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Examining Federalism in American Water Policy: Taking Stock of a Modern Issue

James Harrison Ormesher

University of Mississippi, Sally McDonnell Barksdale Honors College

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Examining Federalism in American Water Policy: Taking Stock of a Modern Issue

By
James Harrison Ormesher

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

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Approved by

Advisor: Professor Jody Holland

Reader: Professor Jason Barrett

Reader: Professor Debra Young

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ABSTRACT James Harris Ormesher: Examining Federalism in American Water Policy:
Taking Stock of a Modern Issue
(Under the direction of Jody Holland)

As American water resources fall under increasing scrutiny, with shortages costing millions of dollars annually, questions about the effectiveness of the policy managing these resources arises. In particular blurred responsibilities and goals generated as a result of the American federalist system raise questions about the nature of the state and federal relationship and the ability of it effectively develop a functioning water policy. To garner an understanding of American federalism, American water policy, and the relationship between them, I utilized a comparative analysis of both the history of water policy and federalism in America. Following this history, I offer an analysis for understanding the state and federal levels of water policy. In this analysis, I argue that the state level evolution of water policy is highly adaptable, and well suited to handle issues associated with supply, demand, and allocation. Contrarily, the federal government is well equipped to deal with interstate resources and issues where benefits are not as easily quantified in market terms. However, as a result of the evolution of federal water policy and trends in federal devolvement, the federal government may be fragmented to the point where it is not able to properly address the inadequacies in the state government's water policies. To remedy this I propose the following three solutions. A) centralize federal legislative and bureaucratic institutions, B) create watershed planning organizations, and C) undertake a National Water Assessment.

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Chapter 1: Introduction

In the past, America has always considered itself a land of plenty, and water is no exception. It is estimated that America has the 4th most renewable internal freshwater sources in the world ("Renewable Internal," n.d.). This has been incredibly useful, as water is important not only in sustaining life, but in developing an economy, industry, and agricultural system. As a result of a growing population and an upward trend in per capita water use, today America consumes water at an impressive rate (Donnelly & Cooley, 2015). Since 1900, the United States has gone from consuming just less than 50 billion gallons of water per day, to consuming 440 billion gallons of water per day at a peak in 1980 (Donnelly & Cooley, 2015). In 2012, one study estimated that the U.S. had the third highest water footprint of any country, and the largest water footprint per capita of any country (Hoekstra & Mekonnen, 2012). And while this increase in water use does not indicate a problem, increased demand and a deeper understanding of our water resources draw concerns about possible water shortages in the United States.

In a 2003 survey, 36 out of 40 state water managers interviewed foresaw water shortages occurring in the next ten years (Government Accountability, 2014). In 2013, there was an increase to 40 out of 50 state water managers who foresaw water shortages occurring in the next ten years (Government Accountability, 2014). What becomes increasingly interesting is the reasons cited regarding water shortages

Between 2003 and 2013, many reasons for concern about water shortages stayed the same. In particular both surveys indicated an emphasis on increases in population placing strain on the water supply, as well as a lack of “comprehensive information on water availability and use”, creating difficulties in water management and planning (Government Accountability, 2014). With the population expecting to increase significantly by 2030, it is not surprising that water shortage was a consistent point of concern in managing the water supply (Government Accountability, 2014). Additionally, with no comprehensive study on water availability and use taking place since 1978, incomplete information is listed as contributing to an inability to adequately manage water resources (Government Accountability, 2014). And while this 1978 report listed threats to the water supply that have come to fruition, such as inadequate surface water resources, pollution of water, and overdraft of ground water, many new issues have risen to prominence as well (United States, 1978, p. 3.)

For example, in 2013, surveyed water managers placed an increased emphasis on many new issues. In particular, managers discussed concerns that climate change and extreme weather patterns could impact water resources (Government Accountability, 2014). In addition concerns over water quality and shortages are highlighted. As a result of water shortages and reduced access to clean drinking water, there are both economic and human costs.

For instance in agriculture, where the impacts of drought translate more obviously, we have seen economic losses in a variety of states. In 2015, when California was experiencing its fourth straight year of drought, it is estimated that the agriculture industry lost billions. In 2015, a study at the University of California Davis calculated

that there was a \$2.7 billion loss in the agriculture sector (Howitt, MacEwan, Medellín-Azuara, Lund, & Sumner, 2015). Furthermore, this study indicated a loss of over 10,000 seasonal farm jobs in the state of California. This story is not entirely unique to California. In Texas in 2011, it was estimated that losses as high as \$7.2 billion occurred as a result of drought damaged crops (Guerrero, 2012). This represented the biggest monetary loss Texas had received as a result of drought in one year by more than by \$3.5 billion (Fannin, 2012).

While America is typically known for its relatively high quality of water, it has become more obvious that pollution and access to safe drinking water is not necessarily an issue reserved exclusively for developing countries. In areas across America, reports of polluted drinking water have emerged. One study shows that from samples taken between 2013 and 2015, 194 water supplies in 33 different states had over acceptable levels for contamination of poly- and perfluoroalkyl substances (PSAFs), a substance which has been linked to cancer in humans (Feldscher, 2016). While this number represents a widespread threat to American drinking water supplies, it is from only one particular substance. Unfortunately, this means it does not represent the entirety of the problems facing the American water supply.

Another modern case worth examining is the Flint Water Crisis and some of the impacts it is having across America. In 2014, Flint, Michigan decided to switch from paying the city of Detroit to pump water out of Lake Huron, instead opting to use the Flint River and pump water themselves (Franz, 2017). This was supposed to be a cheaper option to secure drinking water for the city (Franz, 2017). However, the Flint River's corrosive water was not treated with a corrosion inhibitor, resulting in high levels

of lead leaching into the cities drinking water supply (Franz, 2017). Flint's water contained lead at a rate 10 times higher than the safe water levels set by the EPA (Franz, 2017). As a result of these high lead levels, one professor at the University of Columbia Mailman School of Public Health estimates that there could be \$395 million in social costs resulting from the 8,000 children believed to have been exposed to lead since 2014 (Whitcomb, 2016).

And while tragic, this issue is not confined to the boundaries of Flint, Michigan. In America today, there are believed to be more than 6 million lead pipes in use for water systems scattered across the states (Dolan, 2016). While many of these pipes are located in older urban areas such as the Northeast and Midwest, the companies running these systems are often unsure of the exact locations and number of these pipes (Dolan, 2016; Spangler, 2016). This can make it difficult to know which utilities are at a higher risk for lead poisoning. Given the complexity and danger of the situation, in the wake of the Flint crisis, Fitch Rating Agency calculated that costs could exceed \$275 billion in order to replace lead pipes (Dolan, 2016).

While problems related to water in terms of availability, supply, and quality exist in obvious ways, the solutions to these problems do not necessarily manifest themselves as clearly. The federalist system of governance respects both states' independence between each other, as well as a level of sovereignty from federal authorities. This means responsibilities are frequently muddled between states and the federal governments, and jurisdictions between states are disconnected. As a result, deciding who solves problems and how to solve problems is complicated. This system, while confusing, is a reality of federal governance. However the development of policies governing water resources may

offer insight into the relationship between the state and federal government in order to develop solutions to some of the problems facing water policy today.

Given the importance of water and the issues facing water resources in America today, understanding the problems tied to the federalist system could prove incredibly useful. As a result, the intent of this thesis is to understand the evolution of American water policy and provide recommendations to enhance the relationships between federal and state water politics. First, I will present a history of the evolution of American federalism, as well as the history of the evolution of water policy in America. In examining American water policy, the historical analysis will focus on water policy both at the federal level and the state level in order to garner an understanding of the system. In chapter three, I will present the findings and outline how the American water system exists and functions today, as well as some of the issues facing the system. In chapter four, I will offer an analysis of why the systems came to be this way, as well as the strengths and weaknesses of the given model for governing at the two distinct levels of government. In chapter five, I will provide recommendations for actions the government should take to better the relationship between the state and federal governments in order to reach better water policy outcomes as well as a conclusion.

Chapter 2: Historical Narrative

Federalism

Since the ratification of the U.S. Constitution in 1789, the American government has operated in a federalist system of governance. A federal system is defined as a system where two or more authorities share sovereignty in an area (Boyd, 1997). As this system functions in America, it results in federal rulings that are final on some issues and state or local rulings being final on other issues (Boyd, 1997). As a result, for a federal system to exist, three criteria must be met; 1) an ability for two or more authorities to interact in one territory, 2) each authority must have its own sphere of power, regardless if these spheres interact or not, and 3) neither of these authorities is capable of destroying the other (Boyd, 1997).

This portion of the historical narrative will offer a history of the evolution of federalism in America to offer insight into the way the system exists today and the factors affecting it. I will examine trends in the roles of the state and federal government and the events that impact these relationships in order to categorize different approaches and periods of federalism in America.

Dual Federalism

After the ratification of the Constitution and the Bill of Rights, the American government was operating under a system of dual federalism. Under a system of dual

federalism, it was understood that the state and national governments have separate and distinct authorities (Boyd, 1997). A popular analogy for dual federalism is a layered cake. In this metaphor, the entirety of that cake is the American government as a whole, with the state, local, and federal authorities having their distinct layers that stack on top of one another.

The early period of “state centered” dual federalism took place from the ratification of the Constitution in 1789 until the resolution of the civil war in 1865 (Botsch, 2008; Boyd, 1997). This period was characterized largely by little collaboration between state and federal actors, as well as debates over the nature of the union and what that meant for the roles of both the state and federal government, with the national government largely deferring to state decision-making in most matters other than the military (Botsch, 2008; Boyd, 1997). In particular, the introduction of the Tenth Amendment to the Constitution in 1791 characterize the atmosphere of the time: “The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.” (U.S. Const. amend. X).

During this time, as a result of the understanding of the federalist relationship, the Doctrine of Nullification theory and Doctrine of Secession theory became popular, particularly in the southern states. The Doctrine of Nullification stated that the states had a right to nullify laws and rulings made by the federal government “void and of no force” in their territory if the state ruled the legislation was unconstitutional (Boyd, 1997; Botsch, 2008). This stemmed from an understanding of the union where the national government was viewed as existing solely as a result of state compact, with delegated powers to aid the states in matters the states could not undertake (Boyd, 1997; Botsch,

2008). Developed in 1798 in the Virginia and Kentucky legislatures, this concept of nullification would be established and eventually made popular by Vice President Calhoun (Bassani, 2014, Boyd, 1997; Botsch, 2008; The Editors of Encyclopædia Britannica, 2012). The Doctrine of Nullification would most famously be used by South Carolina in the late 1820's to argue that South Carolina could block federal tariffs in what would come to be known as the nullification crisis (Bassani, 2014, Boyd, 1997; Botsch, 2008; The Editors of Encyclopædia Britannica, 2012;).

