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By

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**Environmental New Federalism and Fracking:
Lessons from the Colorado Experience**

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Environmental New Federalism and Fracking:

Lessons from the Colorado Experience

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Abstract

This article seeks to evaluate the states' capacity to create environmental regulation that does not give in to the major pitfalls associated with environmental new federalism. The emergence of environmental new federalism as the federal government's preferred framework for deciding who has the authority to regulate environmental issues has led to regulatory authority being devolved to state and local governments. The devolution of regulatory authority has allowed the states to become "green laboratories" that have created innovative and effective environmental regulations. However, critics still worry about the states' capacity to overcome the tragedy of commons, temptation to race to the bottom or race to the top, or to use the matching principle inappropriately. In this article, I conduct a case study of fracking policy in Colorado to evaluate the state's ability avoid the pitfalls associated with environmental new federalism while creating public policy. I find that Colorado avoided the pitfalls associated with environmental new federalism by passing innovative fracking policies with the support of the oil and natural gas industry which has promoted the expansion of the industry and mitigated the potential environmental risks.

Chapter One

Introduction

I. Background

Federalism is built in to the framework of American experience of governance and is the driving force behind intergovernmental relations in the United States. Federalism plays an important role in deciding which level of government would be the most effective and efficient to deal with any given issue. Federalism has adapted over the years to shape public policies in different ways depending on the role that the federal government felt that it had in state issues. The United States started with the model of dual federalism where the lines between the federal government and state governments were clear and distinct without overlap (Anderson, 1969; Walker, 1981; O'Toole, 2005). Over the years, the levels of government began interacting more in a cooperative manner in order to produce the most effective and efficient form of governance. This era of cooperation ushered in the framework of cooperative federalism, where the lines between the federal and state governments became blurred as the levels began to work together and overlap on issues in order to solve problems (Elazar, 1969; Walker, 1981; O'Toole, 2005). However, the constant overlap and intermingling of the levels of government proved to be slow and inefficient which resulted in a push to devolve regulatory authority back to the states when federal regulation was unnecessary (O'Toole, 2005). This model of federalism became known as new federalism, and has guided the American experience of governance for almost half a century (O'Toole, 2005).

Federalism with regards to regulating environmental issues has undergone a similar progression to the model of federalism that has guided intergovernmental relations in the United States. However, environmental federalism lagged behind the nation as it underwent changes in

its model of federalism which resulted in cooperative environmental federalism emerging during the era that new federalism emerged as the dominate intergovernmental framework in the United States. Cooperative environmental federalism has continued to guide intergovernmental regulation of environmental issues, but in recent years, signs of inefficiency have begun to push environmental new federalism onto the scene.

Previously, the federal government had typically dealt with environmental issues through a model of cooperative federalism by setting federal baseline standards which guided the environmental policy at the state level (Powers, 2011). However, influences from the current era of new federalism have placed an emphasis in giving the power back to the states which has been reflected in actions taken in recent environmental issues (Scheberle, 2005). This hands off approach to environmental federalism has taken the next step in its progression as the preferred model shaping environmental regulations in its application to the issue of fracking. Thus far, the federal government has elected to buck pass on the responsibility of setting regulatory standards for fracking, leaving the issue of regulation to be decided at the state or local level. The result is that the states will have the regulatory authority under environmental new federalism to deal with an issue that is large, convoluted, and deals with issues of every facet of the environment that would usually fall under the umbrella of federal regulation.

One of most prominent states with a large shale play is Colorado. Fracking has exploded in Colorado leading to the drilling of new wells which have brought new jobs and new tax revenue to the state. These benefits have come at an opportune moment given the most recent recession. However, fracking has not come to Colorado without bringing a whole host of environmental concerns. Colorado has a rich history of being an environmentally friendly state and has several industries that depend on the same resources that fracking does. The environmental spirit the

state's residents embody and the voices from the competing industries have been active in bringing the environmental concerns associated with fracking into the mass media in order to shape the state's fracking policy. The oil and gas industry has also made its own play in the mass media by trying to promote the safety of fracking and influence fracking regulations to continue to promote the expansion of the industry. With mass media coverage of the fracking issue in Colorado, policy makers have been faced with difficult decisions of which level of government should be able to regulate fracking and to what extent. The state has passed many regulations to protect public health and the health of the environment, but some cities have gone even farther by banning the process. These bans, along with other variables have raised many legal questions as to who has the right to regulate fracking.

These variables associated with fracking have put policy makers in a tough situation as they decide who has the right to regulate fracking and to what extent the process should be regulated. Due to the nature of environmental new federalism, these decisions have been placed under the microscope of the entire nation as other states wait to see how the fracking debate plays out in Colorado without federal oversight.

II. Statement of the Problem

Under environmental new federalism, Colorado has been charged with deciding which level of government has the right to regulate fracking and to what extent the process should be regulated. Environmental new federalism has given more weight to the several variables shaping fracking policy in Colorado because at the state level, policy makers are much closer to the issues and are more directly accountable to their constituents than the federal government. The variables shaping fracking policy in Colorado are the economic aspects of fracking,

environmental concerns, public opinion, and other outside influences that have brought fracking to the top of the policy agenda in Colorado. Emerging legal issues have also become a key variable that is shaping fracking policy in Colorado as the state attempts to decide what level of government has regulatory authority over fracking. As the state weighs these variables, it must be careful not to fall into the main pitfalls associated with environmental new federalism. The main pitfalls associated with environmental new federalism are the tragedy of commons, the race to the bottom paradigm, race to the top paradigm, and inappropriate use of the matching principle (Alder, 2005; Powers, 2011; Esty, 1996; Rabe & Borick, 2013).

III. Purpose of the Study

The aim of this study is to contribute to the understanding of how the principles of new federalism as the framework guiding who has the authority to regulate environmental issues have affected public policy. The goal of this study is to shed light on the states' ability to deal with complex environmental issues and create sound public policy. This study should contribute to the overall understanding of environmental new federalism and whether it should continue to be used to decide who has the authority to create environmental policy or not.

IV. Plan of the Study

This paper will conduct a case study of how fracking policy is being shaped in Colorado. It will include a discussion of the main stakeholders in the fracking debate and the five main variables influencing fracking policy in Colorado. The main stakeholders are:

1. Governing Bodies
2. Oil and Gas Industry
3. Other Key Industries

4. Environmental Groups
5. General Public

The five main variables shaping fracking policy in Colorado that will be discussed are:

1. Economics
2. Environmental Factors
3. Public Opinion
4. Other Outside Influences
5. Emerging Legal Issues

After identifying the major stakeholders and examining the main variables shaping fracking policy in Colorado, this paper will discuss the current fracking regulations and the most recent action taken by the state. It will then evaluate the state's ability to avoid the four main pitfalls of environmental new federalism. The four main pitfalls that will be used to evaluate Colorado's policy actions are:

1. Tragedy of Commons
2. Race to the Bottom
3. Race to the Top
4. Inappropriate use of the Matching Principle

Finally, after examining the state's ability to avoid falling into to the pitfalls associated with environmental new federalism, conclusions will be drawn about the value of Colorado's experiences with fracking and environmental new federalism as a model for other states. The paper will conclude by analyzing the environmental new federalism as the framework driving environmental policy and compare it to the alternative of cooperative environmental federalism.

V. Importance of the study

Natural resources and the environment are publicly held finite resources that every citizen has a right to enjoy. However, energy is a commodity that the public cannot function without and finite resources are the most cost efficient resources available to produce energy with. The government has a duty to protect natural resources and the environment to ensure their existence for future generations, but also has the duty to look out for the public's interest and provide for the common welfare. Environmental federalism aims to guide government's decisions to protect the environment while allowing industries to develop in the most effective and environmentally efficient ways. Environmental new federalism has emerged as a way to improve government's effectiveness and efficiency in regulating environmental issues by putting regulatory power back in the hands of the states that are closer to the issues. Being closer to the issues does not always result in sound policy because state governments are smaller and more easily influenced by self-interested constituents than the federal government. Fracking is a process that is essential to producing energy for the United States, but it also poses several threats to the environment and well-being of the general public. This makes it an important issue that can be used to evaluate the states' ability to produce regulation for environmental issues that mitigates environmental damage without under-regulating or over-regulating the process and is carried out by the appropriate level of government.

Chapter Two

Environmental Federalism

I. Overview of Federalism

Federalism is a living and breathing model of governance that has evolved over time to balance power between the different levels of government in the United States. The framework of federalism was built right in to the Constitution and is the foundation for the American experience of government. Due to its entrenched nature in the foundation of American governance, federalism gives us insight into how policies are shaped and the motivations behind why powers are balanced the way that they are in the United States.

