population in urban areas. The uncertainty associated with surface water supplies and to which consumers are subject would also be included into the variables regarding water demand.

One final variable, NEIGHBOR, reflects whether the dependent variable has changed in a neighboring state.<sup>23</sup> This variable is limited in part because of the geographical reach of the data: states such as Texas and Colorado do not have all their neighbors represented. However, some of these states use a different water allocation system, so they would not apply in any case. The problems associated with the dependent variable also affect this variable. Ideally, the problems with the dependent variable would be fixed, and the effect of all relevant neighbors would be included.

**Table 5. Summary Statistics of Independent Variables**

<b>Variable</b>	<b>Mean (# 1s / N)</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Expected Sign</b>
<b>Transaction Costs</b>					
UNIFIED	98/228	0.49	0	1	+
PL280	133/228	0.37	0	1	+
IGRA	126/228	0.49	0	1	+
NEIGHBOR	109/228	0.50	0	1	+
<b>Water Consumers/ Interest Groups</b>					
INDIAN PCT	3.053	2.69	0.38	11.02	+
RES SIZE	6.52	9.28	0.002	35.75	+
FARM LAND	41.35	19.31	8.96	79.49	-
URBAN PCT	41.36	16.15	15.18	70.78	+

<sup>23</sup> The neighbors for each state are listed parenthetically: AZ (CA, NV, UT, CO, NM); CA (OR, NV, AZ); CO (WY, NM, AZ, UT); ID (WA, MT, WY, UT, OR); MT (ID, WY); NM (AZ, TX, CO, UT); NV (AZ, CA, OR, ID, UT); OR: WA, ID, NV, CA); TX (NM); UT (AZ, CO, NM, NV, ID, WY); WA (OR, ID); WY (MT, CO, UT, ID).

## Chapter 5 Empirical Tests and Results

The purpose of this thesis is to determine factors influencing western states' adoption of laws regarding tribal water rights. These laws are adopted as a result of increased tribal-state interaction through negotiated compacts, rather than litigated suits. This chapter discusses the econometric model used in the analysis and the empirical results.

### 5.1 Econometric Model

The dependent variable is binary in nature, taking a one value if the law changes, otherwise remaining a zero. Thus, Ordinary Least Squares (OLS) regression no longer produces the best linear unbiased estimator, since it may predict values outside the interval between zero and one. A probit model constrains predicted values to lie between zero and one. The predictions can be interpreted as the probability of a change in the law. Maximum likelihood is the method of estimation, necessitating an assumption regarding the correct probability distribution function. For a probit model, the standard normal distribution is assumed.

Of interest for this thesis is the decision of a state to change its laws. The dependent variable is equal to a one if the law changes, and a zero if it does not, or:

$$ALL\_LAW_i = \begin{cases} 1 & \text{if the state changes a tribal water transfer law that year} \\ 0 & \text{otherwise} \end{cases}$$

The change in ALL\_LAW is observed; what is not observed is the propensity of a state to change its law ( $ALL\_LAW_i^*$ ). The probability of a change in the law is then equal to the probability that the propensity of a change in the law is greater than a threshold  $x_i$ ,

usually set at zero.

$$\text{Probability (ALL\_LAW}_i = 1) = \text{Probability (ALL\_LAW}_i^* > x_i)$$

The following rule then generates values for the observed dependent variable:

$$\text{ALL\_LAW}_i = \begin{cases} 1 & \text{if ALL\_LAW}_i^* > x_i \\ 0 & \text{otherwise} \end{cases}$$

The propensity of the law to change is such that:

$$\begin{aligned} \text{ALL\_LAW}_i^* = & B_1 + B_2*\text{UNIFIED}_i + B_3*\text{PL280}_i + B_4*\text{IGRA}_i + \\ & B_5*\text{INDIAN\_PCT}_i + B_6*\text{RES\_SIZE}_i + B_7*\text{FARM\_LAND}_i + B_8*\text{URBAN\_PCT}_i \\ & + B_9*\text{Lag1\_NEIGHBOR}_i + E_i \end{aligned}$$

Thus, the probability of observing a change in the law is:

$$\begin{aligned} \text{Prob (ALL\_LAW}_i = 1) = & \text{Prob [(} B_1 + B_2*\text{UNIFIED}_i + B_3*\text{PL280}_i + B_4*\text{IGRA}_i + \\ & B_5*\text{INDIAN\_PCT}_i + B_6*\text{RES\_SIZE}_i + B_7*\text{FARM\_LAND}_i + B_8*\text{URBAN\_PCT}_i \\ & + B_9*\text{Lag1\_NEIGHBOR}_i + C_i) > 0] \end{aligned}$$