The Doctrine of Secession was a similar theory, based in the concept of the Union existing solely as a result of state compact (Bassani, 2014, Boyd, 1997). The Doctrine of Secession argued that, as a result of the union existing through a state compact, states should have the right to secede if they saw fit (Bassani, 2014, Boyd, 1997). During this period however, "state centered" theories of federalism were not the only theories being considered. This resulted in rising tensions through the union.

In the *McCulloch v. Maryland* case of 1819, Congress tried to charter the second national bank following the expiration of the first national bank's charter (Botsch, 2008; Boyd, 1997). However, states then protested that a federal bank was not a power outlined in the Constitution, and therefore, was not a power held by the federal government (Botsch, 2008; Boyd, 1997). However, the Supreme Court unanimously upheld Congress's ability to charter the second national bank, with the Chief Justice of the Supreme Court John Marshall citing the necessary proper clause of the Constitution as supplying implied power. (Botsch, 2008; Boyd, 1997). This clause gave Congress the ability "To make all Laws which shall be necessary and proper for carrying into Execution the foregoing Powers, and all other Powers vested by this Constitution in the

Government of the United States, or in any Department or Officer thereof.” (U.S. Const. art. I, § 8). According to Chief Justice Marshall, while a bank was not explicitly listed as a right of the federal government, it was “necessary and proper” to carry out the explicitly expressed powers of Congress, such as taxing and issuing currency (Botsch, 2008; Boyd, 1997). This generated the Doctrine of Implied Powers, in which it became understood that the federal government’s powers would surpass the powers explicitly listed in the Constitution (Botsch, 2008; Boyd, 1997). This use of the “necessary and proper clause” would be instrumental in undercutting the reservoir of authority for the states established by the Tenth Amendment (Botsch, 2008; Boyd, 1997). Furthermore this case established the Doctrine of National Supremacy, in which federal authority was understood to supersede state and local law. This occurred as a result of Chief Justice John Marshall ruling that states should not have the power to tax the federal government, as then states could destroy the national government (Botsch, 2008; Boyd, 1997). Chief Justice Marshall argued that the federal government’s laws and legislation must supersede the legislation of states to remain indestructible as a result of their being outside states sphere of influence (Botsch, 2008; Boyd, 1997). This understanding would prove important and cemented federal law as the law of the land (Botsch, 2008; Boyd, 1997). Furthermore, in 1824, the Supreme Court ruled that the federal government had the ability to regulate interstate commerce in any way not expressly forbidden in the Constitution (Boyd, 1997). While these doctrines did not result in a great deal of actual intervention in state affairs by the federal government during that period, these precedents laid groundwork for a great deal of federal expansion.

As outlined above, the assumptions underlying the doctrines of national supremacy and implied powers stand in contrast to the Doctrines of Nullification and Secession. In the Nullification Doctrine, one sees the idea of the union being merely a product of state compact, and thus a servant to the needs of the states. In the national Supremacy Doctrine, and the Implied Powers Doctrine, the union could be generated as a result of the American people, and thus existing as an indestructible entity not tethered to the states for its sole authority and purpose. Urged on by increasing tensions surrounding states' ability to regulate slavery internally, the debate over whether the union existed exclusively as a result of state compact came to a head.

By seceding in the early 1860's, the southern states enacted the Doctrine of Secession, and Lincoln responded in turn by declaring that the states had in fact not left the union at all (Botsch, 2008). In Lincoln's victory, the debate was resolved to some extent, with the concept of the union merely existing as a result of state compact largely dying. What would follow the end of the Civil War in 1865 until the turn of the century was a period of "nation centered" dual federalism, where national supremacy was understood (Botsch, 2008; Boyd, 1997).

While a separation of state and federal powers was largely still in play during this period, it seemed federal centered decision-making at the national level could have taken stage. With the passage of the 14th Amendment in 1878, this period did feature the exercising of federal authority. This concept of intervention in social and civil rights issues was seen during reconstruction. This demonstrated the power of the federal government and created precedent for later federal expansion. However, as industrialization was booming, wealth seemed to protect business malpractices and

corruption from a great deal of federal reach (Botsch, 2008). When the federal government would attempt to regulate business practices, states would block federal intervention and then remain inactive in regulating the practices (Botsch, 2008). This created a sort of twilight zone between the Civil War and early 1900's where little actual change occurred in the federalist relationship (Botsch, 2008).

Cooperative Federalism

Cooperative federalism is best explained as a system in which the state and federal government develop relationships and divide or share responsibilities with each other to reach certain goals (Botsch, 2008). This form of federalism is often explained as a marbled cake, where the levels of government's responsibilities and boundaries intermix and are not particularly clear. However, the parts technically are still distinct.

Starting with President Theodore Roosevelt's inauguration, we began to see shifts in the breaking down of states' abilities to block federal intervention in business practice, and that trends increased federal involvement in state responsibilities. Discontented with the corruption of industrial businessmen at the time, Roosevelt would have legislation passed allowing federal regulation of business (Botsch, 2008; Boyd, 1977). This included regulation of railroads, food and drugs, and removed the ability of the states to block federal intervention, all of which expanded federal powers (Botsch, 2008; Boyd, 1977). This was part of Roosevelt's New Nationalism movement, which aimed to consolidate and centralize federal powers in order to allow the federal government to more adequately respond to national problems (Botsch, 2008; Boyd, 1977). Additionally, during this time, the federal and state governments became more collaborative in their solutions and roles. In particular, the federal government initiated the grant-in-aid system programs (Boyd, 1977). These grant programs would quickly gain popularity and would

have over \$30 million of grants by 1920 (Boyd, 1977). These grant systems would be instrumental in ushering in the age of cooperative federalism at large and creating federalism as it is understood today.

Under Woodrow Wilson's administration, the federal government began making large strides forward in terms of federal power with the establishment of the federal income tax under the 16th amendment (Boyd, 1997). This income tax would allow for a great deal of expansion for federal programs. These grant programs frequently took the form of categorical grants. Categorical grants are grants in which lumps of federal funding are distributed to state and local governments for very particular purposes and often have heavy regulation attached to the grant money (Botsch, 2008). These grants can take a number of forms. Three of these are 1) matching grants: where the federal government will match a certain amount for every dollar spent by a state on a given cause up to a certain threshold, 2) formula grants: where states are given a certain amount of money based on a set of measurable criteria, and 3) project grants or competitive grants: where different applications are made and evaluated against each other for federal funding related to a particular issue or cause (Botsch, 2008). Furthermore, after funding had been granted to a state by the federal government, the federal government was able to threaten funding if the states did not meet additional regulation later (Botsch, 2008). As the federal budget increased, so would grant programs, and the federal ability to operate increasingly in domestic affairs.

This concept of federal involvement in domestic affairs was taken to a previously unprecedented place under the FDR administration during the great depression. As a result of economic hardship, states had a large inability to effectively operate (Botsch,

2008; Boyd, 1997). This allowed for the federal government to step in, solving problems the states could not. In solving these problems, the government consolidated and created many federal programs utilizing centralized solutions for national problems (Botsch, 2008; Boyd, 1997).

This concept became a reality in FDR's New Deal. FDR's new deal established 16 ongoing federal programs, largely related to stabilizing the economy. These programs attempted to stabilize the economy by focusing on creating long term jobs, driving up agriculture prices, and helping people make house payments in order to keep banks afloat (*America's Great*, n.d.; Boyd, 1997). These programs increased the reach of the federal government in a way not previously seen. By taking advantage of a national crisis, and rallying the people around the central government, FDR passed legislation enabling federal commerce regulation, federal programs working towards living standards of citizens, social security programs for the elderly, the establishment of unions, and a federally regulated work force (Botsch, 2008). While initially FDR's programs had trouble being implemented, states' needs for economic aid, and FDR's threats to change the size of the Supreme Court would allow for the passage of these policies (Botsch, 2008).

This ongoing centralization of political power would continue through until the 1960's when President Johnson ushered in a new reign of creative federalism.

Creative Federalism

The period spanning from 1960 to 1968, the years of President Johnson's influence, are largely referred to as the period of creative federalism. In this period, Johnson increased the federal role in domestic decision-making. Johnson did this through the use of the grant-in-aid systems and federal regulation in order to have state and local

actors implement national agendas and policies (Boyd, 1997). Where Johnson could not have states act as intermediaries for national agendas, he would have the national government directly intervene (Boyd, 1977).

In particular Johnson's Great Society Initiative sought to use the federal government and regulation to create socially favorable outcomes for the nation (Botsch, 2008; Boyd, 1997). To spur state and local governments, Johnson would use grants to encourage the development of policy that reflected federal interest (Boyd, 1997). He would do this through both traditional categorical grants as well as newer blocked grants (Botsch, 2008; Boyd, 1997). These blocked grants are a result of previously separate grants being consolidated into one account, and used for multiple purposes (Botsch, 2008). These grants would then be redistributed with less specific requirements in order to allow a greater amount of flexibility for state and local governments (Botsch, 2008). In doing this, states were encouraged to come up with nuanced solutions to problems in their jurisdiction in accordance with federal goals. Johnson used a combination of block and categorical grants in order to extend federal reach into what had previously been states' affairs (Botsch, 2008). These areas included nutrition and hunger, medical care for the elderly and poor, highway systems and transportation, housing, and the arts (Botsch, 2008).

In other cases, the federal government would intervene and directly assume responsibility for particular services. This would often be achieved using litigation or legislation to justify their actions (Botsch, 2008). Issues relating to civil rights are a good example of these practices, as when states failed to supply equal protection under the law to their citizens as afforded in the 14th amendment, the federal government directly

intervened. The federal government would intervene in order to make sure the states meet the amendments implications based on the Supreme Court's interpretation (Botsch, 2008).

This concept of forceful federal action and intervention aimed toward particular social outcomes was enabled largely by the litigation of the Supreme Court at the time. For instance in *Baker v. Carr*, the court required all of the states apart from Oregon to reapportion their districts to represent equivalent population size, as it was ruled urbanization had resulted in districts that were no longer in accordance with the 14th Amendment's equal representation (Boyd, 1997).