A. Defining Federalism

The purpose of federalism at its most basic level is to the balance of power between the federal and state governments. O'Toole (p. 127, 2005) provides a good working definition which states that "*Federalism*, as it is understood today, means a system of authority constitutionally apportioned between central and regional governments." It is important to make a distinction between what is meant by "federalism" and what is meant by "decentralization" because the two terms are often used almost interchangeably. Rubin (p. 171, 2008) defines decentralization as "a managerial strategy by which a centralized regime can achieve the results it desires in a more effective manner." The key word in this definition of decentralization is "managerial," which alludes to the fact that even though the states might have power in a certain situation, it is artificial because the centralized regime (federal government) was the one to give them power in order to gain some benefit. This concept provides the important distinction between "decentralization" and "federalism" because with federalism, the federal and state

governments stand as two autonomous entities that derive their power from the same source (Elazar, 1969). This is in opposition to decentralization where one level of government derives its power from the other.

B. Historical Overview

The framers of the U.S. Constitution were charged with drafting a form of government that tied together several states in a structure that had a sufficiently strong central power to rule on important matters but still preserved state and local autonomy on other matters. The task was presented to the framers in the context of their experiences with England which was a system based entirely on a central power and the Articles of Confederation which was a failure with a government based on a loose agreement among states (Walker, 1981). The solution was a dichotomy which provided powers to both the federal and state governments in a system with deliberate ambiguity which left room for controversy, flexibility, and adaptability. The deliberate ambiguity in the power dichotomy between the federal and state governments is what we refer to today as the issue of federalism.

C. Constitutional Powers

The dichotomy that empowers both the federal and state governments to the full extent of the law is built into the United States Constitution. As a reaction to the Articles of Confederation, the Founder first sought to provide power to a strong central government. The power was enumerated in Article I, Section 8 of the Constitution which states that “The Congress shall have Power to lay and collect Taxes, Duties, Imposts and Excises, to pay the Debts and provide for the common Defense and general Welfare of the United States.” (Anderson p. 15, 1969; “The United States,” 2013) The first few provisions cover what most people could agree

upon as the preferred functions of the federal government being to collect taxes, pay debts, and provide for national defense. Where this article gets sticky is in the ambiguity of the statement “to provide for the general welfare of the United States.” To provide for the common welfare was a direct echo from the Preamble, thus showing how important it was to the Founders. Enumerating the power to provide for the general welfare gives context to the great deal of importance the founders put on creating a strong central government. The same article also states that Congress is “to make all Laws which shall be necessary and proper for carrying into Execution the foregoing Powers, and the other Powers vested by this Constitution in the Government of the United States, or in any Department or Office thereof.” (“The United States,” 2013) This article makes a major contribution to the powers of the federal government because it creates an inherently political question to decide which laws are both “necessary and proper” and which ones “provide for the common defense.” The arguments for what could constitute as providing for the general welfare and common defense are endless and hold the potential for the central government to gain too much power and become a tyrannical leader like the Founders had experienced with England. The founders in their infinite wisdom were in need of a check in order to balance the power given to the central government to ensure power for the states and individuals.

The answer came in the Tenth Amendment in the Bill of Rights which asserts that “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.” (O’Toole p. 129, 2005; Anderson, 1969) This ever important amendment provided the necessary power for the states to maintain their independence and autonomy by giving them the power to rule on decisions that were not prohibited in the Constitution. However, by itself, all the Tenth Amendment does is reestablish

the principles of the Articles of Confederation, loosely tying the states together but leaving the central government lacking real power and virtually making it impossible for it efficiently act on matters of importance (Elazar, 1969; O’Toole, 2005). However, using the Tenth Amendment in conjunction with Article I, Section 8 of the Constitution creates a power dichotomy which allows for each level of government to enjoy different levels of power on any given issue.

The power dichotomy derived from the Constitution provides enough justification that if either clause stood alone, it would provide that level of government with supreme power over the land. This creates tension between federal and state governments as they jog for power over any given political issue to exercise the full power of their clause. Over time, the United States has gone through several phases of federalism which attempted to separate the powers, promote cooperation amongst them, and to promote democracy by returning more power to the states and the people.

II. Types of Federalism

A. Dual Federalism, “Layer Cake Federalism” (1789-1945)

The first type of federalism that attempted to take on the complexity of the dichotomy created in the Constitution of “who had the power to decide of certain matters” was dual federalism. Dual federalism can be defined as “each of level of government operating independently within its own separate jurisdiction without relying on the other for assistance or authorization.” (O’Toole p. 129, 2005; Anderson, 1969; Walker, 1981) Dual federalism is often referred to as “layer cake” federalism due to the easily distinguishable levels of government. This metaphor is beneficial in understanding dual federalism because it is the clear boundaries of power that make it vastly different from cooperative federalism. This is due to the fact that it is

the tension created by the power dichotomy derived from the Constitution rather than cooperation between the layers of government that leads to governance (Walker, 1981). The belief is that each level has its own distinct role and that power should not overlap.

Dual federalism was the dominant force that influenced the intergovernmental relationship between the federal and state governments as they decided on issues of education, transportation, and other social policy. The idea that the two levels of government operate separate of one another influenced policy makers and the decisions made by the Supreme Court. In fact, Supreme Court Justice David Brewer summed up the policy of dual federalism stating “We have in this Republic a dual system of government, National and state, each operating within the same territory and upon the same persons’ and yet working without collision, because their functions are different.” (Schapiro, 2006; Walker, 1981) This statement highlights the role that the Supreme Court felt it had in umpiring the game of power relations between the state and federal government. The court felt that it was their duty to hold each level of government in its separate sphere where the federal government had power over some things and the states did over others, but that those powers did not interact (Schapiro, 2006; Walker, 1981). The framework of dual federalism also influenced various presidents to veto legislation that would have created a federal presence in public works construction on the grounds that the Constitution did not permit it (O’Toole, 2005). The implication of presidents vetoing legislation to promote dual federalism on a Constitutional basis and the Supreme Court feeling that it had the duty to keep the federal and state governments in separate spheres reflects an interpretation of Strict Constructionism. Strict Constructionism is characterized by looking at the literal meaning of the Constitution while taking into consideration the original intent of the framers during the time in which the Constitution was written (Nolo, 2010). The Strict Constructivist interpretation of the

Tenth Amendment and Article I Section 8 held the pieces of legislation as completely separate and having no interworking relationship besides the fact that each set the boundaries of the other's power.

The Strict Constructionist reading that drives dual federalism is the idea that the state and national government have certain enumerated powers that allow each to operate within the same territory and upon the same people, but that their functions are different and do not collide or overlap with one another (Scharpiro, 2006). This idea is somewhat hard to fathom by today's context where the lines between state and federal government are often blurred, but there are three main principles of dual federalism that make it operational in theory, and to some extent, in practice. The three main principles of dual federalism are "1) the federal government and the state governments exercise exclusive nonoverlapping authority; 2) the allocation of authority between the national government and the states rests on functional premises, with the national government regulating certain kinds of matters and the state governments regulating different matters; 3) the courts play an important and distinctive role in maintaining the boundary between the states and the national government (Scharpiro, 2006)." (Walker, 1981) When considering these three principles, the idea of dual federalism does not only seem workable, but is argued as the preferred model by several groups. The idea of keeping distinct lines between state and federal government is an attractive idea from the standpoint of organization and clarity. Also, the idea that power will be allocated between the national government and the states based on functional premise sounds like prudent behavior in theory as long as it is evident which level would be better fit to rule over an issue. However, the problem is that policy issues are often very complex, and it is not always clear which level of government should have power over the issue because each has a good functional argument. In principle dual federalism attempts to

charge the courts with the role of deciding where the boundaries lie between state and national government, but yet again, the question of which level could functionally regulate an issue best is not always so clear.

For these reasons and more, dual federalism was a force in shaping intergovernmental relations from 1789 to about 1945. Dual federalism can still be seen today with some issues being dealt with solely by state powers in the state sphere while others are dealt with exclusively by the federal government in the national sphere.

B. Major Fluctuations in State and Federal Power During the Dual Federalist Period

1. The Civil War

During the period of dual federalism, the United States saw several major fluctuations in power as both federal and state governments disputed the extent of their powers and the limitations of the other. Under the framework of dual federalism, states had reserved the right to decide whether or not to allow slavery, and the federal government had attempted to stay out of the issue because it was seen as within the states' power to decide. The question of states' rights escalated over the issue of slavery and continued to be tabled by compromise after compromise in the federal government until it finally came to a head with the onset of the Civil War. The United States' system of federalism, that had empowered states as their own autonomous entities, with their own specific powers reserved only to them, built the foundation from which the Southern States would justify their secession from the union (Elazar, 1971). The Southern States argued that because they had ratified the Constitution, and had the power to create the federal government, they also had reserved the power to exit from the contract and secede from

the union (“States’ rights,” 2013; Walker, 1981). Within the framework of dual federalism, the Southern States had made the ultimate push for states’ power arguing that states were independent agents who had agreed to create the federal government and operate within the federalist system by choice and could also choose to leave the agreement.