## 5.2 Empirical Results

Results from the probit analysis with ALL\_LAW as the dependent variable are shown in Table 6. Several variables were found to be statistically significant, though not all with the expected sign. The parameter estimates measure the change in the unobservable ALL\_LAW<sub>i</sub><sup>\*</sup> given a change in an explanatory variable. In order to determine the effect on the observed dependent variable, marginal effects are calculated. For non-dummy explanatory variables, marginal effects are found by evaluating the probability of the derivative at the mean value. Dummy explanatory variables are evaluated at a one value (Johnston and DiNardo, 1997). The size of the marginal effects

changes with the values of the explanatory variables, so the mean value is commonly used for non-dummy variables. The interpretation of the marginal effects is, for example, that a one percent increase in the population identifying as Native American and Alaskan Native increases the probability of a state adopting laws regarding tribal water rights by 0.021 (Table 6).

Nearly all the variables associated with transaction costs are either not significant or significant and not of the expected sign. Unified political party control of state governments and whether the state had previously signed a gaming compact with a tribe are the former: neither estimate is significantly different from zero. The effect of Public Law 280 is significant, but unexpectedly has a negative effect on the probability of a change in the law. The interpretation of this finding is that a state is less likely to adopt a change in the law relating to tribal water rights if it adopted civil and criminal jurisdiction over tribes under Public Law 280. The prior experience may have soured states' appetite for assuming responsibility over tribes and their resources. Tribes in those states may also fight harder to keep states from assuming such responsibility, having already lost portions of their jurisdiction.

The only transaction cost variable to have the expected, significant effect is that of neighboring states, lagged one year. If a neighboring state adopted any of the four tribal characteristics the previous year, a state has a larger probability of doing the same. Estimations with a non-lagged variable and a two-year lag were also done, and did not yield significant results.

The two characteristics relating to Indian tribes are both significant, with the expected positive signs. The larger the American Indian and Alaskan Native population

or size of reservations in a state, the more likely a state is to adopt a change in the laws regarding tribal water rights. The percent of land in farms, as expected, has a negative effect on the likelihood of a state adopting a law regarding tribal water rights. The same is true for the percentage of people living in an urban area, though this result is unexpected. While changes to these laws can provide another source from which urban areas may lease water, they also present a threat to an established system of water allocation. This threat may be of such magnitude as to cause urban interests to oppose changes in any form.

**Table 6. Probit Results with ALL\_LAW as the Dependent Variable<sup>24</sup>**

Variable	Parameter Estimate	Marginal Effect	Expected Sign
INTERCEPT	5.234** (1.814)	0.474	
Transaction Costs			
UNIFIED	-0.288 (0.282)	-0.026	+
PL280	-1.050* (0.509)	-0.095	+
IGRA	0.166 (0.315)	0.015	+
NEIGHBOR _ LAG1	0.760* (0.277)	0.069	+
Water Consumers/ Interest Groups			
INDIAN_PCT	0.227* (0.010)	0.021	+
RES_SIZE	0.072** (0.023)	0.007	+
FARM_LAND	-0.112** (0.030)	-0.010	-
URBAN_PCT	-0.078** (0.022)	-0.007	+
McFadden's $R^2 = 0.250$			
Prob (ALL_LAW=1)= 0.031			

N=216

It is important to note the small magnitudes of the marginal effects in the

<sup>24</sup> In Tables 6-9, \*\* reflects significance at the 1% level, \* at the 5% level. Standard errors reported in ().



ALL\_LAW estimation. Though some estimates are statistically significant, an equally important test is the extent to which they affect the dependent variable. The magnitude of the explanatory variable on the probability of a change in the law is quite small in all cases.