Under President Johnson's administration, as Boyd (1997) points out, it seems that the government went from being strictly a servant of the states with federal action being viewed as an often justifiable and necessary evil to a system with its own goals and capable of taking action if a national goal could be articulated. Using this approach, Johnson created more programs than any other president with the exception of FDR (Botsch, 2008). As Botsch (2008) notes, by the end of the Johnson administration, the federal government had more responsibilities than arguably any other period. However, while some of these trends would be continued in the Nixon administration, particularly with the creation of the Environmental Protection Agency, the end of Johnson's presidency rung in a new era of federalism in which the federal role would diminish (Reimer, 2013, "History of the EPA", n.d.).

New Federalism and Devolvement

New federalism was a period of federalism largely characterized by shifts in the intergovernmental grant systems, decentralization of previously held federal responsibilities, and debates over the nature of the federal system (Botsch, 2008; Boyd,

1997). This period began in some sense under Nixon and would serve as a trajectory for federalism as it would come to exist today (Botsch, 2008; Boyd, 1997).

Through the 60's and 70's questions concerning the grant system's fragmentation resulting in inefficiencies began to arise (Boyd, 1997). As a result, grant reform would become an attractive option for potential legislation (Boyd, 1997). Both the Nixon and Ford Administrations saw shifts to revenue sharing systems as well as further consolidation of existing grant programs into block grants (Boyd, 1997). This returned some flexibility in decision making to state governments that had previously been held by the federal government (Boyd, 1997). These general revenue sharing systems were a change in the grant systems that served as a sort of antithesis to categorical grants. General revenue sharing programs work by funding being given to state and local governments with virtually no regulation attached (Botsch, 2008). This allowed funds to be used at the state and local government's discretion, whether that is for new facilities or reducing taxes on local populations (Botsch, 2008). These grants began in 1972 under Nixon, and would continue until 1987 when Reagan would eventually cut them (Botsch, 2008). Similarly, the Supreme Court applied these ideas of decentralization as well when in 1976 they struck down the Fair Labor Standards Act's of 1974, ruling the federal legislation unconstitutional (Boyd, 1997).

While returning power and responsibility to states was a gradual trend in the Nixon and Ford presidencies, the Reagan administration made a concerted and articulated attempt to return to a more state centered form of federalism (Boyd, 1997; Botsch, 2008). In his speeches Reagan discussed the ideas of the federal government being inefficient, and of the union being generated as a result of state compact (Boyd, 1997). As a result of

these views, the Reagan administration actively removed the federal government from many areas of decision-making, and sought to reduce the size of the federal government (Botsch, 2008, Boyd, 1997). These trends in reduction of federal authority are now known as devolvement (Botsch, 2008, Boyd, 1997).

To accomplish these goals, Reagan would cut the general revenue sharing programs in 1987 as a way to reduce the federal deficit (Botsch, 2008). Reagan also consolidated a great deal of social programs into block grants to increase state responsibility, flexibility, and authority (Botsch, 2008; Boyd, 1997). In some cases after blocking grants, Reagan then reduced the overall funding of these block grant programs to continue reductions in government spending (Botsch, 2008; Boyd, 1997). This empowerment of state governments being well received by the public, and a strong economy enabling high functioning local governments kept trends of devolvement continuing through a Democratic presidency (Botsch, 2008; Boyd, 1997).

In 1993, President Clinton took office and would eventually work with a Republican dominated Congress to reduce the federal role in domestic politics (Botsch, 2008). Clinton's *Reinventing Government Initiative*, as well as the Republican *Contract with America*, sought to rearrange federal power relationships (Boyd, 1997). The *Reinventing Government Initiative* resulted most immediately in policy focusing on the efficiency of the federal government in order to avoid excess spending and encourage review reform for grant programs (Boyd, 1997). The *Contract with America*, which outlined ten priorities the Republican Congress would work towards in their first 100 days, contained several items relating to changing the power structure between the states and the federal government (Boyd, 1997). These initiatives resulted not only in the passing of unfunded

federal mandate legislation, which required the federal government to do cost/ benefit analysis for state and local governments impacted by unfunded mandates, but also spurred conversations about block granting or cutting numerous federal programs (Boyd, 1997). Furthermore, legislation was passed consolidating a number of social programs during the Clinton administration, particularly welfare (Botsch, 2008, Boyd; 1997). Clinton and the 104th Congress changed the Aid to Families with Dependent Children formula grant to the Temporary Assistance to Needy Families block grant (Botsch, 2008, Boyd, 1997).

This devolvement continued in the Supreme Court through the 1990's as well, when in 1995 the Supreme Court took a slim 5-4 majority of conservative and state rights advocating justices (Boyd, 1997). As a result of this, states rights advocates saw a number of victories in the Supreme Court. In *United States v. Lopez*, the verdict narrowed the rule of the commerce clause to not allow the federal government to regulate guns near schools in states, and in *Seminole Tribe of Florida v. Florida* the Supreme Court ruled in favor of state autonomy, deciding that Native American tribes could not sue states over gambling compacts on Indian Land (Boyd, 1997). As Bianco & Canon (2013) note, during this period of devolvement in the 1980's and 1990's, the Supreme Court would overturn more federal laws than it had in the previous 200 years.

Modern Cooperative Federalism

Today, America still utilizes a cooperative form of federalism. However, a form of federalism with a more equal distribution of power than has been seen previously.

The effectiveness of federal regulation and its ability to coerce state action has kept it as a relevant policy tools (Bianco & Canon, 2013; Botsch, 2008; Boyd, 1997).

This option has been brought in check by a number of factors, including the Supreme

Court taking an active role on states behalf, Clinton and the *Contract with America* generating policy regulating the use of unfunded federal mandates, and the trend towards block grants lessening federal control over grant use (Bianco & Canon, 2013, Botsch, 2008, Boyd, 1997). However, a tendency to turn to the national government in times of crisis, the civil rights movement of the 1950's and 1960's, and the maintenance of the Doctrine of National Supremacy keeps federal government from losing a real ability to interact with many areas of policy (Bianco & Canon, 2013). This has resulted in a form of cooperative federalism where the traditional "marble cake" metaphor for federalism may not be appropriate.

Instead of the "marble cake" metaphor, where the federal government and state governments relationship resembles a marbled cake, what Bianco & Cannon (2013) call a "picket fence" metaphor is more appropriate. As a result of actors at all government levels being more equally empowered, actors at the federal, state, and local levels are required to work across a metaphorical "picket fence" in order to accomplish goals in policy areas, where the picket fence is the different levels of government (Bianco & Canon, 2013). This generates more conversations between policy actors at various levels than in the past. With the federal actors holding the grant money and an agenda, and the states holding an understanding of nuanced implementation and responsibility to do so, these two groups must work together to reach their respective goals.

While a dynamic and ever changing system, the evolution of federalism has resulted in a complex series of checks and balances that requires cooperation and interaction between state and federal actors if it is going to be successful.

Water Policy

With water being such a foundational part of a society as well as a valuable economic tool, it is not surprising that a robust system for managing this resource has developed. However, as a result of the American federal system of governing, there have historically been relatively distinct roles between federal and state responsibilities in water management. In this section, I will explore the evolution of water policy at the state and federal levels in order to gain an understanding of the history of water policy. First I will explore the evolution of water policy at the federal level. Next, I will explore the development of water doctrines at state levels. In particular, I will examine the differences between the way the east and the west coasts have developed their water and the policies that regulate it.

Historical Trends in Federal Water Policy

The federal government is not explicitly given the power to regulate waterways of the United States. However, it has come to do so by deriving power from interpreting the Commerce Clause in Article 1 of the Constitution. This clause lists the power of the federal government to “regulate commerce ... among the several States”, and in conjunction with the “necessary and proper” clause has been used to grant Congress the ability to carry out these powers (Austin & Myers, 2007, p. 1-3). Over time, this has resulted in the federal government expanding its powers to address issues of national scope (Austin & Myers, 2007). However, this did not happen altogether, and as some have noted, trends in federal water policy often reflected interests of the government at the time, as well as trends and concerns in water consumption during policy implementation (Reimer, 2013).

As water policy began to emerge in the 19th century, much of water policy and regulation was left to the states to decide, particularly regarding issues of allocation and use of the water supply (Reimer, 2013; Getches, 2001). This practice started both in the eastern regions of the United States as well as the western regions. In the eastern regions, this can be attributed largely to water conflict and management issues being a relative non-issue, and the nature of the dual federalism separating water policy from federal control. In the western regions, where management of these resources seemed politically possible, attempting to legislate or manage these resources seemed counter productive, logistically infeasible, or unnecessary.

Water regulation was counterproductive, as policy interest focused on development and settlement, which required agriculture and mining (Getches, 2001). As both agriculture and mining require a great deal of water, the federal government took a hands off approach to water management and let individuals sort disputes out at the local (Getches, 2001). At the time the federal government had the legal ability to regulate water policy fully. Also the federal government may have lacked the ability to functionally enforce any regulation (Getches, 2001; Reimer, 2013). This disinterest in allocation, both as a function of constitutionality and a function of simplicity would come to characterize a great deal of the historical approach to water (Reimer, 2013). This approach would ultimately allow the states to develop their unique water allocation policies (Reimer, 2013).

While water allocation was left to the states, 19th century federal policy continued to focus on development, with projects improving rivers and waterways' economic capabilities (Getches, 2001, Reimer, 2013). This mentality is reflected in the United

States Army Corps of Engineers (USACE) taking up the management of the United States' water infrastructure (Reimer, 2013). This was particularly fitting as the USACE carried the expertise in large projects such as ones that were necessary to develop water based transportation infrastructure (Reimer, 2013). This was a recurring theme through the 19th and 20th centuries, as large-scale construction projects aimed at the infrastructural development of water resources were common.

The 20th century brought with it a transition from a system of dual federalism to one of cooperative federalism. The federal government increasingly extended its reach into areas previously under state control, and water was no exception (Reimer, 2013). At the turn of the 20th century, the first federal legislation regulating pollution of any kind came with the Harbors and Rivers Act of 1899. This act, known as the Refuse Act, established a need for permits for discharging waste into navigable American waters, and gave the government the ability to impose fines on perpetrators (“Criminal Liability,” 1972). However, keeping in line with previously mentioned goals of development in the 19th and 20th centuries, this legislation was a part of a bill largely designed to influence rivers as an economic and transportation tool, and not particularly as an environmental resource (Newman, 2006, Reimer, 2013). Furthermore, the continuing introduction of federal agencies, such as the U.S. Reclamation Service, allowed the government to continue to expand its authority (Reimer, 2013). Simultaneously the Roosevelt administration brought with it progressive policies and a renewed emphasis on development (Reimer, 2013). This focus on infrastructural development shifted from being exclusively on commerce to encompass interests in irrigation, storage, power generation, and flood control (Reimer, 2013, Getches, 2001). This shift in interest

reflected shifts in water use from agriculture to industry and manufacturing in the beginning of the 20th century (Reimer, 2013, Getches, 2001).