Once the Union had prevailed and the Southern States were brought back to the union, it was inevitable that certain limitations be placed on states’ rights and some powers be granted to the federal government. This was a crucial point in American history and for the framework of dual federalism because the federal government would emerge as supreme over the states, thus finally answering the question of who had ultimate power. Interestingly, the actions remained within the framework of dual federalism, because the powers were clearly defined as either state or federal. The Thirteenth, Fourteenth, and Fifteenth Amendments to the Constitution reserved certain powers to the federal government to protect the rights of individual citizenship but left other expressions of states’ rights untouched (“The United States,” 2013; Walker, 1981). Even though the federal government did take back some of the power from the states, the framework of the United States system of federalism remained intact by continuing to allow for individual state powers to exist (Elazar, 1971; Walker, 1981). Despite the test, the federalist system and namely the framework of dual federalism continued and was strengthened by the Thirteenth-Fifteenth Amendments. However, the creation of these amendments changed the face of federalism by beginning to push the pendulum from the side of extreme exercise for states’ power toward more extreme exercises of federal power.

2. Industrialization and Globalization

After the Civil War, the United States started an era of industrialization and globalization. Up until the Civil War, the federal government had taken a laissez-faire approach to economic policy by allowing the states to fund their own public works projects and staying out of trade with the exception of practices such as joint-stock companies and federal land grants which showed the development of cooperative federalism, but were framed in a way that it appeared that federal and state governments were acting as independent players (O'Toole, 2005; Walker, 1981). However, as the Civil War finished and Reconstruction began, the United States and the system of dual federalism saw a major shift of power granted to the federal government as the federal government took a larger role in economic policy both foreign and domestic.

The Progressive Era brought about a focus on the concentration of power in large corporations, the reluctance of some state governments to enact regulatory and other social welfare legislation, and the recognition that natural resources were limited which called for a more expanded role of the federal government in domestic policy (Elazar, 1969; O'Toole, 2005; Walker, 1981). These focuses on previously state regulated issues resulted in great increases in the power of the federal government. The federal government began taking on a regulatory role by "trust busting" in order to regulate the influence that large corporations had created due to the industrialization of the United States economy. The federal government also expanded power due to globalization by creating the first federal government chartered corporation since 1836 when one was formed to construct the Panama Canal (Holcome, 1997). This direct intervention in the market by the federal government was only the beginning of rapidly expanding federal power.

The size and power of the federal government greatly expanded with the ratification of the Sixteenth Amendment to the Constitution in 1913. The Sixteenth Amendment permitted the

federal government to enact an income tax which gave the federal government more power to raise revenue for a more active role in the economy (“The United States,” 2013). The impact of the federal income tax on the size of the federal government was amplified during World War I when the tax rate rose to 77 percent starting at incomes of \$4,000 and higher (previously the highest rate was 7 percent on all income above \$20,000) (Holcome, 1997). The result was an increase in federal power directly from the United States’ increased globalization. Also during World War I, the federal government expanded its power by nationalizing railroads, regulating waterborne shipping and the creation of the United States Food Administration in order to support the war effort (Holcome, 1997). These expansions in federal government’s power were directly tied to the industrial nature and needs of the United States because goods needed to be manufactured and moved efficiently to support the war effort.

The power of the federal government would once again grow due to industrialization and globalization during the Great Depression and the New Deal. The Great Depression was the worst economic downturn in the history of the United States resulting in the need for greater federal assistance in order to keep the economy running. During the New Deal, the scope of federal regulation greatly increased to embrace industrialization by promoting agricultural production and marketing, labor-management relations, wages, hours, and working conditions, petroleum and coal, trucking, and airline operation (Higgs, 1999). Once again, the United States’ role in global issues became a driving force behind the expansion of power for the federal government. The influence of World War II drove the federal government to arguably its most extreme exercises of power. The federal government made gross violations on human rights with the creation of internment camps and also attacked the First Amendment by limiting free speech by denying newspapers mailing privileges or banning some newspapers all together

(Higgs, 1999). Despite these displays of excessive federal power, federalism survived and the New Deal had a lasting effect on federalism and the shape of the American Federalist System that fostered in a new era of cooperative federalism.

C. Cooperative Federalism, “Marble Cake Federalism” (1945-1969)

As Franklin D. Roosevelt initiated New Deal programs to tackle the economic and social problems that emerged from the Great Depression, it was more politically acceptable for the federal government to issue grant-in-aid to establish new programs rather than continue to increase the size of the national government (Elazar, 1969; O’Toole, 2005; Walker, 1981). The result was an expansion of power for both the federal and state governments in a cooperative fashion. In essence, the national government’s role expanded by creating new programs to take on social and economic issues, and the states’ governments gained power by gaining leverage on how programs were implemented and carried out (Anderson, 1969; O’Toole, 2005; Walker, 1981). This model of more intertwined intergovernmental relations would frame the model of federalism that would shape the American federalist system for the next couple of decades.

The problem with dual federalism is that, in practice, federal, state and local governments do not act in a vacuum where their responsibilities are separate and do not overlap with one another. In reality, there is a vast amount of concurrent authority shared amongst the state and national governments. This overlap renders the framework of dual federalism unfit for shaping many policies because it does not account for the power overlap between federal and state governments which was quickly emerging as the norm. The result was a need for a more adaptive form of federalism that was less concerned with question of who should have what

regulatory power, but rather how can the regulatory overlap of the federal and state governments could be best managed for the most effective form of governance? (Schapiro, 2006)

The answer was a new form of federalism that has been called creative, interactive, and cooperative federalism which focused on integration and cooperation between the multiple levels of government with a focus on problem solving (Elazar, 1969). I will use the term cooperative federalism for this paper because I feel that it is the practice of cooperation between the levels of government that distinguishes this form of federalism from dual federalism and new federalism, because both of those forms emphasize more of a separation of powers. The blurred lines of power created by cooperative federalism are why it is often referred to as “marble cake” federalism (Walker, 1981). This metaphor is useful in understanding the interaction between the multiple levels of government because in practice cooperative federalism operates through a mixing of authority between federal, state and local governments in a way that it is not easy to distinguish where one level of government’s power ends and the other one begins.

As stated earlier, it was the continuation of many New Deal programs that built the framework for cooperative federalism through grant-in-aid and categorical grants that took on many social and economic issues in the United States through a cooperative effort between federal and state governments (Elazar, 1969; O’Toole, 2005; Walker, 1981). Cooperative federalism really took hold as the dominant framework guiding public policy during the 1960’s and the presidency of Lyndon B. Johnson. President Johnson greatly expanded the influence of cooperative federalism by making a commitment to assist state and local governments with many domestic issues through direct assistance from the federal government (Elazar, 1969; O’Toole, 2005; Walker, 1981). The push for a more cooperative form of federalism was successful in creating hundreds of intergovernmental programs and tripling the number of grant-in-aid that

provided funding directly to state and local governments making the federal government seem as more an ally in a cooperative mission (Elazar, 1969; O'Toole, 2005). The expansion of federal funding to state and local governments so that they could take on certain domestic issues created the need for interest groups and for state and local officials to pay attention to what was going on in Washington in order to get their piece of the pie. The increased attention to policies being shaped in Washington by more stakeholders is an important result of cooperative federalism. Due to the fact that interest groups and state and local governments can all see direct help from the federal government in addressing policy goals increases their desire to have their opinion heard which in turn increased the number of perspectives and number of solutions being proposed to solve a particular issue. In theory, the dialogue created between the different stakeholders can inspire better policy solutions because different sides can learn from each other's experiences (Elazar, 1969; Scharpio, 2006). The increased involvement from different stakeholders is possibly the greatest triumph of cooperative federalism because of its influence on increased participation in the policy making process.

The blurred lines of authority in cooperative federalism acted as a strength to foster a working relationship between the different levels of government, but also acted as a weakness by adding ambiguity to issues that demand uniformity. The cross-jurisdictional nature of overlapping power created by cooperative federalism leads to problems of uncertainty in regards to which rules apply in a situation that federal and state rules diverge from one another (Scharpio, 2006). This problem is amplified without a set hierarchy of accountability and a lack of uniformity, which are common characteristics of cooperative federalism states. Another downfall of cooperative federalism is that by creating numerous intergovernmental programs with broad goals with which the amount of potential recipients are almost limitless, there was a

competitive market created where recipients could shop around between state and federal governments and tailor programs just enough to receive money under minimal federal oversight without really addressing the goal (O'Toole, 2005). This resulted in a loss of federal intent which undermines the public policy because funds were not being used to address the intended policy issue. The abundance of federal funding for programs built on matching ratios generated tension for state and local governments because program choices were being made based more off economic formulas than local needs (O'Toole, 2005). Localities lost a lot of independence because their budgets were being used to draw federal matching for programs that were seen as a national interest rather than creating programs that fit the interests of their communities. Despite the advantages of increased cooperation between the federal, state, and local governments to advance a variety of policy goals created through direct funding, the limitations of cooperative federalism quickly rendered cooperative federalism as an unfit framework for federalism in the United States.