The percentage of a state's population identifying as American Indian and Alaskan Native averages just over 3%. A variable measuring the percentage of the population not identifying as white, non-Hispanic was also created (MINORITY\_PCT), and used in an alternative specification (Table 7). This variable as a proxy for water demand is an overstatement, but it may be more reflective of the relative political power of tribes within the state. Fewer significant results are found in this specification, and the

**Table 7. Probit Results with ALL\_LAW as the Dependent Variable, MINORITY\_PCT substituted for TRIBAL\_PCT**

Variable	Parameter Estimate	Marginal Effect	Expected Sign
INTERCEPT	3.048* (1.342)	0.378	
Transaction Costs			
UNIFIED	-0.149 (0.270)	-0.019	+
PL280	-0.595 (0.423)	-0.074	+
IGRA	0.351 (0.326)	0.044	+
NEIGHBOR _ LAG1	0.734** (0.277)	0.091	+
Water Consumers/ Interest Groups			
MINORITY_PCT	-0.0081 (0.011)	-0.001	+
RES_SIZE	0.063** (0.022)	0.008	+
FARM_LAND	-0.067** (0.019)	-0.008	-
URBAN_PCT	-0.052** (0.017)	-0.006	+
McFadden's $R^2 = 0.223$			
Prob (ALL_LAW=1)= 0.0012			

N=216

magnitude of the marginal effects also falls. Most of the estimates associated with transaction costs are not significantly different from zero, except for the lagged effect of neighboring states. The variable reflecting the size of the non-white population is also not significant. The size of reservations is still found to be positive and significant, as expected. The percentage of land in farms and population in urban areas are again negative and significant.

The above results have very few empirical studies with which they can be directly compared. Some results are similar to what has been previously found in the state policy innovation literature. Both Boehmke and Witmer (2004) and Berry and Berry (1990) found the effect of neighboring states to be positive and significant. Boehmke and Witmer also found unified political party control of state governments to be insignificant, though they did find the effect of Public Law 280 states to be positive and significant. It may be possible to attribute the discrepancies to the unique processes by which tribal water rights are legally addressed. Comparing these laws to any other policy adoption outside of the tribal water rights arena may be inappropriate, but is necessitated by the limited state of the literature. The discrepancies may also be due to the presence of an omitted variable, the effects to which probit models are especially susceptible. In addition to those above, estimations were run to test the effects of other legal characteristics, changes in a state's annual population and precipitation, and political party control of each house of the state legislatures and the governor's office, all of which were found to be insignificant.

In order to test if the effects of any particular state biased the results found in Table 6, one state's observations were dropped from each of the estimations found in

Table 8. If a given result was significant and robust across all estimations except when a particular state's observations were dropped, the effect of those states on each variable can be isolated. For example, the size of reservations is significant except when Arizona's observations are dropped. The sign of this variable is robust across estimations, but Arizona is driving the significance of the estimate. Arizona has by far the largest percentage of state land falling under reservations at 35.75%; the state with the next largest percentage is Montana, with only 9.06%.

The insignificance of unified political party control of state governments is constant across estimations, as is that of states having previously signed a gaming compact with a tribe; no one particular state is driving the effect of these variables. The effect of being a Public Law 280 state is significant except when the observations for California, Idaho, Montana, Utah and Wyoming are dropped, of which all except Wyoming are Public Law 280 states. Arizona, Nevada and Oregon are also Public Law 280 states, but the variable does not lose its significance when these observations are dropped. The expected sign is positive, though it is always negative, even when all observations are included. The effect of neighboring states, lagged one year, is always significant and positive: no one particular state has particular influence over its neighbors. The population of American Indian and Alaskan Native is significant except when the observations for California, Idaho and New Mexico are dropped. Both California and Idaho have Indian populations near one percent of their entire populations, while New Mexico has the largest, at nearly ten percent. The percent of land in farms is always significant and negative, as is the percent of population in urban areas, except when Idaho's observations are dropped. Idaho is also the only state whose loss of

observations causes the percent of land in farms to be significant at only the 5% level, instead of the 1% level. Idaho's mean for both variables is below the mean of all states, but is not the minimum. Idaho does, however, have a large number of changes to the dependent variable within its observations.