In the second half of the 20th century, water use shifted from agriculture, industry, and manufacturing, to agriculture, drinking water supply, and recreational use (Getches, 2011). Furthermore, a midcentury environmental consciousness movement combined with declining drinking quality and growing demands for drinking water to result in a great deal of interest in water quality (Reimer, 2013). As a result, the national government began passing legislation to protect the water supply from pollution (Reimer, 2013,).

Originally introduced in 1948, the Federal Water Pollution Act was the first federal legislation that aimed to address pollution in the water supply ("History of the", 2015). As public interest grew, a series of amendments would be passed incrementally increasing the capabilities of the federal government to regulate water quality until the legislation became known as the Clean Water Act ("History of the Clean", 2015). This act, in conjunction with the Safe Drinking Water Act of 1974, enabled the federal government to hold states to particular water standards (Reimer, 2013; "Summary of the Safe", 2015). Furthermore, this legislation enabled the federal government to intervene if these standards were not met (Reimer, 2013; "Summary of the Safe", 2015). These acts empowered agencies such as the Environmental Protection Agency to hold states accountable and to serve as extensions of federal interest (Reimer, 2013, "History of the EPA", n.d.). While these standards guaranteed higher water quality standards for citizens, they also began to blur the lines between state and federal water rights (Reimer, 2013).

As the federal government forced cooperative answers to pollution problems, coercive powers of creative federalism practices became obvious (Reimer, 2013).

With the environmental movement continuing to gain momentum through the latter half of the 20th century, the federal government increased the amount of water quality legislation, while simultaneously stopping the major infrastructural projects seen in the 19th and 20th century (Reimer, 2013). The ceasing of the major infrastructural projects was caused mostly by the National Environmental Policy Act, which required environmental impact analysis of future federal projects (Reimer, 2013). This change resulted in a shift of development projects from federal control towards more regionally authorized governing bodies (Reimer, 2013). These projects not strictly being governed by state or federal governments reflected a collaborative form of federalism and would come to exemplify how federal actors would rely on local governments for the implementation of water policy (Reimer, 2013)

In 1981, Reagan taking office further decentralized federal water policy, Reagan emphasized state rights and devolvement swept through the federal government. Thus water policy decisions and management of projects were shifted from the federal government to the states (Reimer, 2013). For example states regulating pollution standards, as opposed to the federal government, became more prevalent (Reimer, 2013)

As a result of decentralization of water policy, and a continuing interest in water quality, a new approach in managing these issues through the 1980's and 1990's developed (Reimer, 2013). Watershed approaches, where one examines the watershed of a particular resource in developing policy, drove interstate and cross agency collaboration (Reimer, 2013). This trend in interstate collaboration would continue to be reflected in

federal policy, as collaborative tools and partnerships with the private sector became more prevalent in almost all policy areas (Botsch, 2008; Boyd, 1997; Reimer, 2013). A continuing interest in water as a resource and a greater understanding of the interconnected nature of these resources continue to drive watershed approaches in water policy today (Reimer, 2013).

Moving into the modern era of water policy, the federal government once again began taking a more active role in state water decisions, as legislation forced states to increase conservation efforts. Acts such as the 1999 Water Resources Development Act required states to take over projects typically handled by the United States Army Corp of Engineers, while the expansion of the National Pollutant Discharge Elimination System reflected the continued quest for improved water quality and a deeper understanding of its causes (Reimer, 2013). These federal mandates resulted in states increasingly legislating water policy that seeks to decrease environmental impact and trying to solve problems collaboratively to reach federally mandated standards. As a result of this increased emphasis on water conservation and ecological values trends in policy have shifted towards restoration and collaboration (Reimer, 2013). This is exemplified by an almost complete shift from development of infrastructural projects at the federal level to maintenance and conservational projects (Reimer, 2013).

Development of Water Doctrine at State and Regional Levels.

Due to each state having the sovereignty to manage and regulate its water resources as they deemed fit, regions adopted doctrines to manage these resources in ways that best suited their needs. For example, in the western region of the U.S. where water was in higher demand, states developed a Prior Appropriation Doctrine (Newman, 2006; Shurts, 2003). Under this system, permits are given “first in use first in right”,

where the first to acquire a permit has seniority and thus a stronger claim (“Introduction to the Doctrine”, 2011; Newman,2006; Shurts,2003). This means in times of drought, senior claim holders have rights to water over junior claim holders, so long as the use is considered beneficial, and one is using the water allotted to them (“Introduction to the Doctrine”, 2011; Newman,2006; Shurts,2003). This stands in contrast with the eastern region of the U.S., where a system of Riparian Doctrine has evolved. Under this system, water is treated more as a property right (Newman,2006, Ruhl, 2003, “Riparian Theory”, 2011). Under Riparian Doctrine, anyone can use as much water as they like so long as it is “reasonable” and doesn’t prevent anyone else from accessing the water who could otherwise (Newman,2006; Ruhl, 2003; “Riparian Theory”, 2011). The following section will involve a review of the details of both systems and how they came to exist in America.

Riparian Doctrine

The Riparian Doctrine as it exists today is very much a product of historical abundance, both in America and England. In England, water policy was not particularly developed as a result of England having many rivers and a lot of readily accessible freshwater. This resulted in relatively few water conflicts and a simplistic water law (Apple, 2001). Under this system, all navigable waters were considered the property of the crown and treated as such, with the king allowing activities such as drinking, fishing and swimming that did not divert water from these navigable waters (Apple, 2001). This system created a way in which no individual could create a monopoly on transportation, and commerce and water access would function as an attractive amenity for land owners (Apple, 2001). As the American colonies were in a similar water situation of little water conflict, it was fitting for the English to adopt a similar approach in the colonies. As a

result, “free flow” Riparian Doctrine became the basis for American Riparian Doctrine in the eastern regions of the U.S. when the American government came into power.

Free flow Riparian Doctrine largely comes from the view that water is an amenity to property (Apple, 2001). Since it was perceived that rivers increased value of a property, all those with property along a river had a right to free flowing water. This led to a doctrine allowing the use of water for activities not requiring a diversion, so long as the use would leave the water flow “in an undiminished and unpolluted condition” (Apple, 2001, p. 5). This system didn’t certify that an individual owned the water; it simply associated a claim to water based on the ownership of land capable of accessing it. This system would remain sensible until advances in technology allowed rivers to become valuable tools for economic growth in early industry.

As technology advanced, it was realized that streams could be used to fuel industry as an energy source, coolant system, and waste disposal tool. This increased monetary value associated with water claims drove a change from a “free flow” doctrine to a “reasonable use” doctrine (Apple, 2001). Under “reasonable use” doctrine, water could be diverted and used by those with access to the river, so long as it was a “reasonable” diversion (Apple, 2001). If diverting water for any or all uses on the river resulted in a shortage, the burden of the shortage was carried as a common loss to all on the river with each party cutting back in equal proportion (Apple, 2001). Furthermore, under this doctrine the use of the water was the claim established, not ownership (Apple, 2001). This meant permissible water appropriation was determined by the impact it would have on others utilizing the water (Apple, 2001). The tenets of Riparian Doctrine, in addition to the reasonable use feature, are 1) that only Riparian rights

generated by land ownership constitute a claim to water use 2) not using the rights you have to your water does not forfeit them, 3) water rights are relative, not absolute, with existing claims adjusting as new water claims are made on the land, and 4) that since water rights, claims and quantities are in flux based on the claims made on an ongoing basis, water allocated in a specific quantity and purpose is never completely secured (Apple, 2001). Because of the way communal loss is calculated under this system, it is generally considered to be ok to use water in whatever way one wants so long as the use is “reasonable” and one owns the land adjacent to the body of water (Newman, 2006; Dellapenna, 2002; Ruhl, 2003; Shurts, 2003). What is considered “reasonable” can vary from state to state, but is generally interpreted to be withdrawing less than 100,000 gallons of water a day so long as it doesn’t interfere with the rights of others relying on the source downstream. (Newman 2006; Dellapenna, 2002).

It is important that this Riparian system as it is understood in a modern context came to exist in places where crops and other uses apart from industry could largely be met through rainwater needs (Apple, 2001). This made it a viable system in much of the eastern regions where it was adopted, as diversion of water, even would often result in relatively absorbable losses. However, in other areas of the country without abundant water resources, this system would not be as effective. Even the eastern regions would eventually undergo changes in population and technology that would expose the weaknesses of this system as water demands rose.

Prior Appropriation Doctrine

In the arid western regions, where water was often scarce and in high demand, water rights were formed to treat water in a way that would provide levels of certainty

during inevitable times of shortage (Deason, Schad, & Sherk, 2001). The Prior Appropriation Doctrine was developed in order to meet these needs.

The history of Prior Appropriation Doctrine as it is understood today comes from Spanish rule and the mining industry (Apple, 2001, Newman, 2006). Under Spanish rule, ownership of water resided with the state, and it was treated as a public good (Apple 2001).

With the crown owning the water, the crown would focus on securing enough water for a town to use for public activities such as drinking, fishing, and navigating (Apple 2001). Only after enough water had been secured for public use would the crown begin to issue permits to individuals (Apple 2001).

This established that first and foremost rights to the water lay with the needs of the public, and any subsequent individual permit only being honored in cases where the public's need had been met (Apple, 2001). This value structure of emphasizing community need over the individual was well suited to the American west as a result of the mining taking place there (Apple, 2001). Mining requires large amounts of water and has the potential to negatively impact water quality and access for those downstream (Apple, 2001, Newman 2006). This permit system, honoring the needs of the public guaranteed to secure clean water for daily living, as well as allowed miners to exploit the resource to the fullest level of economic achievement (Apple, 2001).

Furthermore, this system reflected the way in which miner's allocated rights to minerals, with the right holder having a claim to the mineral so long as the miner continued to make use of the resource they were claiming (Newman, 2006). When miners claimed rights to gold, the land they used was not considered to be theirs, but was in fact

considered public domain (Apple, 2001). Therefore, claiming gold meant claiming use of the land, so long as the claimer occupied it (Apple, 2001, “Introduction to the doctrine”, 2011). This would be reflected in the beneficial use clause, and “use it or lose it” mentality of Prior Appropriation Doctrine (Newman, 2006). If one is not using the resource as claimed, it gets passed to the next in line to benefit (Apple, 2001, “Introduction to the doctrine”, 2011, Newman, 2006).