D. New Federalism (1969-Present)

The election of President Richard Nixon brought about the end of the era of Cooperative Federalism and the beginning of New Federalism. Nixon aimed to reduce the tensions brought about by the expansion of federal influence through cooperative federalism by shifting power away from Washington and toward federal field offices and state and local governments by trimming intergovernmental red tape (O'Toole, 2005; Walker, 1981). The expansion of federal power from the period of Reconstruction all the way through the New Deal and Cooperative Federalism had finally hit a wall and the Nixon administration set out on a mission to return power to the states. Nixon's "new federalism" initiated revenue sharing from the federal level to state and local governments, block grants toward broad policy fields, and supported

administrative reform efforts to simplify and expedite the grant application and renewal process (O'Toole, 2005). Ultimately these initiatives had a moderate effect on the size and intergovernmental relations of the federal government during his presidency, but the framework for New Federalism was created and was carried out by each of the succeeding presidents.

The mantle of new federalism was most notably taken up in the Presidencies of Ronald Reagan and Bill Clinton. Reagan believed that the best system of federalism for the United States was a system in which the states had the strongest, most vital governments, with the broadest jurisdiction over domestic matters (O'Toole, 2005). Reagan sought out to reshape intergovernmental relations by reducing the size of the federal government and returning more power to the states. Reagan's main initiatives within the framework of new federalism were "an additional series of block grants, a dramatic simplification of the system of intergovernmental aid, a devolution of responsibilities for many policies at the national level to the states, and administrative simplification" (O'Toole p. 139, 2005). These initiatives saw moderate success and further embedded the United States in the framework of new federalism.

President Clinton entered his presidency with a focus on reinventing government by making it more efficient by reducing the size of the federal government and cutting red tape so that those closest to policy issues would have the power to deal with them, thus extending the principles of new federalism. Clinton highlighted the principles of new federalism in his keynote address at Democratic Leadership Council's 1991 Cleveland Convention by stating the necessity of "pushing decisions down to the lowest possible level, empowering people, [and] increasing accountability." (Miller, 2010) Clinton continued to make good on his ambitions to implement policies that operated within the framework of new federalism during his presidency. Most notable were President Clinton's initiatives for welfare reforms and unfunded mandates which

reinforced the integrity and autonomy of states and sought to release them from the heavy hand of the federal government (Miller, 2010). These sweeping reforms fall squarely within the framework of new federalism and can best be classified by the words of Clinton himself. Clinton saw these policies as building "a workable and realistic philosophy of federalism that can empower federal, state, and local governments and enhance the partnership in intergovernmental service delivery." (Miller, 2010)

The framework of new federalism was also supported and established by the Supreme Court in 1995. In 1995, in the *United States v. Lopez*, the court held for the first time since 1937 that Congress had exceeded its authority under the Commerce Clause which checked the power of the federal government and allowed some slack to fall back to the states (Barnett, 2008). This was a landmark case because within the framework of cooperative federalism in the post-New Deal era, the court had essentially granted Congress unlimited legislative power under the Necessary and Proper Clauses (Barnett, 2008). New federalism had crossed a major threshold by being supported not only by the executive branch, but also the judicial branch which has historically been charged with the responsibility of umpiring the game for power between the federal and state governments. For new federalism to stand the test of time as the preferred policy for dealing with intergovernmental relations and shaping policy by dividing federal and state powers, it would have to continue to be promoted by the Supreme Court. New federalism got that support in 1996, when the Supreme Court held that states enjoyed a constitutional immunity against suits for damages that could not be displaced by Congress (Schapiro, 2006). This decision was another major limitation on the power of the national government and provides evidence that the *United States v. Lopez* was not an isolated decision, but rather the first step by the court to limit the extent of federal powers and return power to the states.

Returning the power to the states has devolved more authority to local government also. The authority of local governments varies around the United States, but local government has always had a role in shaping federalism. Local governments are able to check state and federal power through local zoning, city ordinances, etc. which may clash with the goals of state or federal policies. The push by new federalism to make government more efficient and the quest to empower more localized government has resulted in more power being given to localities and a more active role for citizens through direct democracy. Through referendum's and voter initiatives, local governments and citizens have been granted a more active role in setting important policies (Schwarzschild, 2003). In fact, California had 77 initiatives make the ballot from 1988 to 1998, 33 of which passed and became law (Schwarzschild, 2003). Though this is small in comparison to the amount of legislation produced by the state and federal government, it is evidence that new federalism has pushed the devolution of power past the states to localities and citizens themselves.

Currently, there is not a cake metaphor for new federalism but if dual federalism is a metaphorical layer cake and cooperative federalism is a metaphorical marble cake, then I would argue that new federalism is an ice-cream cake. The metaphor for new federalism as ice-cream cake provides a broad understanding for the roles of each level of government much as a layer cake does for dual federalism and a marble cake does for cooperative federalism. The federal government is the frosting, with the role of only dealing with how the nation interacts with the outside world and only enhancing the "flavor" brought by the other layers of the cake. It is also the protective layer of the cake that attracts attention and provides a shell to shield the cake from the outside world. The federal frosting is vitally important but it devolves the major role of being a food-stuff to the cake portion which represents the states. The cake part of the ice-cream

cake is the part that creates the framework that holds the cake together and is responsible for the characteristics that make the item a cake, and not something else. The powers of the state are the most important in terms of defining what the flavor of the cake is going to be (policy agenda) and how the cake will function. The ice-cream portion of the ice-cream cake would be metaphorical for the powers of the local government because it is held within the cake and works most closely with the flavors (policies) of the cake. Though the ice-cream works within the framework of the cake, it still has its own distinctive characteristics which allow it to operate within its own jurisdiction. However without the cake; the ice-cream would have no framework to hold it together and would be doomed to dissipate.

III. Environmental Federalism

Due to the nature of environmental issues, there is a new level of complexity and perspective added to the issue of federalism. This is due to the fact that environmental issues are concerned with scarce resources that are often in the public domain and have effects that exceed the borders of the state or locality of the issue. The result is a daunting task for federal, state and local governments as they attempt to find a system of federalism that most effectively protects the quality of the environment without unduly sacrificing economic prosperity and development (Powers, 2011).

A. Dual Environmental Federalism (1789-1969)

The dual federalist argument from the perspective of environmental federalism is that concurrent regulation by federal and state governments would lead to an oversupply of regulation (Engel, 2006). This concern makes logical sense when considering that each level of government would include its own level of bureaucracy and standards to protect the same

resource. William Buzbee also points out that overlap could also lead to under-regulation (Schapiro, 2006). The potential of under-regulation is a real concern because different levels of government may be tempted to buck-pass on the responsibility of regulation due to budgetary pressures with the hope that another level of government will adequately regulate the issue. Just as the argument was made for dual federalism as the overarching driver of governance in the United States, there are some environmental issues that are geographically located only in the states, therefore the states should have the sole power of regulation because it is for only a local public good, while other environmental issues affect the nation as a whole, and therefore should only be in the power of the federal government to regulate as a pure public good (Oates, 2001). The problem again emerges that environmental issues have a lot of spillover between localities and states which make dealing with issues especially difficult to deal with due to the fact that pollution crosses borders and the depletion of natural resources in one area directly affects other areas (Oates, 2001). These factors once again were the driving factors behind taking on a more cooperative framework of federalism in order to deal with environmental issues.

1. Dual Environmental Federalism in Practice

The system of dual federalism that was derived from a strict constructionist reading of the Constitution also influenced environmental federalism in the United States. Up until the implementation of the National Environmental Policy Act in 1969, most environmental responsibilities were left in the hands of state and local governments (Adler, 1998). Environmental regulation among state and local governments was guided by common law tradition which eventually “led to judicial rulings that ‘regulated’ the activities of isolated transgressors against the environment” (Lewis, 1988). The nature of this process limited the effects of environmental regulation because it was implemented on more of a case by case basis

and only if there was substantial enough personal injury to require legal action. Nonetheless, this era of common law regulation was the first system of environmental regulation by the states.

The federal government did not take an active role in regulating environmental issues prior to 1969. However, the federal government did take on the power of environmental conservation in the form of creating national parks. The federal government took an active role in protecting pristine wilderness and other forms of natural beauty by creating the first national park with the Yellowstone National Park Act in 1872 (“National park system,” 2013). The federal government continued to exercise its power of conservation throughout the era of dual environmental federalism. Toward the tail end of the 1950’s and throughout the 1960’s there was a growing environmental movement driven by more public awareness of environmental impacts and recent environmental disasters (Lewis, 1988). This push from the public for greater environmental regulation resulted in the federal government taking a more active role in the regulation of common resources through more cooperative endeavors with the states. The final straw came with the failure of the first Clean Air Act in 1963. In 1963, Congress adopted the first Clean Air Act that gave the Secretary of the Department of Health, Education, and Welfare the authority to establish advisory air quality “criteria” and to have “conferences” when interstate pollution endangered the public health or welfare (Esty, 1996). This policy still operated within the framework of dual environmental federalism because it did not give the federal government any power to actually regulate clean air. In the end, the policy was a failure due to interstate spillovers of pollution, the poor performance of states as environmental regulators, and interstate competitiveness arising from differing level of environmental regulation (Esty, 1996). The failure of the policy called for a broadening of power for the federal government as an environmental regulator.