**Table 8. Probit Results for ALL\_LAW, Dropping 1 State per Estimation**

Drop State	Intercept	UNIFIED	PL280	IGRA	NEIGHBOR_LAG1	INDIAN_PCT	RES_SIZE	FARM_LAND	URBAN_PCT
AZ	5.581** (1.870)	-0.438 (0.325)	-1.070* (0.525)	0.145 (0.525)	0.774* (0.302)	0.239* (0.101)	0.068 (0.065)	-0.116** (0.031)	-0.082** (0.223)
CA	5.112** (1.761)	-0.288 (0.292)	-0.879 (0.495)	0.355 (0.334)	0.709* (0.290)	0.189 (0.101)	0.065* (0.023)	-0.107** (0.029)	-0.079** (0.021)
CO	5.174** (1.842)	-0.285 (0.282)	-1.04* (0.510)	0.168 (0.315)	0.760** (0.278)	0.224* (0.102)	0.071** (0.024)	-0.111** (0.030)	-0.077** (0.022)
ID	2.725 (2.149)	0.073 (0.312)	-0.832 (0.524)	0.166 (0.378)	0.652* (0.308)	0.137 (0.097)	0.051* (0.024)	-0.075* (0.033)	-0.048 (0.026)
MT	5.162* (2.217)	-0.395 (0.298)	-1.00 (0.754)	0.126 (0.331)	0.944** (0.301)	0.238* (0.103)	0.074** (0.026)	-0.113** (0.037)	-0.079** (0.023)
NM	6.247** (2.160)	-0.388 (0.294)	-1.463* (0.701)	0.010 (0.354)	0.671* (0.290)	0.437 (0.256)	0.062* (0.267)	-0.134** (0.404)	-0.094** (0.024)
NV	5.246** (1.925)	-0.194 (0.307)	-1.068* (0.531)	0.183 (0.337)	1.012** (0.323)	0.222* (0.108)	0.081** (0.027)	-0.113** (0.031)	-0.086** (0.025)
OR	6.686** (2.324)	-0.301 (0.289)	-1.415* (0.634)	0.177 (0.327)	0.707* (0.284)	0.280* (0.116)	0.089** (0.029)	-0.135** (0.038)	-0.095** (0.028)
TX	5.234** (1.814)	-0.288 (0.282)	-1.050* (0.509)	0.166 (0.315)	0.760** (0.277)	0.227* (0.100)	0.072** (0.023)	-0.112** (0.030)	-0.078** (0.022)
UT	5.471** (1.809)	-0.122 (0.314)	-0.961 (0.515)	-0.150 (0.407)	0.730* (0.292)	0.242* (0.103)	0.071** (0.023)	-0.117** (0.030)	-0.077** (0.021)
WA	5.675** (1.877)	-0.388 (0.305)	-1.237* (0.580)	0.172 (0.344)	0.741** (0.284)	0.231* (0.111)	0.077** (0.024)	-0.118** (0.023)	-0.080** (0.023)
WY	4.377* (1.965)	-0.125 (0.318)	-0.650 (0.624)	0.198 (0.238)	0.668* (0.291)	0.289* (0.115)	0.060* (0.015)	-0.114** (0.031)	-0.069** (0.023)

N=198

Also done were estimations using the four individual characteristics as the dependent variables. Results from these four estimations are shown in Table 9. The general insignificance of the explanatory variables in these estimations may be at least partly attributed to the low number of times the dependent variables change to a 'one' value (Table 4). Those variables whose effects are significantly different from zero are

of the same sign as found when ALL\_LAW is the dependent variable.

**Table 9. Probit Results with Individual Characteristics as the Dependent Variable**

Variable	FED_APP	NON_TRIBE	PROTECT	OFF_RES
INTERCEPT	-9.106 (27940.92)	0.551 (1.952)	5.495** (2.095)	-0.404 (2.182)
Transaction Costs				
UNIFIED	6.567 (27940.92)	-0.233 (0.353)	-0.127 (0.338)	-0.169 (0.395)
PL280	0.357 (0.920)	-0.299 (0.596)	-0.996 (0.601)	-0.042 (0.666)
IGRA	-0.0035 (0.584)	-0.039 (0.377)	0.332 (0.390)	0.139 (0.422)
NEIGHBOR_LAG1	1.055 (0.595)	0.178 (0.326)	0.888* (0.365)	0.052 (0.345)
Water Consumers/ Interest Groups				
INDIAN_PCT	-0.116 (0.244)	0.072 (0.115)	0.264* (0.116)	0.102 (0.122)
RES_SIZE	0.057 (0.046)	0.038 (0.025)	0.020 (0.055)	0.028 (0.027)
FARM_LAND	0.005 (0.036)	-0.043 (0.030)	-0.114** (0.035)	-0.039 (0.033)
URBAN_PCT	-0.008 (0.035)	-0.022 (0.022)	-0.097** (0.027)	-0.013 (0.025)
McFadden's R <sup>2</sup>	0.342	0.095	0.303	0.117

N=216

## Chapter 6 Conclusions

This thesis empirically analyzes the factors leading to adoption of state water laws regarding tribal water rights. Three propositions were made earlier, for which varying levels of empirical support were found.