Additionally, miners established junior and senior right holders in the way they allocated water disputes amongst themselves. In diverting the water necessary for their beneficial project, one was said to have appropriated it, and thus placed their claim on the water. If any miner upstream then withdrew and appropriated water in a way that prevented your previously established appropriation, it was deemed a later claim, and would not be honored. This resulted in the “first in time, first in right” clause of Prior Appropriation Doctrine (Newman, 2006).

As the American government came to control these lands in the west, it became obvious that they lacked a firm enough grasp on the territories to functionally regulate water consumption, and thus left issues of water allocation to the states (Getches, 2001). The states then adopted the policies based that had been developed as previously described. This meant much of the western United States adopted the Prior Appropriation Doctrine.

Under Prior Appropriation Doctrine in the U.S., resources are largely considered to be properties of the state, with access granted to users based on permits administered by the government. These permits generally required three conditions. 1) An intent to divert water for a beneficial use, 2) an actual diversion of water, and 3) an application of the

water to the beneficial use intended (Newman 2006, Stephenson 2000). The system also utilizes temporal rights of claim holders, establishing “junior” and “senior” right holders, where one cannot infringe upon a previously established claim, as was the case in “first in time, first in right” practices (Newman, 2006). The system adopted in the early United States also made use of “use it or lose it” practices as a result of the government maintaining a fundamental ownership of the resource, making holding the resource while not using it equivalent to squatting (Apple, 2001).

However, as the American conception of property and ownership seems to be ubiquitous, prior appropriation does encounter a riparian sense of ownership of property. This can result in some interesting grey areas of law. When purchasing land with access to bodies of water, it seems to imply a right to the water at some level. In turn it seems that then water claims made upstream before the purchase of the land shouldn't not prevent a land owner from accessing water, regardless of when the upstream claim was made (“Introduction to the Doctrine”, 2011). This allowance of land ownership based claims to water exists in many state doctrines, even though no divertive or appropriative claim of water may have been made. This however does not leave the landowner as the owner of the resource, with ownership of the water still fundamentally residing with the state. All of this seems to pose potential problems as a result of the clashing between Prior Appropriation and Riparian allocation. This can be seen in court cases such as *Irwin v Phillips*, California 1855 (“Introduction to the Doctrine”, 2011). And while the Prior Appropriation Doctrine is a great tool for development and having a decent ability to balance the allocation of resources based on fairness, it also has its shortcomings in its implementation.

As a result of the Prior Appropriation Doctrine and the Riparian Doctrine developing under particular conditions to meet particular needs, the ever-changing demands on water resources has resulted in the doctrines being altered on a state by state basis over time. In the next section, I will examine how these systems exist in todays complicated water landscape.

Chapter 3: Findings

After having explored the origins of water policy, this section will examine the water system exists today, the current trends at the state and federal level, and the mechanisms that allow these systems to interact.

Modern State and Local Water Policy

As outlined in the history of Prior Appropriation Doctrine and Riparian Doctrine, both have their weaknesses and strengths. As water supplies and demands shift, the weaknesses of each system are exposed and states act accordingly. As a result, 50 different water policies have come to exist in the states, and each state seems to be in one of three categories 1) Riparian 2) Prior Appropriation or 3) a hybrid of the two (Getches, 2001 Reimer, 2013). However, more and more of these doctrines are moving into the hybrid category.

The Riparian Doctrine, adopted in lands with abundant water resources, is poorly equipped to deal with issues of water allocation as a result of the doctrine being based on an assumption of unlimited resources (Deason, Schad, & Sherk, 2001). This results in a vague system for water management, where the resource is treated largely as an amenity and claims being a result of land ownership. (Deason, Schad, & Sherk, 2001).

Furthermore, as a result of purposes of water use not being differentiated, they are treated

equally (Deason, Schad, & Sherk, 2001). This makes it difficult for the Riparian system to protect or regulate any particular use of the water, such as drinking, agriculture, or navigation (Deason, Schad, & Sherk, 2001). This inability to effectively regulate a fundamentally finite resource has created problems in the east where population growth increases stress on the resources (Deason, Schad, & Sherk, 2001).

Prior appropriation, on the other hand, suffers a different series of woes. The development of junior and senior rights holders place barriers to new regulation and appropriation of water (Deason, Schad, & Sherk, 2001). This is made more complicated by the fact that many of the regulations and claims being considered today have benefits that are difficult to express in quantifiable market terms, and thus hard to justify (Deason, Schad, & Sherk, 2001). With each of these systems not being fully adequate, we have begun to see a convergence towards more complex and homogenous systems across the 50 states (Deason, Schad, & Sherk, 2001).

Riparian Doctrine in the eastern regions has grown to allow more particular management of resources, with at least 20 eastern states implementing supplemental permit systems to their Riparian Doctrine (Deason, Schad, & Sherk, 2001). To do this, many governments have implemented ideas of temporal rights and reserving ownership of resources for the public good to gain control over resource allocation (Deason, Schad, & Sherk, 2001). This theme has been reflected in western states' doctrines, with new policy being developed to allow consideration of public benefit against previously established claims (Deason, Schad, & Sherk, 2001). Both of these indicate a national trend of states' allocations of water being tailored to allow for equitable priorities (Deason, Schad, & Sherk, 2001).

While states are moving towards seizing more control in terms of their ability to allocate water as needed, states are also experiencing a squeeze from federal mandates. These mandates require that states meet water quality and pollution standards administered by the EPA (Reimer, 2013). While this policy requires state action, which can sometime be costly, the Unfunded Mandate Act of 1995 protects the states (Boyd, 1997). As a result, the EPA offers loan programs that can help municipalities tackle these problems. Examples of these programs are the Clean Water State Revolving Fund, and the Drinking Water State Revolving Fund, which offer loans for approved projects pertaining to their respective acts (Reimer, 2013). And while these environmental regulations do not directly allocate state water resources, they frequently tie states' hands to take actions and adjust priorities. To help meet these standards, states are increasingly adopting watershed-based approaches to tackle these problems.

As an increasing focus on water quality at the federal level is taken, states maintain a particular interest in supply. With water use increasing 209% over the 50 years leading to the 21st century, it is not shocking that concerns over supply and demand drive policy decisions. However with these increases in demand of 209% outpacing population growth of 90% during time period, it should be no surprise states turned their focus to issues of efficiency and conservation, as opposed to seeking new water resources (Allin, 2008, Reimer, 2013).

These policies are based around attempts to fix inefficiencies not only at an infrastructural level, but at a market level. As a result of public works being undertaken with taxpayer money, the government has subsidized the cost of water (Allin, 2008, Reimer 2013). This has generated an artificially low price of water, and has resulted in

inefficient markets contributing to overconsumption of the resource (Allin, 2008, Reimer 2013). While an obvious problem, the solutions are complex and states are exploring a variety of options. Additionally, institutional inefficiencies are being explored, as fragmented decision-making is perceived as contributing to efficient allocation and management of water (Reimer, 2013).

Another modern issue in water management at the state level is ground water rights. As a result of technology only recently enabling widespread access to aquifers, the majority of groundwater use has begun since the turn of the 20th century (Schlager, 2006). Because of this, many states attempted to apply doctrines of use from their established surface water policies to their ground water resources (Reimer, 2013, Getches 2001, Schlager, 2006). This presents problems, however, particularly in the western regions where temporal rights are prevalent.

In the timeline of when a given resource was accessed, surface water claim holders are largely the senior rights holders (Reimer, 2013, Schlager, 2006). This is a result of when technology would enable claim holders to appropriate ground water for use (Reimer, 2013, Schlager, 2006). However, states largely do not recognize surface and ground water as connected. Instead, states evaluate ground water claims holders relative to other ground water rights holders, and do not view surface water right holders as having senior claims compared to groundwater holders (Reimer, 2013, Schlager, 2006). This poses problems as certain aquifers; called tributary basins, are connected to surface water. Thus, it does make sense to treat ground and surface water as separate entities in these cases. In addition to placing groundwater rights at an advantage in their ability circumnavigate issues of being junior right holders, groundwater is much cheaper to

divert (Reimer, 2013, Schlager, 2006). These factors encourage the overuse of ground water resources (Reimer, 2013; Schlager, 2006).

In the eastern regions similar problems have arisen. As a result of the loose “reasonable use” clause, states often failed to prescribe proper quantities in which people could pump water from ground water resources (Reimer, 2013). This is a particular problem with a resource that is cheap to divert from (Reimer, 2013). As conflicts developed in the eastern regions, many states applied Prior Appropriation Doctrine for ground water allocation; however, many states still do not treat ground and surface water as connected (Reimer, 2013). As of today, Nebraska is the only state treating ground and surface water under the same laws (Reimer, 2013).

Ground water issues continue to complicate, as some of its unique characteristics continue to increase its demand. The fact that aquifers are not prone to evaporation in arid environments makes them prime candidates for western water supplies, a concept only furthered by the fact that aquifers are not impacted by seasonal drought in a meaningful way (Schlager, 2006). These features have combined with shortages of western surface water to result in two thirds of groundwater use occurring in 17 western states (Reimer, 2013). Additionally, as a result of aquifers being isolated from pollutants, aquifers have become an attractive option for cities seeking to avoid costs associated with meeting new Federal drinking water standards (Schlager,2006). Instead of investing money to maintain and clean surface water resources, it is often cheaper to simply switch to pumping from pollutant-insulated aquifers (Schlager,2006). These characteristics make groundwater use tempting. However, none of these uses encourage fostering understanding or stewardship of the resource, and their being shielded from the surface encourages the opposite.

The processes involved in mapping aquifer boundaries are time consuming and expensive processes (Schlager, 2006). Further, developing the models to understand inputs and outputs affecting these resources is even more complex, resulting in a great lack of knowledge about the impact of withdrawals on an aquifer system (Reimer 2013, Schlager, 2006). Lastly, the fact that aquifers and their watersheds often cross state lines does not encourage any given state to properly investigate these resources. All of these factors result in an appealing and un-seeable resource that has suffered a great deal of overuse (Reimer, 2013). Because of this, many states are faced with dropping water tables (Reimer, 2013). This loss of access can drive conflict between those who have invested in developing access to these resources (Reimer, 2013, Schlager, 2006). Furthermore, these disputes have higher levels of occurrence and intensity, compared to surface water disputes (Schlager, 2006). Since parties did not understand the amount of water in the aquifer, or see water levels dropping, parties were not aware of potential shortages until they occurred (Schlager, 2006). This means by the time of shortage more capital had been invested in developing these resources than would have with complete information, and less preemptive planning had been done (Schlager, 2006). This principle is mirrored in the development of ground water policy, with a lack of information and visible conflict resulting in a policy lagging behind use of the resource.