B. Cooperative Environmental Federalism (1969-present)

Cooperative environmental federalism emerged with the implementation of the National Environmental Policy Act (NEPA) in 1969 which enacted a series of sweeping federal legislation to regulate the environment at a national level (Adler, 1998). The goal behind NEPA was to create certain standards of environmental protection that were necessary and proper for ensuring for the preservation of natural resources for the future. The Environmental Policy Act resulted in the creation of the United States Environmental Protection Agency (EPA) which became the central agency for environmental regulation and protection of air, water, and soil (Adler, 1998). The creation of the EPA instrumentally gave power to the federal government to set environmental standards and to decide how to regulate certain issues. The EPA has operated within the framework of cooperative environmental federalism by using several cooperative schemes that blur the lines of authority between the different levels of government by providing regulatory roles for each level within national regulatory standards. The two major cooperative schemes used by the EPA to carry out environmental regulation are 1) the federal government setting a regulatory floor that creates a baseline of optimal environmental protection, which empowers states to formulate regulations for activities within their borders that adhere to those standards or are more stringent 2) direct regulatory administration by federal authorities, while still providing some roles for the states to supplement regulation with state laws and reserved police powers (Powers, 2011). These practices operate within the framework of cooperative federalism by fostering dialogue and buy-in from state and local governments by allowing them to increase standards to the proper level of regulation based on their circumstances, allowing for flexibility with implementation so localities can decide what methods work best with their resources and geographic location, and also by providing federal teeth to protect localities

against collective action problems and large corporations. Cooperative environmental federalism has shown to have significantly improved environmental quality by many indicators in the first 25 years after the creation of the EPA, and to many, is one of the few areas where federal programs clearly worked (Adler, 1998). However, over the past couple of decades questions have begun to be raised about the efficiency of cooperative environmental federalism on the grounds of getting the greatest environmental bang for our buck, resulting in a push for more localized control.

1. Major Cooperative Federalism Environmental Initiatives in Practice

a. Federal Baseline Standards and State Regulation

The Clean Air Act and the Clean Water Act served a role similar to many New Deal programs in fostering in the era of cooperative federalism by expanding federal power through a baseline of regulation and authority, but still giving the states substantial leverage because they carried out the policies. The Clean Air Act of 1970 and the Clean Water Act of 1972 were both created within the framework of cooperative environmental federalism because each policy shifted power to the federal government to set baseline standards for that nation that all states had to adhere to (Powers, 2011). Under these federal laws, states are required to devise and implement their own comprehensive plans to meet federal goals (Powers, 2011). This policy echoes the beginning of cooperative federalism that occurred almost 25 years prior with New Deal programs that provided localities with grant-in-aid to take on federally targeted social and economic issues and charged states with implementing their own programs to meet federal goals. This patch of inconsistency between the beginning of cooperative federalism as the framework guiding legislation and judicial decisions for the United States, and the beginning of cooperative federalism as the framework guiding regulation of environmental issues, is important because it

creates a tension that is currently being seen between the framework of new federalism that is guiding the nation and cooperative federalism that is still being used for environmental policy.

b. Direct Federal Administration with Reserved State Roles

The federal government began to take an even more active role in environmental regulation with the implementation of the Resource Conservation and Recovery Act in 1976 and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980. These two policies increased the power of the federal government because they were directly administered by the federal government, but they remained in the framework of cooperative federalism by still providing some roles to the states (Powers, 2011). These two policies were targeted at setting standards for the handling and clean-up of wastes which promoted direct authority from the EPA. However, despite having direct regulation from the federal government, states were granted the power to pass state laws that included more stringent regulations and other regulatory authorities as long as they were accepted by the EPA. One of the most important powers reserved to the states under CERCLA is sovereign immunity (Appel, 2002). Even though the regulatory authority of CERCLA is directly administered by federal authorities, states are often protected from lawsuits despite any role that they may have in contributing to hazardous waste dumps due to their right of sovereign immunity (Appel, 2002). The fact that states still maintain sovereign immunity under CERCLA illustrates that despite the fact that the federal government has expanded its power by becoming a direct regulator, Congress still values the cooperative nature of federalism and respects state autonomy.

2. Pitfalls of Cooperative Environmental Federalism

There has been recent pushback against the practice of cooperative federalism being applied to environmental issues. The arguments against cooperative environmental federalism in many ways mirror the arguments that led to the creation of new federalism in 1969. The main argument that has been presented is that involvement by the federal government in regulating environmental issues has grown too much, resulting in over regulation and inefficient regulation, because Washington is out of touch with how policies relate to different geographic areas.

It is a compelling argument for regulatory power to be returned to state level policy makers because they are closer and more directly answerable to citizens (Warner & Shapiro, 2013). This argument has many environmental analysts, government officials, and activists pushing for the federal government to return more of the regulatory power to the states because they feel that they can most efficiently deal with environmental issues that pertain to them. A lack of efficiency from federal regulation became apparent in the 1990's when the overall success of programs such as the Endangered Species Act and CERCLA (which at times exacerbated the environmental problems they were meant to solve) are taken in combination with the fact that American's now spend well over \$150 billion complying with environmental regulation (Adler, 1998). This lack of efficiency has made many states fed up with regulation by the federal government. State and local officials have also complained that they are forced to comply with federal laws and regulations that force them implement programs that make very little sense in their regions (Adler, 1998). This problem seems to be supported by the fact that the "EPA's Scientific Advisory Board concluded in 1990 that most remaining environmental problems are site specific, varying from area to area and requiring tailored controls at the regional, state or local level for effective mitigation." (Alder p.2, 1998) The bottom line is that the framework of cooperative federalism has all but run its course in the sphere of environmental

issues. The initial success of cooperative endeavors between the federal and state governments can be linked to what Oates (2001) refers to as “pure public good” issues dealing with clean air and water whose benefits are felt fairly equally around the country. However, it appears that most issues that remain today are based on “local public goods” that have very little interstate spillovers (Oates, 2001). Despite these arguments, the framework of cooperative federalism still maintains a large influence in the regulation of environmental issues and is still the method preferred by many politicians and scholars. This can be seen by the fact that federal baseline standards are still the norm for environmental policies and that scholars such as Garnezy (2013), Powers (2011), and Spence (2013) all push for federal baseline standards for fracking.

3. Continued Support of Cooperative Environmental Federalism

Despite the growing concerns about the ability of the federal government to efficiently and effectively regulate environmental policy, there is still a large following of scholars who promote at least some degree of cooperative federalism with regards to environmental issues. Scholars such as Garnezy (2013), Powers (2011), and Spence (2013) among others support at least some cooperation between the federal and state governments due to the overlapping nature of many environmental issues and potential for collective action problems. These scholars feel that if states were left on their own to regulate environmental issues, they would under-cut each other’s regulatory standards in a race to the bottom in order to attract business and they would fall victim to the tragedy of commons making intrastate decisions that would have adverse interstate environmental effects. To some extent, these scholars recognize the problems with cooperative federalism and do suggest returning some power to the states, but they do so by reforming cooperative overlap between federal and state governments.

C. The Push to Environmental New Federalism (1994-present)

The lack of effectiveness and efficiency surrounding federal environmental regulation has given life to a movement toward environmental new federalism. In his 1994 State of the Union address, President Clinton sought out to reinvent government which translated into the environmental sphere by eagerly seeking to return authority over environmental regulation to the states (Scheberle, 2005; Esty, 1996). Clinton came into office with the ambition to reinvent government by making it smaller and more efficient. One area of the federal government that was seen as grossly inefficient was the EPA and the regulation of environmental issues. The main ambition of Clinton's reinventing strategy with regards to environmental issues was to "partner" with state and local governments in order to make things run more efficiently (Scheberle, 2005). At first glance this seems like a policy of cooperative federalism, but when looking at how the Clinton Administration sought to "partner" with state and local governments, it becomes apparent that it was a move motivated by new federalism seeking to give power back to the states. Scheberle (p.74, 2005) states:

"The U.S. Government Accountability Office (GAO) also noted opportunities for improving intergovernmental cooperation in administering environmental programs. Inconsistent EPA oversight across EPA regional offices, micromanagement of state programs, lack of involvement of state staff in EPA decisions affecting state programs, and insufficient technical support all contributed to less than stellar federal-state managerial relationships. A National Academy of Public Administration report suggested that a key part of a new direction for the EPA rested with the ability of the EPA and Congress to hand over to the states more responsibility and decision-making authority. According to the Academy, 'A new partnership needs to be formed, one based on 'accountable devolution' of national programs and on a reduction in EPA oversight when it is not needed.'"