Proposition 1: As transaction costs increase, fewer laws will be adopted. The effect of neighboring states having adopted the same law one year previously is the only transaction cost-related variable to be found significant with the expected positive sign. Rather than re-inventing the wheel in every state, previous adoptions in neighboring states allows transaction costs to be lowered. This finding echoes earlier results by Boehmke and Witmer (2004) and Berry and Berry (1990).

The effect of being a Public Law 280 state was also found to be significant, but its sign was unexpectedly negative. Boehmke and Witmer found this variable to positively affect tribal-state negotiations with respect to gaming jurisdiction. It may be that states are unwilling to take on further responsibilities in Indian country, or those tribes, having lost some jurisdiction years ago, are less willing to formally support state laws regarding tribal water rights. The other two variables relating to transaction costs were not found to be significant. These mixed results indicate that increasing transaction costs do not affect legal change as predicted. The variables used may be poor measures of the costs associated with adopting laws regarding tribal water rights in particular.

Proposition 2: As benefits rise, more laws will be adopted. Over the past few decades, tribes have increasingly entered into negotiations with states to quantify their water rights, often as part of larger general stream adjudications. The benefits of doing so outweigh the potential costs of sitting on the sidelines. State

adoption of laws regarding tribal water rights is part and parcel of these settlements. Empirical support was found for two of the variables used for Proposition 2, specifically those variables related to the Indian population and reservation land base within a state. Variables related to other interest groups, percent of land in farms and population in urban area, were both found to be negative and significant. Though state adoption of laws relating to tribal water rights does reduce the uncertainty associated with other water rights, these interest groups may view their adoption as a threat to the established way of doing business, and withdraw their support.

The effects of each state on the above results were also tested, with only Idaho consistently affecting the significance of the explanatory variables. Again, this may be due to the Idaho's large number of 'one' observations for the dependent variable.

In terms of changes across types of laws, the legislature is far more active in adopting these changes. The administrative branch of government changes the least often, perhaps because they have the smallest opportunity to deal with tribal water rights. Initially, it is the court system that deals with water adjudications. Negotiated compacts may then be sent to the state legislature for approval. For those hoping to influence the adoption of these laws, the legislative branch offers the most opportunities.

The results presented in this thesis are limited in several ways. The data used is imperfect, notably the dependent variable. A clearer measure of the magnitude and direction of the legal change would more accurately answer the research question. The dependent variable would also ideally capture the sequential process these laws have gone through as part of quantification negotiations. Due in part to these limitations, there exist many opportunities for future research. The complicated relationship between tribes

and states, and the federal government, is one possibility for future research. Another is how these state laws affect tribal water transfers after they have been adopted.

As the western United States continues to achieve record population growth in the face of a fixed water supply, water suppliers increasingly look to transfers to provide secure sources of water. Tribal water rights, once quantified, are an attractive option for transfers because of their magnitude and early priority date. Their legal environment has grown to include state water law, and provides a direct approach for policymakers to effectively intercede on behalf of future transfers.



**Appendix 1: A Chronological list of Tribal Water Rights Settlements and Cases**

<b>Settlement or court case</b>	<b>Indian tribe(s)</b>	<b>State</b>	<b>Quantity of entitlement (afa)*</b>	<b>Date</b>	<b>Comments</b>
Ak-Chin Indian Water Rights Settlement Act	Ak-Chin Indian Community	AZ	85,000	1978, 1984, 1992	Amendments allow leasing
Southern Arizona Water Rights Settlement Act	San Xavier and Schuk Toak districts, Tohono O-odham Nation	AZ	66,000	1982, 1992, 2004	Allows limited off-reservation leasing
Fort Peck-Montana Compact	Assiniboine and Sioux tribes	MT	1,050,472	1985	Allows limited off-reservation leasing
Salt River Pima-Maricopa Indian Community Water Rights Settlement	Salt River Pima-Maricopa Indian Community	AZ	122,400	1988	Allows limited off-reservation leasing
Colorado Ute Indian Water Rights Settlement	Southern Ute and Ute Mountain Ute tribes	CO	70,000	1988	Allows leasing subject to state law
San Luis Rey Indian Water Rights Settlement Act	La Jolla, Rincon, San Pasquale, Pauma and Pala bands of Mission Indians	CA	Joint authority over 16,000	1988	No firm source of settlement water identified; no leasing provisions
Wind River adjudication	Eastern Shoshone and Northern Arapaho	WY	490,000 divided into historic and future water uses	1989	Instream flow uses disallowed
Truckee-Carson-Pyramid Lake Water Rights Settlement Act	Pyramid Lake Paiute Tribes	NV	520,000	1990	Settlement shaped by environmental concerns
Fallon Paiute-Shoshone Tribes Water Rights Settlement Act	Fallon Paiute and Shoshone tribes	NV	10,558	1990	Allows leasing subject to state law
Fort Hall Indian Water Rights Act	Shoshone and Bannock tribes	ID	581,331	1990	Allows on-reservation leasing