A prime example of this is the Supreme Court dispute over the Sparta Sands Aquifer. Today, Mississippi is locked in a dispute with Tennessee over water rights to the Sparta Sands Aquifer. As water is pumped out of the aquifer in Memphis for use and sale, the water table of the aquifer has sunk one to one and a half feet every year for the last 40 years (Upholt, 2015). In the future, this lowering of the water table has the potential to

prevent use of the aquifer to those unable to afford a deeper well. Additionally, the continuous withdrawals from the aquifer have created a cone of depression, displacing water laterally across the Mississippi border, into Tennessee (Upholt, 2015). This has resulted in a formal lawsuit being filed, and the Supreme Court granting a bill of complaint to be filed by the state of Mississippi against the state of Tennessee, the City of Memphis, and Memphis Light, Gas & Water Division. While Mississippi is attempting to sue over a violation of sovereignty, claiming the lateral displacement of the water is functionally theft; the case is unlikely to pass. This is because the resource in dispute appears to be an interstate resource, and therefore, is subject to an equitable apportionment. Disputes like this are not uncommon, and in the next section of the findings, I will outline the various mechanisms for resolving these disputes.

Interstate Conflict Resolution Mechanisms

In the United States, states have a level of sovereignty. This sovereignty extends to the control of resources inside of their jurisdictions. However, this opens up opportunity for conflict over shared resources that must be resolved. Since these states are not allowed to resolve their disputes through violence, other ways of resolving these disputes must be found (“Interstate Allocation”, 2007). As the system exists today, there is four ways to manage water conflict in the United States when it comes to interstate water resources. As noted in “Water policy in the United States: a perspective” these four ways are 1) litigation, 2) legislation, 3) negotiated agreements, and 4) market mechanisms (Deason, Schad, & Sherk, 2001). Each of these mechanisms has different purposes and uses a variety of procedures.

Litigation

The first of these, litigation predominantly occurs in the Supreme Court. In the Constitution, the Supreme Court is granted jurisdiction over any dispute between states, which includes interstate water conflicts (Deason, Schad, & Sherk, 2001). The way the state handles such disputes is through an equitable apportionment action. A state can seek an equitable apportionment action only if the state filing for damages can demonstrate a clear harm to themselves as a result of a diversion of resources (Deason, Schad, & Sherk, 2001). Once this harm is demonstrated, the burden of proof then shifts to the defending party. The defending party is then responsible for proving that the diversion is necessary and needs to be continued (Deason, Schad, & Sherk, 2001). If this can be done, the court will then typically appoint a “special master” to arrange an equitable apportionment (Deason, Schad, & Sherk, 2001). An equitable apportionment is a federally recognized allocation of resources which attempts to take into account the needs of both parties (Deason, Schad, & Sherk, 2001).

However, there are other ways for litigation to occur in lower courts if states choose to intervene. In matters where national permits are required for diversions of water by the states, U.S. District courts issue these permits (Deason, Schad, & Sherk, 2001). If in the issuing of these permits a state challenges the issuance of the permit, and the court honors the objection, then the issue falls under the aforementioned jurisdiction of the Supreme Court (Deason, Schad, & Sherk, 2001). Since the permit is now officially a dispute between states, it must be heard in the Supreme Court if the process is to continue (Deason, Schad, & Sherk, 2001). In practice, this can allow a state to block the issuing of another states permit for water use if the Supreme Court will not hear the case.

Legislation

The next way interstate water conflict can be resolved is through legislation.

Similar to litigation, legislation results in an outcome in which the federal government decides a resources allocation. In the Constitution, the legislature is invested with a great deal of power. Utilizing this power there have been occasions, held up by the Supreme Court, in which the legislature made water allocation decisions (“Interstate Allocation”, 2007, Deason, Schad, & Sherk, 2001). One such example is the *Arizona vs. California*, 373 US 546 (1963) Supreme Court case (“Interstate Allocation”, 2007, Deason, Schad, & Sherk, 2001). In this case, there was a dispute over how much water the states of Arizona, Nevada, and California were allowed to divert from the Colorado River, with the states of Utah, Wyoming, Colorado, and Nevada voicing concerns about not receiving a proper share (“Interstate Allocation”, 2007). The Supreme Court ruled that the answer lay in the previously passed Boulder Canyon Project Act (“Interstate Allocation”, 2007, Deason, Schad, & Sherk, 2001). This means the legislature had allocated water in the Boulder Canyon Project Act. Furthermore, Congress may have the ability to create institutions with the authority to regulate water.

It has been a point of interest that the Federal Energy Regulatory Commission, as granted power in the Federal Power Act, may have the ability to allocate water resources on rivers where federally licensed hydro-electric projects exist (Deason, Schad, & Sherk, 2001). Since the Supreme Court has ruled that national interest in the development of hydro-electric energy may outweigh states interests, there is plausible grounds for the Federal Energy Regulatory Commission having the authority to allocate water (Deason, Schad, & Sherk, 2001). And while further litigation concerning if the Federal Power Act and the Boulder Canyon Project Act are similar enough to be scrutinized under the same

Supreme Court precedent, the conversation not being about Congressional limitations on creating such legislation indicates it is possible (Deason, Schad, & Sherk, 2001).

Negotiated Agreement

The next form of conflict resolution is the negotiated agreement. And while there are many forms of negotiated agreements, the most common for managing interstate water resources is the interstate compact. In an interstate compact, states are authorized to negotiate control of resources without having the resources allocation being decided at a federal level (Deason, Schad, & Sherk, 2001; Newman, 2006). However, before states may enter into negotiations, Congress must approve the negotiations, and following the negotiations, Congress must approve the outcomes (“Interstate Allocation”, 2007, Newman, 2006). Finally before the compact is finalized, it must receive a presidential signature (“Interstate Allocation”, 2007, Newman, 2006). Following finalization, the interstate compact is considered to behave in the same way as a Congressional Act (Newman, 2006).

This system for allocating water relatively independent of the federal government is useful in a few different ways. First, it seems preferred by states as a way to circumvent the heavy costs associated with a battle in federal courts (Newman, 2006). Additionally, some governors in the southeast have discussed their preference of interstate compacts as they maintain a level of state autonomy not available in litigation or legislation (Newman, 2006). The Supreme Court has even gone so far to say interstate compacts are often the preferred method of water allocation as they are "more likely to be wisely solved by cooperative study and by conference and mutual concession on the part of representatives of the States ... than by proceeding in any court, however, constituted"

(Deason, Schad, & Sherk, 2001,p. 190). While this is some high praise, interstate compacts have some drawbacks.

For example, the previously mentioned southeastern governors, who lauded the autonomy and lower legal costs associated with interstate compacts, spent millions of dollars each to negotiate an interstate compact (Newman, 2006). Furthermore, despite the millions spent, none of these governors would reach an interstate compact agreement (Newman, 2006). Additionally, as a result of the 11th Amendment, preventing a state from acting on behalf of a citizen in a suit against a separate state, violations of compacts often end in the defending state suing the prosecuting state (Newman, 2006). The defending state will claim the prosecuting party in the compact dispute is acting on behalf of a citizen and therefore is unable to levy a complaint (Newman, 2006). This undermines the ability of interstate compacts to function properly (Newman, 2006). Lastly, with the introduction of regulatory legislation with ecological conservation goals, such as the Endangered Species Act and the Clean Water Act, there is more that has to be considered when making a compact than merely issues of water use (Newman, 2006).

Market Mechanisms

One of the last tools that can be used to regulate interstate water conflicts is market mechanisms. As a result of the commerce clause, it has been ruled that states cannot place unreasonable barriers on the transfer of waters between states (Deason, Schad, & Sherk, 2001). There have been arguments made that this could be grounds for lifting of policy barriers to water transference (Deason, Schad, & Sherk, 2001). The argument then is that if institutions do not intervene, and the value of water can be quantified in market terms, one could use the hand of the market to solve problems of water allocation (Deason, Schad, & Sherk, 2001). While in theory, this is a possible

solution, there is also an obvious lack of these systems being used effectively today. Additionally, questions of ones ability to quantify the value of such an essential resource, and then the markets ability to allocate water in a way that reflects ecological needs raises skepticism about market mechanisms being good solutions. These critiques also do not take into account the logistics associated with stripping away the policy necessary to allow such a market to exist, or the results of this removal of policy. However, as of 2013, 25 different programs are reported as being in some stage of development for using market solutions to meet pollution standards (Reimer, 2013).

Modern Federal Water Policy

One of the best ways to explain the difficulty with categorizing the modern state of federal water policy is to explain the fragmented and convoluted nature of the federal institutions governing water (Apple, 2001, Reimer, 2013, Deason, Schad, & Sherk, 2001).

For example, the United States Army Corps of Engineers does not maintain the same role it once did building massive projects (Reimer, 2013). Today, the United States Army Corps of Engineers is a large agency responsible for maintaining the navigability of waterways, undertaking maintenance projects, and maintaining and operating flood control structures (Reimer, 2013) To do this, the United States Army Corps of Engineers manages 12,000 miles of navigable waterways and 600 dams with their small army of 37,000 civilian employees (Reimer,2013). The United States Army Corps of Engineers roles begin to overlap with other agencies, however, as they often aid in advising federal and state agencies attempting construction and restoration projects, as well as going so far as to conduct restoration projects on federally owned property (Reimer, 2013).

Similarly, the modern Bureau of Reclamation focuses on managing maintenance projects for existing water infrastructure in the western U.S., particularly related to water supply and hydroelectric power, and like the United States Army Corps of Engineers, is turning its eyes towards restoration projects (Reimer, 2013). The Bureau of Reclamation controls a number of reservoir sites in conjunction with the National Park Service and Forest Service, and additionally, uses the reservoirs as the largest water wholesaler in the country (Reimer, 2013).

The Environmental Protection Agency (EPA) is primarily in charge of maintaining water quality and administering standards set in the Clean Water Act (CWA) and Safe Drinking Water Act (Reimer, 2013). The CWA is a huge program that allows the EPA to impose water quality standards as well as administer a permit system for pollution (Reimer, 2013). The EPA administers this permit system in conjunction with states to enact the National Pollution Discharge Elimination System (Reimer, 2013). Furthermore, should states fail to meet standards the EPA sets, the EPA has the ability to intervene in state operations and force the necessary actions to reach quality standards (Reimer, 2013). While the focus of the National Pollution Discharge Elimination System is on point source pollution emissions, the EPA has also begun funding and assisting states to reduce non point source pollution (Reimer, 2013).