These statements by the U.S. Government Accountability Office and the National Academy of Public Administration clearly sought out to lay the framework for an era of more efficient environmental regulation through principles of new federalism. The action by the Clinton Administration was clearly the start of environmental new federalism but it did not completely replace the framework of cooperative federalism which is why much tension still exists today about how to most effectively and most efficiently regulate environmental issues.

1. *The Case for Devolution*

The nature and scope of environmental issues make the most solid case for returning regulatory power to the states. It is a fact that state legislators are closer and more directly answerable to the citizens affected by environmental policies than the federal government in Washington (Warner and Shapiro, 2013). It is also a fact that the general public tends to be in support of environmental protection, but not necessarily the role of the federal government in environmental regulation. In fact, in 1996 voters broadly supported environmental priorities being dealt with by the states and local government by a margin nearly two-one (Adler, 1998). The answer appears to be to keep regulation close to the geographic environment and people most directly affected by the environmental issues in question.

a. The Matching Principle

The “matching principle” is a theory derived from economics that seeks to make government more efficient by identifying the best match between a level of government and the geography of the environmental problem (Powers, 2011). The argument is that environmental issues should be matched to the level of government that makes the most economic sense in respect to the size and geography targeted at fixing the problems that arise with one-size-fits-all

federal regulations. The problem with one-size-fits-all federal regulations like the Clean Air Act is that the geography of the United States is so vast and diverse that overarching regulation affects different places disproportionately. This is due to the fact that it is impossible for federal regulators to acquire and assimilate the enormous amount of information necessary to make optimal regulatory judgments that reflect the specific requirements of each particular location and pollution source (Adler, 1998). It is more common than not that decisions made by public administrators are based on “good enough” rationale because information is always incomplete and imperfect. However, the argument is that to battle the results of “good enough” one-size-fits-all policies that in practice equate to one-size-fits-nobody in practice, decisions should be left to localities who would only need to specialize on their geographic location and pollution sources such as local power production and waste disposal (Adler, 1998). Proponents of the “matching principle” use this basis to make the argument that matching specific environmental problems with the specific levels of government that deal with specific geographic locations will promote the most efficient and effective environmental policies.

b. *States are Green Laboratories*

It is pretty apparent that most scholars and politicians believe that the federal government needs to take new approaches to environmental protection. The divide comes in the decision to pursue policies that continue to adhere to the framework of cooperative federalism or policies that fall within the framework of new federalism. Clinton started the movement toward new federalism by seeking to forge new partnerships between the federal government and state and local governments by handing over more responsibility and decision-making to the states but scholars like Garmezzy (2013), Powers (2011), and Spence (2013) still have reservations about

abandoning the old tradition of established federal baselines being the basis for a cooperative endeavor (Scheberle, 2005).

Unfortunately, relying on a top down method of federal baselines guiding environmental policies is more of the same and does not allow for the adaptability and flexibility needed to adequately deal with environmental concerns. The framework of the Constitution ensures that the federal government is stable and is more stubborn when it comes to change than are state governments. This framework is good for stability, but is rather lousy for quickly adapting to the changing needs of a society whose hallmark has become speed, innovation, and efficiency.

In recent years, state governments have attempted to shed the shackles of federal environmental regulation by becoming “green laboratories of democracy,” experimenting with new ways of approaching and advancing environmental protection (Alder, 2005). There are several success stories of how state governments have become more innovative and more successful in dealing with environmental issues. These innovations include Virginia implementing individual transferable quotas for state fisheries to combat overfishing and Montana turning a profit with its timber management in state forests where National forests tend to lose money, while also maintaining superior environmental performance (Adler, 2005). These are good examples of how state governments have improved local environmental policy by allowing for innovation to make regulation more efficient. The strength of these examples is that they illustrate how states can use their flexibility and localized experience to make environmental regulation more efficient and more effective for their geographic location. However, neither of these examples illustrate the capacity of the states to take on an interstate environmental issue more efficiently than the federal government.

States have also shown an ability to regulate several environmental issues that have interstate effects. A great example is how 40 states now have their own hazardous waste site cleanup programs that have outperformed Superfund on many levels. For example, Minnesota is cleaning up sites for less than \$5 million in only a few years while Superfund typically costs \$25-30 million and takes an average of 10 years to clean up a single waste site (Alder, 2005). The states have also outperformed the federal authority that drives Superfund by cleaning up many more sites. In fact, in 1995, New York, California, and Wisconsin had cleaned up approximately 200 sites each, which is about as many sites as the entire Superfund program did nationally (Alder, 2005). This case is extremely persuasive because Superfund (CERCLA) is an environmental policy with direct federal regulatory authority that reserves few rights to the states. In essence the states simply got fed up with waiting on the federal government to take action and did their job for them. Another example of the states doing the job of federal regulators is Michigan cutting red tape in the Department of Environmental Quality by eliminating 100 rules that were wasteful or duplicative while speeding up the process of issuing new regulations from two years to only seven months (Alder, 2005). It would appear that the states are primed and ready to implement new and innovative forms of environmental regulation that both improve the efficiency and effectiveness of environmental policy. As the states continue to outperform the federal government on issues of environmental regulation, it becomes rather difficult to make arguments against environmental new federalism because it appears that the states should be given back the power.

2. Concerns with Environmental New Federalism

Critics of environmental new federalism cite the potential for three theoretical problems for why regulatory power should remain in the hands of the federal government and implemented through cooperative endeavors with the states.

a. “Tragedy of Commons” and “Spillover”

The “tragedy of commons” is a concern for the foundation of environmental new federalism because it uses human nature to argue for the need for federal oversight. The tragedy of commons describes how individual actors are driven by short-term self-interests to pollute a commonly held resource even though they know their collective action will eventually damage or destroy it (Powers, 2011). This problem is most clearly illustrated by the emergence of global warming and our reliance on fossil fuels. Even though individuals are well aware that the use of fossil fuels contributes to global warming by releasing greenhouse gasses, individuals are still driven by short-term self-interests and will not refrain from driving cars or engaging in other activities that release greenhouse gasses despite knowing that their collective action will continue to damage and eventually destroy our planet. This problem is directly related to environmental new federalism because individual, self-interested actions do not stay in the geographic area in which they occur but often have effects that spill over into other jurisdictions. The argument is that the federal government has more capacity to overcome collective action problems due to increased resources and information to identify the nation’s needs and the authority to force compliance with standards that will protect common resources (Powers, 2011).

b. “Race to the Bottom”

The most widely talked about concern with pursuing policies of environmental new federalism is the potential for states to “race to the bottom” in terms of regulation. The “race to

the bottom” paradigm is based on the prisoner’s dilemma dynamic in which states or localities will decide not to adopt high environmental standards that entail substantial costs for industry or impede economic development for the fear that their environmental standards will drive economic development to areas with lower environmental standards (Esty, 1996). The idea is that localities and states are willing to sacrifice some environmental protection in exchange for some level of economic benefit and that level varies jurisdictionally. The result is that those jurisdictions who are free and willing to sacrifice more on environmental protection without federal regulation will continue to undercut one another to attract economic development. This problem is amplified by the fact that many states and localities often operate with limited budgets so the chance to increase revenue is quite tempting.

The best examples of the “race to the bottom” paradigm in practice came before 1969 when the states were essentially left on their own to regulate environmental issues. The negative effects on the environment from states and localities under regulating industry for economic development are most vividly illustrated by the events in 1969 when “industrial debris in Cleveland’s Cuyahoga River caught fire and oil from an offshore blowout lighted Santa Barbara’s beaches” (Graham, 1998). These incidents were not only part of the driving force that fostered in the era of cooperative environmental federalism, but they also serve as a reminder of what can happen when the states are left to their own devices to make environmental policy.

c. “Race to the Top”

States and localities “racing to the top” can arguably be just as damaging as “racing to the bottom.” Due to the local nature of many environmental issues, residents are often opposed to industrial development that happens in their back yard no matter how environmentally friendly it

is or economically beneficial it can be. This can result in the overprotection of environmental resources which not only affects the economic development for the locality making the decision, but due to the nature of many environmental issues, the economy of the nation as the supply for scarce resources dwindles.

Recent trends of “racing to the top” have been directly driven by the use of states as “green laboratories of democracy.” In recent years, states across the country have begun to emphasize environmental protection as a primary state policy goal in order to both protect public health and to lure economic development that is sensitive to “quality-of-life” indicators such as pristine wilderness, air quality, water quality, etc. (Rabe & Borick, 2013). The results of these policies are not staying isolated to their state or geographic area either due to the expansion of environmental new federalism as many powers of environmental regulation have been given back to the states. The result has triggered a race to the top between states as states attempt to set dramatic and innovative practices that brand the state as the “first mover” or “early mover” which then influences the standard for other states (Rabe & Borick, 2013). This trend has been evident with policies involving global climate change, open space conservation, and pollution prevention (Rabe & Borick, 2013).