Fort McDowell Indian Community Water Rights Settlement Act	Fort McDowell Indian Community	AZ	36,350	1990	Allows limited off-reservation leasing
Northern Cheyenne Indian Reserved Water Rights Settlement	Northern Cheyenne Tribe	MT	91,330	1992	Most off-reservation leasing subject to state law
San Carlos Apache Tribe Water Rights Settlement Act	San Carlos Apache Tribe	AZ	77,435	1992	Allows limited off-reservation leasing
Reclamation Projects Authorization and Adjustment Act	Northern Ute Tribe	UT	481,000	1992	Designed to resolve tribal claims against federal government
Jicarilla Apache Tribe Water Rights Settlement Act	Jicarilla Apache Tribe	NM	40,000	1992	Allows off-reservation water-marketing
Yakima basin adjudication	Yakima Indian Nation	WA	Instream and irrigation rights	1993	Instream flow right limited to 'minimum flow'
Yavapai-Prescott Indian Tribe Water Rights Settlement Act	Yavapai-Prescott Tribe	AZ	Up to 16,000	1993	Allows marketing of surface-water from reservation
Las Vegas Artesian Basin	Las Vegas Paiute Tribe	NV	2,000	1996	Recognizes permanent groundwater right
Warm Springs	Confederated Tribes of Warm Springs	OR	Up to 450 cfs** diverted	1997	200 cfs may be marketed off-reservation
Chippewa Cree Tribe of the Rocky Boy's Reservations Indian Reserved Water Rights Settlement and Water Supply Enhancemnt. Act	Chippewa Cree Tribe	MT	20,000	1999	Necessary federal funding for water treatment plant and pipeline delayed

Crow Tribe-Montana Compact	Crow Tribe	MT	500,000 plus 300,000 storage	1999	Closes certain basins to new appropriations under state law
Shivwits Band of the Paiute Indian Tribe of Utah Water Rights Settlement Act	Shivwits Paiute Band	UT	4,000	2000	Some instream flow rights recognized
Fort Belknap-Montana Compact	Gros Ventre and Assiniboine tribes	MT	650 cfs plus other diversions	2001	Hydrologically-connected groundwater may be diverted
Zuni Indian Tribe Water Rights Settlement Act	Zuni Pueblo	AZ	1,500 groundwater; up to 3,500 surface water may be purchased	2003	Also addresses Zuni Pueblo's land in Arizona
Arizona Water Rights Settlements Act	Gila River Indian Community	AZ	655,000	2004	Allows in-state off-reservation sale or leasing
Snake River Water Rights Act	Nez Perce	ID	50,000	2004	Allows leasing of tribal water

*Sources:* Colby, Thorson and Britton (2005) and Getches, Wilkinson and Williams (1998)

\*acre-feet annually, unless otherwise noted

\*\*cubic-feet per second

## Appendix 2: List of Legal Categories and Their Respective Characteristics

### Category: Definition of the Water Right

- v1 Recognizes a right to exclusive possession of surface water.
- v2 Recognizes a right to exclusive possession of groundwater.
- v2 Recognizes a right to exclusive possession of instream flows.
- v4 Recognizes a right to exclusive possession of effluent (waste water).
- v5 Recognizes a right to a qualified or limited possession of surface water.
- v6 Recognizes a right to a qualified or limited possession of groundwater.
- v7 Recognizes a right to a qualified or limited possession of instream flows.
- v8 Recognizes a right to a qualified or limited possession of effluent.
- v9 Makes the water right more definite or precise.
- v10 Redefines purposes that are accepted as beneficial use.
- v11 Defines the volume of water that may be pumped, diverted, or consumed.
- v12 Allows for the water right to exist apart from ownership of the land.
- v13 Imposes a time limit on the water right.
- v14 Allows a water right to be attached for purposes of executing a debt.