While some of the institutions regulating water resources are not shocking, like the previously mentioned EPA, Bureau of Reclamation, and Army Corps of Engineers, it does not stop here. One study indicated 25 separate federal agencies having some role in managing water resources (Reimer, 2013). This results in overlapping responsibilities,

fragmentation of powers, and decentralized planning. And this phenomenon seems reflected in the bodies that generate the legislation guiding these agencies.

At the national level, the parties responsible for developing water policies are “fragmented among at least thirteen Congressional committees, twenty-three Congressional subcommittees, eight Cabinet level departments, six independent agencies and two White House offices” (Deason, Schad, & Sherk, 2001p. 188). This decentralized decision-making can make it difficult to discern trends in federal operations, much less to identify goals of the federal government during any given time frame.

One noticeable modern trend is the expansion of the scope of federal power over water resources. For instance, the federal government has passed Acts increasing agencies’ responsibilities through legislation. Recently the EPA and United States Army Corps of Engineers worked together to pass the Waters of the United States Act, expanding their areas of jurisdiction to all navigable waters, including territorial seas (Bakst, 2016). However, especially in modern periods of devolvement, this legislation draws criticism from those who are already concerned about federal actors overstepping their Constitutional bounds (Bakst, 2016, Botsch, 2008, Boyd, 1997). This expansion of power is also accomplished through creating regulatory standards states must meet. For example, by passing increasingly stringent standards for water quality, the federal government can force states into action and cooperation without technically requiring states to take any particular action. This has caused a great deal of collaborative action at state and regional levels, as actors strive to meet quality standards for shared resources. The Unfunded Mandate Act of 1995, requiring cost benefit analysis, has balanced these

actions and has lead increasingly to block grants (Botsch, 2008). However, proponents of state rights still criticize these policies as attacking state sovereignty.

These initiatives by the EPA promoting water quality do capture the focus on water moving from a focus on water as an economic tool, to encompass an ecological view of water. Increased focus on infrastructural maintenance as opposed to massive construction projects echo this sentiment. Similarly, so does the passing of legislation requiring increased examination of the environmental impacts of new projects. The National Environmental Policy Act is one such piece of legislation, requiring environmental impact assessments of a federal project before the project can begin (Reimer, 2013). The Endangered Species Act prevents public and private actions that threaten endangered species or their habitats (Reimer, 2013). The Wild and Scenic Rivers Act allows Congress to designate particular waterways as protected in their “natural free-flowing condition” (Reimer, 2013). Additionally, the Federal Power Act established that all private hydroelectric facilities must be federally licensed in order to ensure the facilities are in compliance with both the Clean Water Act as well as the Endangered Species Acts (Reimer, 2013). These trends coincide with the increasing concerns of water scarcity throughout the U.S., with policy not only seeking to protect quality of freshwater resources and other environmental factors, but also to increase efficiency of the use of our water (Reimer, 2013).

At the federal level, a current trend driven by increased water consumption is water scarcity policy. As the United States is ranked last in an international study of water efficiency, working to solve these inefficiencies is a good way to address problems with possible water supply shortages (Allin, 2008). In particular, agencies such as the

EPA have begun heading up a number of initiatives. These initiatives range from studying physical inefficiencies of systems, such as irrigation practices, to creating a more informed consumer base to address market inefficiencies (Reimer, 2013). While many of these initiatives indicate a need for funding scarcity priorities, throughout much of the 2000's, Congress has remained focused on implementing water quality measures (Reimer, 2013).

In conclusion, while there are some overarching trends in modern federal water policy, as Apple (2001) notes, policies are being made in an “ad hoc and decentralized manner” that may result in a lack of a unified federal policy and an inability to articulate water priorities. Furthermore, as devolvement discourages federal intervention in decision making in policy, areas that represent interstate problems require centralized solutions. This leaves the federal influence of water policy at an interesting impasse.

Chapter 4: Analysis of Federalism in Water Policy

This analysis will offer an explanation of why the relationship between federal and state governments exists as it does, and the strengths and weaknesses that exist as a result. To do this we will develop a theoretical understanding of how the state and federal water policies have developed, before analyzing the relationship between the two.

State Analysis

At the state and local levels, water policy mostly concerns itself with issues of supply and the allocation of water resources. This is particularly effective, as compared to the federal level, states have higher visibility to the needs of their constituency, and therefore, an ability to adapt more quickly to solve crisis in their jurisdiction. Additionally, more direct ties to their constituencies create a higher level of accountability, and visibility for developing policy to efficiently manage the resource. The evidence for state and local government's ability to quickly adapt to meet the needs of their constituents can be seen in various places.

A prime example of this is as water scarcity has begun to impact communities, City governments have worked to develop innovative solutions to these problems. In areas such as Texas and Colorado, cities have turned to waste water reclamation to meet the needs of their citizens (Atkins, 2014). Additionally, as surface water has become

polluted, cities have turned to aquifers for clean water (Schlager, 2006). Physical proximity and a limited scope of responsibility allow for a deeper understanding of the problems a population faces. This results in nuanced solutions to these problems. Similarly, a direct line of accountability to the constituency drives policy makers to seek these solutions in order to gain reelection. This strength has been highlighted as states have taken on increased roles in water policy during devolvement, and the federal government equips states with blocked grants (Botsch, 2008). However, state governments also seem to suffer as a result of direct visibility to a particular constituency.

Constituency is shared between local, state, and federal levels of government. For example, an Austenite is a Texan, and Texan is an American. Contrarily, states cannot share constituencies, nor can cities. An Austenite is not a New Yorker, and a Texan is not a Californian. However water resources defy these horizontal boundaries of constituency, with many rivers and aquifers existing as interstate resources. As a result of this limited jurisdiction being matched against interstate resources, states are poorly equipped to deal with interstate resources.

As a result of the shared nature of water resources, any benefits from policy affecting the interstate resources are spread to all constituencies that can access it. This makes it unappealing for any particular state to shoulder the cost of addressing the issues of an interstate resource. Further, the complexity and vastness of interstate resources create costly solutions to problems plaguing interstate resources. As a result, actors are less likely to pursue interstate resource policy. Simply, there is less visible benefit to a policymakers' constituency per dollar spent on issues handling interstate resources than

on intrastate issues. This results in a lack of understanding, development, and stewardship of interstate resources.

This idea is exemplified in the development of policy managing groundwater resources. Because of their large and obscured nature, there is a high cost associated with developing an understanding of the size and location of ground water resources (Schlager, 2006). However, this cost pales in comparison with costs associated in developing models of the inflows and outflows of aquifers necessary to understand the impact of water withdrawals and stresses on them (Schlager, 2006). As a result, we have gaps in literature on many of the groundwater resources that are used today. This lack of information has greatly contributed to the inefficiencies in state ground water policy. As demonstrated with market inefficiencies resulting from artificially low water prices, information is key to proper management of a resource. With groundwater, far from knowing the value of the good, it is often not known how much of the resource is available. And while this groundwater is good for highlighting the problems with state water policies, these issues are not unique to ground water.

Unfortunately, 50 independent and self-interested actors do not reflect the interconnected nature of water resources. As a result, inefficiencies resulting in states having conflicts over water rights. However, even as states are independent actors, there is opportunity for collaboration. This can be seen in many ways, both in voluntary interstate compacts, as well as general watershed based approaches to water management.

Federal Analysis

The strengths of the federal government seem to be opposite of the states, with the federal government's vast jurisdiction and fewer direct ties to any particular constituency creating its best features.

The significant scope of the federal governments' power over America's water resources has grown over time as a result of federal legislation incrementally extending federal reach. While the federal government may not have the ability to directly manage water resources, it has the ability to indirectly manage virtually any resource. For instance, while in many cases the federal government may have an inability to implement programs or undertake projects on a particular intrastate resource, the Clean Water Act or Endangered Species Act can indirectly have a great impact on how a state treats the intrastate resource. This incredible ability to coerce state action has come under fire for overstepping federal bounds, but also has great promise as a possible policy tool. Furthermore in interstate resources coercive legislation has a great power to drive cooperation amongst states. This can be used to encourage good stewardship of shared resources when states may not otherwise seek it. In large part, these coercive water policies administered at the federal level are the reason watershed based approaches are becoming more prevalent today.

In addition to offering up proverbial "sticks" to accomplish its goals, the federal system also offers positive incentives to enable states and other entities to reach goals in line with federal interest. In doing this, the federal government allows local governments to develop nuanced solutions to problems matching the federal agenda, as they exist in a given area. The Clean Water State Revolving Fund and the Drinking Water State Revolving Fund are examples of these incentives, offering match loans to state and local governments carrying out projects aimed to meet Clean Water Act and Safe Drinking Water Act requirements (Reimer, 2013). These tools are methods way to manage enacting change towards federal goals while benefitting from states more nuanced

understanding of local issues. Furthermore, as a result of Americans trusting local levels of government over national levels, it has become increasingly popular as a strategy for the federal government to meet their goals (Botsch, 2008). However, as a result of the way in which the federal water policy has developed, it is not obvious what these goals are.

Throughout much of history, while state water policy was dictated by the demands of state constituencies, as outlined in the historical review, any given time period had its interests, and water existed largely as a tool to serve those needs. Water policy legislation was predominantly an extension of other issues. If the interest of the period was in industrial development, water policy was developed in a way to allow and encourage industrial development. This was the case until the green wave environmental movement of the 1970's turned interest in water from strictly economic benefits, to an interest in water as an environmental resource. However, this has been a recent development occurring during devolvement, and has left the federal government with a structure not prepared to manage water as a resource with unique and independent goals. As noted by Diana Apple (2001), this has left a federal government that may not be capable of identifying problems, articulating priorities, and adapting in a timeframe that allows for meaningful action to be taken.

Federalism in Water Policy Analysis

In conclusion, states' independent agendas based around attempts to meet demands of their constituency seems to have created a system that is evolving constantly to meet problems as they arise and efficiently allocate resources. This quasi-market adaptability is incredibly valuable, and serves the states well. Furthermore, recent trends of devolvement and a predisposition for Americans to trust local levels of

government over national levels has lead to states taking on an increased role in water policy (Botsch, 2008). However, these independent agendas do not reflect the connected nature of water and can generate problems when dealing with interstate resources. This manifests itself as gaps in information, inefficiencies, and conflict.