Other instances of a “race to the top” can be seen with legal disputes between levels of governments in “home rule states,” and the willingness of the states to sue the EPA. Nearpass & Brenner (2012) cite *Anschutz Exploration Corporation v. Town of Dryden* and *Cooperstown Holstein Corporation v. Town of Middlefield* as two cases that caused conflict where localities in New York raced to the top by banning high volume hydraulic fracturing despite the fact that New York State law has preemption powers of the oil and gas industry. Cases such as these are emerging due to the transition of power being given back to lower levels of government within

the framework of new federalism. The problem may arise that the race to the top may start within states as localities fight to keep industry out of their back yard, resulting in overregulation, slowing development, and causing legal conflicts as localities fight against the supremacy of the state. New York also provides a good example of states racing to the top with its willingness to sue the EPA over a lack of environmental protection. Scheberle (p. 69, 2005) provides the example of how the New York Attorney General Eliot Spitzer and others have sued the U.S. EPA “to take action to regulate green-house gases, protect wetlands, compel coal-fired power plants to reduce emissions, expand regulation of mercury emissions, and forestall relaxation of energy requirements.” These types of law suits have been amplified by “first mover” action as states band together against the EPA in a race to the top of environmental protection.

The economic effects of the “race to the top” have not really been explored by scholars yet as the problem may be just emerging because the principles of environmental new federalism have just begun to guide public policy. There is speculation that strict environmental policies could be driving industry out of states, because of the costs to comply. Future studies should instigate the effects of strict environmental policies on the development of industry within the states in order to shed light on the effects of racing to the top.

d. Inappropriate Use of The “Matching Principle”

The “matching principle” also poses several concerns as the environmental new federalism continues to emerge as a more dominate force. First, the nature of environmental issues makes them a poor area for the matching principle because intrastate environmental issues often have interstate effects in the form of pollution or economics (Powers, 2011). It may seem

like a good fit for the matching principle to be used in localities to regulate the accidental release of hazardous materials by stationary sources in their jurisdiction, but the effects of their regulation of the accidental release will cross geographic boundaries into other jurisdictions. Another concern with the matching principle in practice is that it underplays the effect that interest groups and other factors have on the policy making process (Powers, 2011). Public policy is shaped by a variety of point-of-views and interests and is the result of decisions made with incomplete and imperfect information. The matching principle does not safeguard against the influences of economic disparity or environmental interest groups that may be distorting public opinion and swaying the public policy to over or under regulate on a given environmental issue. This problem is amplified at the state or local level where governments are much smaller with fewer resources to accumulate all the information needed to make a sound decision. Just as Madison argued in Federalist 10 that the strong central government is needed to control the power of factions, a strong central environmental regulator may be needed to control the environmental factions in states and local jurisdictions.

D. The Future of Environmental Federalism

This paper will aim to provide insight to the future framework that will guide environmental regulation as the principles of cooperative environmental federalism and environmental new federalism continue to jog for position as the dominate framework guiding environmental policy. I will perform a case study to examine how environmental policy is being shaped in Colorado to regulate the issue of hydraulic fracturing (fracking) with special attention to the framework of environmental new federalism which has devolved regulation to the state. I will examine the effects of the U.S. granting the power to the states to regulate fracking by studying Colorado's ability to overcome the "tragedy of commons" and the temptation to either

“race to the bottom” for short-term economic benefit or “race to the top” for dramatic and innovative environmental protection. It is my hope that the study will shed light on whether or not the framework of environmental new federalism provides sound public policy, based on Colorado’s experience with issues of economic opportunities, environmental concerns, public opinion, and emerging legal issues.

Chapter Three

Fracking: A Colorado Case Study

I. Fracking

Despite the fact that fracking has just recently become a household term, the origins of the fracking process go back to the 1860's when gunpowder and liquid nitroglycerin were first used to stimulate shallow hard rock formations (MacRae, 2012). The more modern process of fracking has been going on for over sixty years with the first documented well that was fracking being Kelpper Gas Unit No. 1 in Hugoton gas field in western Kansas (Edwards, Shepherd & Deutsch, 2011). This process that has been used for industrial production since the 1940's has greatly increased in importance as it has been widely used in conjunction with horizontal drilling in order to tap unconventional reserves of natural gas that are trapped in shale rock (Garmez, 2013). Increased access to natural gas has started an energy revolution in the United States as policy makers and energy companies are chomping at the bit to increase production thus promoting energy independence and economic development. However, the fracking process has not emerged without several concerns spanning from the environment to property rights. The rapid expansion of fracking, numerous concerns, and the fact that regulation has been devolved to the states has made it a mammoth of a responsibility to regulate for smaller governments. States with large shale plays have been asked to decide how much to regulate fracking without any guidance from federal regulatory oversight. I will discuss a case-study on the Colorado experience to examine how the state has balanced the many factors surrounding fracking to regulate the process in the best interest of its residents while considering the potential for the state to fall victim to the tragedy of commons or engage in a race to the top or the bottom.

A. The Fracking Process

Hydraulic fracturing “fracking,” is a process that is used in order to allow oil or natural gas move more freely from rock pores to a production well. During the three step fracking process a “fluid cocktail” containing water, sand, and chemicals is pumped underground at extremely high pressure which exceeds the rock strength thus opening or enlarging fractures in the rock to drive out oil or natural gas (Pontius, 2009). In the first step, a volume of fracking fluid called the pad is pumped into the well under extremely high pressures to create and open up fractures in the reservoir rock (Lamarre, 2011). This opens up access to new fractures or increases existing fractures as much as several hundred feet into the reservoir rock which greatly increases the amount of natural gas that can be retrieved by the well (Pontius, 2009). During the second step, a slurry of fracking fluid known as a “fracking cocktail” containing treated sand and other propping agents are pumped down the well to extend the fractures and to carry the proppants down deep into the fractures (Lamarre, 2011). Common ingredients in the fracking slurry are water, sand, hydrochloric acid, glutaraldehyde, ammonium persulfate, guar gum, citric acid, among many other chemicals that target opening up fractures and increasing the efficiency of the process (“COGCC frequently asked,” 2011). In the third step, the fracking fluid is pumped back up the well leaving the proppants behind to hold open the fractures so that natural gas will released and flow to the well (Lamarre, 2011). Extending a well’s access deeply into the rock reservoir greatly increases the potential production of a well and the economic viability of drilling in certain areas. The increased access to otherwise unobtainable natural gas or oil provided by the fracking process has been the driving force behind the fracking boom in recent years.

B. Why Fracking? Why now?

It is a curious thing that a technology that has been explored since the 1860's, and that began being used for industrial production in the 1940's, is the same technology revolutionizing the energy industry during "the age of technology." It would seem that after sixty years of using the process, we would have a full understanding of fracking technology and would have fully developed and exhausted its use. In reality, this could not be further from the truth. The explosion of the use of modern fracking technology was quite circumstantial, hinging on the development of horizontal drilling, increased natural gas prices, and the United States' growing demand for a domestic energy source.

Up until 1998, fracking had been used to stimulate wells in order to gain more access to natural gas but there was no real push behind developing the process. One reason was that natural gas was valued at less than \$2.00 per thousand cubic feet in the 1980's which stunted the economic viability of developing many wells (Soeder & Kappel, 2009). Also, the technology to using horizontal drilling to access the vast natural gas reserves that lie in the United States did not exist so most natural gas was unobtainable. However, in 1998, fracking technology developed by injecting the fluid at much higher pressures than before and by using it in conjunction with horizontal drilling practices (Richardson, 2013). These developments sparked the interest in fracking because companies would now have access to vast reservoirs of natural gas that were previously unobtainable or economically unfeasible. This interest in fracking was stimulated by the growing demand for energy independence influenced by the wars in the Middle East which resulted in growing energy costs. The war was not the only thing bringing national attention to energy development. Increased education about global warming and greenhouse emissions was another driving force behind the push for new energy development. The fact that fracking provided increased access to natural gas is one of the main reasons why fracking

expanded while other forms of increasing energy production did not. Natural gas burns cleanly and emits the lowest amount of carbon dioxide per calorie of any fossil fuel (Soeder & Kappel, 2009). What makes natural gas even more attractive is that it is domestically abundant with an estimated amount of more than 1,744 trillion cubic feet of technically recoverable natural gas (Reser, 2013). The potential for fracking to provide the United States access to a 120 year supply of natural gas is only made more attractive by the fact that natural gas is also affordable, costing only one fourth the cost of oil at only \$5.15 per thousand cubic feet in 2009 (Soeder & Kappel, 2009). So, basically fracking could provide the United States access to a domestic energy source that was in-line with their desire to decrease greenhouse emissions for a fair market price.