### Category: Restrictions on Holder's Use of Water

- v15 Limits the point of diversion from a surface water body.
- v16 Requires that the use be shared with others.
- v17 Authorizes water districts, irrigation districts, or other member institutions to regulate use and transfer of water rights by their members.
- v18 Recognizes a limit on use because of the Public Trust Doctrine.
- v19 Recognizes a limit on use because of environmental restrictions.
- v20 Recognizes a restriction on use based on water quality concerns.

### Category: Provisions for Loss or Limitation of Water Rights

- v21 Restricts the water right based on the waste or inefficient use of the resource.
- v22 Restricts the water right by recognizing that there has been an abandonment of the resource.
- v23 Restricts the water right by recognizing that there has been a forfeiture of the resource.

### Category: Right to Transfer Water Rights

- v24 Recognizes a right to benefit financially from the sale, exchange, or transfer of water.
- v25 Recognizes a right to benefit financially from the sale, exchange, or transfer of effluent.
- v26 Recognizes a right to transfer ownership of the water right.
- v27 Recognizes a right to transfer ownership of effluent.
- v28 Recognizes a right to lease the water right.
- v29 Recognizes a right to temporary or urgency transfers
- v30 Recognizes a right to trial transfer of the water right.
- v31 Recognize a right to exchange the water right.
- v32 Enforcement of water rights.

Category: Conditions on Transfer of Water Rights

- v33 Restrict the amount of financial gain that can be obtained from the sale or transfer of water rights.
- v34 Place limits on transfers in order to protect other users.
- v35 Restrict transfers in order to protect the environment.
- v36 Prohibit transfers out of a basin or a watershed.
- v37 Restrict transfers out of a basin or a watershed.
- v38 Prohibit transfers in order to protect the impacts on rural communities.
- v39 Restricts the transfer of water out of state.
- v40 Prohibits the transfer of water out of state.
- v41 Restrict transfers in order to protect “the public welfare.”
- v42 Restrict transfers due to the impacts on rural communities.
- v43 Restrict transfers in order to maintain the level of the water table.
- v44 Require compensation to third parties.
- v45 Impose additional restrictions depending on quantity of water transfers

Category: Conservation Measures

- v46 Encourages or requires conservation of water.
- v47 Encourage conservation of water, with a right to sell or transfer some or all of the conserved water.
- v48 Provide for water banking mechanisms.
- v49 Recognize a right to recharge water.
- v50 Recognize a right to recover the recharged water.

Category: Regulatory Procedures and Mechanisms

- v51 Impose a fee for a permit or other use of the resource.
- v52 Provide expedited processing option for short-term transfers or during severe need periods, e.g. drought.
- v53 Provide for notice of proposed transfers.
- v54 Allow third parties to protest water transfers.
- v55 Impose costs associated with preparing the notice of transfers or with holding hearings on proposed transfers.
- v56 Generate water transfer fees to provide funding to facilitate water transfers.
- v57 Does the water transfer process carry the risk of exposing weaknesses in the nature of the transferor’s existing water rights, so that they might be deemed abandoned or forfeited?
- v58 Impose a burden of proof on the proposed transferor, for example to demonstrate that there will be no harm to juniors.
- v59 Place burden on parties challenging the transfer.
- v60 Streamline proof requirements for transferor.
- v61 Require a water transfer to be approved by a state or federal agency.
- v62 Require the approval of a state public utility commission before a private water company can transfer water rights.
- v63 Establish a registry of water transfers administered by a state agency.

Category: Tribal Water Rights

v64 Require the approval of a federal agency for transferring tribal water rights.

v65 Allows transfer of Indian water rights to non-Indians and non-tribal entities. \*

v66 Protects water-related rights of Indians, e.g. fishing rights, regarding transfers to non-Indians.

v67 Permit tribal water rights to be used off the reservation.

Category: Uncategorized Factors

v68 Recognize institutional structures, such as irrigation districts, that own water rights.

v69 Provide for election procedures for the boards of directors of irrigation districts or other water institutions.

v70 Authorize the use of canals, streambeds, reservoirs, or water supply facilities, to transport water as part of a water transfer.

v71 Create an institution (such as a replenishment district) to secure water rights for proposed developments.

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