However, the federal government seems to hold a lot of promise to mitigate these weaknesses. An ability to champion causes that do not hold obvious economic value has resulted in the rise of environmental policy at the federal level. Federal legislation being inherently broad and superseding state policies allows the federal government to coerce state actors towards collaborative action. Additionally, the federal government seems to have the ability to intervene where state inabilities to effectively deal with interstate resources persist. However, a fragmented federal system has developed as a result of water policy being a function of other policy interests and devolvement. This has created a framework that is not particularly in tune with, or capable of adapting to, water issues. In order to address this, the federal government must create a more centralized and streamlined process capable of understanding, adapting to, and solving water problems as they arise at both a state and national level. However, the federal government has struggled to do this as a result of trends in devolvement encouraging further decentralization of the policy making process.

Chapter 5: Recommendations and Conclusion

Policy at the state level is largely pertaining to issues of particular water resources, a given constituency, and creating local solutions to local problems. Recommendations made here aim to enact institutional change at the federal level and adjust the state and federal relationship which will effect the deficiencies inherent in the state model of dealing with interstate resources. The recommendations are as follows:

- A) Centralize federal legislative and bureaucratic institutions
- B) Create watershed-planning organizations
- C) Conduct a national water assessment

Centralize Federal Legislative and Bureaucratic Institutions

As discussed repeatedly, the spread of the legislature and bureaucracy associated with water policy creates a system in which both policy development and implementation is fragmented and decentralized (Apple, 2001, Deason, Schad, & Sherk, 2001, Reimer, 2013). As a result, there seems an inability to create a unified water policy capable of reacting to the needs of the water system or achieving goals in managing it (Apple, 2001). Furthermore, as a result of water policy being defined by other policy agendas until devolvement began, the federal government may not be able to develop coherent goals and priorities for managing water as a holistic resource.

The first step in empowering the federal government to deal with water issues is reinstating the Council of Environmental Quality in the current administration. As established in the National Environmental Protection Act of 1970, the Council of Environmental quality is a division in the office of the presidency (“Welcome,” n.d.; “What is the National,” 2017). In particular, the Council of Environmental Quality works to coordinate federal agencies environmental efforts, and to administer standards set in the National Environmental Protection Act (“Welcome,” n.d.; “What is the National,” 2017). These standards are binding to all federal agencies, and largely concern administering environmental impact assessments and environmental assessments (“Welcome,” n.d.; “What is the National,” 2017). While this board was not explicitly concerned with water, it served as a centralizing force in the bureaucracy, and enabled coordination between the various federal agencies. However, since February of 2017, the Council on Environmental Quality has vacated their offices and their website has been taken down without any indication of future plans for the council. By reinstating the Council of Environmental Quality, the executive branch could maintain a more holistic understanding of water landscapes, encourage interagency coordination and act to combat environmental issues.

Next, in order to encourage legislation reflecting current issues, a federal legislative board with a focus large enough to enable a big picture approach to water management should be established. As a result of modern federalism encouraging decentralization of responsibilities, a complete centralization of legislative authority in a single committee is not feasible. However, while water policy decision-making will be fundamentally

fragmented in a sense, this does not mean water information or the water policy agenda should be.

To fix this, a Congressional water plan similar to the 104th Congress' *Contract with America* could be drafted. The goal would be to bring legislators from the various committees and sub committees dealing with water into a round table discussion in order to develop a broad understanding of water and the issues affecting it. From there, water policy priorities could be developed and pursued in the various legislative bodies that exist. The unified policy enacted by these legislative bodies would result in more efficient and clear responsibilities in federal agencies than currently exists. With institutions carrying clearly articulated and redefined goals, it becomes easy for federal agencies to realign their efforts with updated policies.

Create Watershed-Planning Organizations

As discussed in the analysis chapter, states seem particularly well fitted to deal with intrastate allocation. This stems from the nature of their jurisdictions allowing an ability to address water issues, and a visible accountability to their constituency creating an interest in doing so. However, states become less capable where their jurisdiction ends and less interested where benefits from their dollars are less visible to their constituency. As a result, information gaps surrounding shared resources have emerged. These gaps can result both in an inability to mitigate the impact of shortages, and indirectly cause shortages as a result of mismanagement of resources (Government Accountability, 2014, Reimer, 2013, Schlager, 2006). The latter of these can be seen in cases surrounding groundwater as well as market inefficiencies associated with artificially low water costs (Government Accountability, 2014, Reimer, 2013, Schlager, 2006). These shortages are capable of having economic consequences, as well as drive interstate conflict. Contrarily,

closing these gaps creates more appropriate policy at state and federal levels creating better management practices and less interstate conflict. As a result, one of the most beneficial opportunities for the federal government is in closing information gaps that exist in interstate water resources.

In order to harbor effective communication, as well as collaborative and comprehensive policy development, the federal government should create watershed-planning organizations. These organizations would have jurisdictions and responsibilities tethered to a particular watershed, as opposed to a particular task or purpose. For instance, as opposed to the Federal Energy Regulatory Commission having jurisdiction related to hydroelectric power, one could imagine an organization with responsibilities pertaining to the Colorado River as a whole. The goals of these institutions would then be to promote effective policy solutions by developing a thorough understanding of the resource and engaging all parties involved with the resource.

A good model for this kind of organization already exists in transportation policy, with Metropolitan Planning Organizations (MPO's). These MPO's are federally mandated and funded for all urban centers with populations over 50,000 ("About MPO's," n.d.; "Metropolitan Planning," 2016). These organizations are responsible for coordinating between the governor and local governments on issues relating to transportation and city planning ("About MPO's," n.d.; "Metropolitan Planning," 2016). When a government, city or local, wishes to implement a policy or program, the MPO must certify that the initiatives meet state and national standards ("About MPO's," n.d.; "Metropolitan Planning," 2016). Additionally, federal funding for transportation projects comes through these MPO's ("About MPO's," n.d.; "Metropolitan Planning," 2016). In

doing this, it has enabled the federal government to be sure funding is being used in projects that are compliant with federal standards, and encourage collaborative and comprehensive approaches by gathering the appropriate parties around a table where information has been previously consolidated (“About MPO’s,” n.d.; “Metropolitan Planning,” 2016). This approach could be used to great effect if applied to water management.

By establishing federally mandated and funded watershed planning organizations for every intrastate water resources, the government could encourage collaborative and comprehensive solutions. This collaboration would allow the communities to begin closing gaps in literature on water resources. While the logistics associated with bringing all federal and state actors associated with the Colorado River is daunting, by distributing federal funds through these watershed planning organizations and requiring the watershed planning organizations approval for any projects concerning the resource, the necessary parties would quickly come to the table. Once gathered, under supervision of the planning organization, representatives from each state and agency could address issues affecting the resource. Furthermore, these conversations be would guided by readily accessible, comprehensive and continuously updated information on the resource. This information and cooperation results not only in the kind of problem solving that works towards long term solutions, but could serve as a tool to resolve interstate conflict.

By having a round table in place, with the respective parties and necessary information already present, it would encourage conflict resolution through interstate compacts. While litigating an equitable compact is expensive, interstate compacts are not necessarily an inexpensive option. As discussed, an interstate compact negotiation comes

with no guarantee of finding a solution as a result of the expenses incurred. However, these watershed planning organizations both lower the cost of seeking an interstate compact by having the information on the resource available, as well as increase the likelihood of solutions being reached as a result of an ongoing discourse between the associated parties.

Furthermore, this watershed planning organization could be used to administer federal standards and regulation. By requiring certification of federal, state, and local initiatives affecting the water resource, the watershed planning organization would encourage compliance with federal policy.

Undertake a National Water Assessment

As discussed in this thesis, incomplete information regarding water resources is a concern of water managers and is driving shortages in multiple ways. Artificially low water costs create market inefficiencies, and groundwater generally not being understood is resulting in overuse of the resource. In order to resolve this, I propose another national water assessment

The national water assessment would be an ongoing, comprehensive water use and availability study. The goal would be to have comparable to the Second National Water Assessment in 1978 in scope, and adhering to standards set out in the 2002 report on Concepts for National Assessment of Water Availability and Use. Under these standards, the assessment would provide an understanding of “the status and trends in storage volumes, flow rates, and uses of water nationwide”, as well as “regional information on recharge, evapotranspiration, interbasin transfers, and other components of the water cycle across the country ” (U.S. Department, 2002 p. 3). Under these

assessment standards, a more comprehensive understanding both of supply and demand, the tensions between the two, and the nature of the resources utilized would be gained.

If undertaken, an assessment of this sort should be vastly beneficial. By driving a deeper understanding of groundwater supplies and demand, one can understand the inefficiencies of water supplies at the state level. Additionally, while understanding availability of water resources does not solve artificially low prices of water, it helps provide information necessary to address the problem effectively. Furthermore, by mandating and funding assessments of water supply, it would lead to a better understanding of groundwater resources that is currently unavailable.

This National Water Assessment would help resolve issues of water allocation for states through a more thorough understanding of supply and demand, increase federal ability to develop meaningful goals for water management, and help all parties to implement more effective policy.

Conclusion

The American system of federalism has undergone a great deal of change since America's inception. These changes have manifested themselves in an ongoing tug of war over power between the federal and state government. And while an oversimplification, since the era of Dual Federalism the federal government increasingly gained power until Reagan took office in 1981. However, since 1980 a modern movement of federal devolution has resulted in state governments having more power to enact policy, as they deem necessary. This trend has been reflected in water policy, with the federal government taking increasing roles in managing America's water resources until the 1980's and 1990's when watershed based approaches became popular,

and policy focused on collaborative state solutions. While this has empowered states to implement nuanced water policy in their jurisdictions, the decentralization of federal decision making has also resulted in a federal inability to address the issues in water policy that exist as a result of the state model of governance. However, since federalism has created a dynamic and ever-changing policy landscape, these issues can be addressed.

In order to address these problems, the federal government should centralize federal legislative and bureaucratic institutions, undertake a National Water Assessment, and create watershed-planning organizations. By developing more unified federal processes for the creation and implementation of water policy, it will allow for the federal government to develop goals for water resources and work to solve problems as they arise. By undertaking a National Water Assessment, the federal government can work to mitigate the detrimental effects associated with information gaps affecting water policy. And lastly, by creating watershed-planning organizations institutions can be created to encourage understanding of water resources.

Ultimately, while trends in devolvement has empowered states to make nuanced decisions and take advantage of their adaptable system of water management, it has not been particularly helpful resolving issues associated with interstate resources. This has only been made more difficult by federal fragmentation of water policy resulting in a real lack of a centralized structure able to compensate for these inadequacies. However, by consolidating information, bringing together the involved parties, and empowering the federal government to take advantage of current trends in cooperation at the state levels, the federal government could improve the federalist relationship and create a more proactive and unified water policy.

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