The result of these developments was access to previously uneconomical shale basins prompting the Barnett Shale in Texas to be opened up for fracking and exploration of several other shale reserves (Garmezy, 2013). The quick expansion of the modern fracking process called into question the safety of the process, namely the potential for the contamination of drinking water. Fracking crossed this major hurdle in 2004 when a study of the process by the Environmental Protection Agency (EPA) stated that though fracking fluids are toxic, and that some portion of these fluids remain in the ground after the frack job; the injection of fracking fluids poses “little to no threat” to drinking water supplies (Richardson, 2013). This decision was important because previously underground injection involving oil and gas waste and other operations required a permit (Spence, 2013). However, the EPA chose to exempt underground injection of fluids and propping agents for fracking, thus making it so that fracking operations did not require the same permitting process as other underground injection (Spence, 2013).

These conclusions by the EPA were the springboard for the subsequent policy actions and for the current debate.

The EPA's conclusions prompted the Bush administration to exempt hydraulic fracturing from the existing environmental regulatory framework of the Safe Drinking Water Act, the Clean Air Act, the Clean Water Act, and the CERCLA Superfund Act in the 2005 Energy Policy Act (Garmezy, 2013). These exemptions fall within the framework of environmental new federalism by releasing fracking from any direct federal regulation, thus pushing the burden onto localities that would be able to streamline the process of expanding fracking. Streamlining the expansion of the fracking process was exactly Congress' aim due to rising energy cost which can be seen by their statement that the fracking exemption would increase the country's potential to reach its goal of energy independence (Garmezy, 2013). The circumstances of the period between 1998-2005 surrounding increased access to natural gas and the demand for energy independence were the driving force behind why fracking exploded in recent years.

The impact of these exemptions and actions to streamline the process can be seen by the quick expansion of fracking and production of natural gas. In fact, since 2005, 82,000 new fracking wells have been drilled (Benjamin, 2013). The quick expansion in the number of wells has resulted in a steady increase in the amount of natural gas the U.S. has withdrawn from shale gas. The expansion of fracking resulted in U.S. natural gas gross increases withdrawals from shale gas 44.21% (879,815 million cubic feet) from 2007 to 2008, 37.92% (1,088,355 mcf) from 2008 to 2009, 46.96% (1,858,807 mcf) from 2009-2010, 46.96% (2,683,861 mcf) from 2010-2011, and 21.12% (1,795,589 mcf) from 2011-2012 (United States Department of Energy, 2014). The large increase in production has been directly due to the expansion of the fracking process

and has allowed the United States to use more domestic natural gas, thus cutting its dependence on foreign suppliers.

C. What does Fracking mean for Environmental New Federalism?

Fracking is an important issue for the future of environmental new federalism because of the many potential environmental threats that the process poses and the implications for how states are able to overcome the tragedy of commons or racing to the top or bottom when faced with a controversial environmental issue. The case for devolution has been made for issues across the board, but with its recent push into environmental issues, we have seen many states thrive and produce environmental policies that are more effective and efficient than what the federal government has produced. If the states are able to regulate fracking in a manner that can cash in on the economic potential while mitigating or eliminating environmental threats, it would be a huge win for environmental new federalism reinforcing the principles of the theory.

What makes fracking more important to environmental new federalism than other issues is the size and scope of the environmental concerns. Fracking is a process that can potentially threaten every facet of the environment because it has issues relating to water, land, and air. The fracking issue is also not extremely localized due to the size and shape of many large shale plays making it an interstate issue that the states will have to work out without federal oversight. One of the strongest arguments for devolving environmental policy issues down to the state and local level is that environmental issues are often local issues that are best understood by the people who live there. However, fracking is an issue that crosses borders and will require states to set policies that will have a direct effect on the environmental of other states. This makes it the perfect case to study in order to examine if states fall victim to the tragedy of commons or to see

if they are racing to the bottom or the top. One thing is for sure, the policies made on the fracking issue will change the face of environmental new federalism because it is the first time since 1969 that states will be setting policy on a national environmental issue without any federal regulatory oversight.

II. Colorado Case Study

This section will highlight a case-study of how the public policy revolving around fracking is being shaped in Colorado by several variables. It will begin with by identifying the key players involved in the policy making process for fracking and their roles. These players include governing bodies, natural gas industry, Colorado's key industries, environmental groups, and the public as a whole. I will then evaluate five key variables that are playing a pivotal role in shaping the policy decisions being made across the state. These variables are 1) Economic Impacts 2) Environmental Factors 3) Outside Influences 4) Public Opinion 5) Emerging Legal Issues. These variables cover the majority of the factors shaping the public policy in Colorado and shed light on how the state is making policy decisions without federal regulatory oversight.

A. Why Colorado?

Colorado is an interesting case when it comes to its public policy involving fracking because of its past reputation as an environment first state and its potential for a large natural gas play. Most of the other scholarship examining public policy and fracking around the country has focused on states such as Texas, Pennsylvania, and New York which are well versed in policies involving the extraction of oil, gas, and other natural resources. Colorado is not as versed in the extraction of oil and gas as Texas and Pennsylvania, but is quickly becoming one of the largest oil producing states in the United States and is also a leader in natural gas production with a

shale play large enough to be a major producer for years to come. However, Colorado is also a leader in environmental protection and is greatly identified as one of the most environmentally conscious states in the U.S.

What also makes Colorado an interesting case is the fact that it is seen as one of the most environmentally friendly states in the U.S. In fact, in 2011, Huffington Post reported Colorado as the tenth “greenest” state in the U.S. based on population, toxic waste, carbon footprint, and alternative energy (“The top ten,” 2011). It is also noteworthy that Environmental Leader found Colorado to be the second greenest state in the U.S. based on the proportion of “green” consumer activity including those who have purchased carbon offsets, organic foods, renewable power and hybrid vehicles as well as those who compost, reuse grocery bags and donate money to environmental groups (“Indiana comes in,” 2010). These rankings illustrate that not only has Colorado taken on environmentally friendly policies as a state to reduce its carbon footprint and promote alternative energy, but that the residents of Colorado are also driven to be environmentally friendly based on their “green” purchasing and use habits. This is interesting with regards to fracking policy because it is not only a process that extracts fossil fuels, but it has also gotten a black eye in the media about potentially being environmentally hazardous. This creates a real problem for proponents of fracking because not only do they have to sell the state on enabling the United States’ fossil fuel addiction, but they also have to sell the nation’s second most “green” consumers on a process that could be detrimental to their environment.

However, opponents of fracking in Colorado must convince the state and its residents to not cash in on the vast amount of revenue that is literally sitting underneath their feet. In 2011, Colorado produced 1.6 trillion cubic feet of natural gas which made it the fifth largest natural gas producing state in the U.S. (U.S. Department of Energy, 2011). The oil and gas industry in

Colorado contributed \$1.6 billion in public revenue; \$1 billion of which was derived directly from severance taxes, public leases, public royalties, and property taxes (Lewandowski & Wobbekind, 2013). This creates a real problem for opponents of fracking in Colorado because not only must they must sell the state on not producing more natural gas to be used across the nation, but they must also convince policy makers and citizens to miss the opportunity to cash in on a large revenue source that will contribute greatly to their local communities.

The desire to be an environmentally leading state and the temptation to cash in on the economic potential of fracking has brought Colorado to an impasse by creating a dichotomy that has forced the state into an identity crisis. Colorado can decide to join the ranks with Texas by promoting fracking and cashing in on its potential revenue in essence branding it an industry first state or it can choose to heavily regulate fracking in essence branding itself as an environment first state.

These factors are why Colorado is the best place to study how the principles of environmental new federalism have allowed states to decide their own environmental identity and policies without federal regulatory oversight. Colorado is a unique case because it has not already been tainted by the precedents of past legislation involving oil and gas extraction like Texas and Pennsylvania who have a well-established history in with dealing with oil, gas, and other natural resource extraction. Not only does Colorado not have a well-established history of dealing with oil and gas extraction, but the greatly divided opinions about what the state should do make it an appealing state to study because a decision may have to be made with all other things held equal. Another factor that makes Colorado the perfect laboratory to study environmental new federalism is the fact that it is a home rule state which sets the stage to see how far devolution will go to regulate fracking. The argument that the states should have

authority over environmental issues because they are closer and have a vested interest in their immediate surroundings gives way to the argument that the authority should be further devolved to localities because they are even closer. States with traditions of strong local control are empowered by environmental new federalism to have more buy-in with environmental issues and due to home rule legal protections and the initiative process, can make a serious bid for local regulation of fracking. The home rule dynamic in Colorado makes it an interesting case because localities could be given the ability to make decisions that will affect the entire nation's well-being because the decisions of a small municipal government in Colorado could result in increased natural gas for the nation, released greenhouse gasses that will have an effect on overall air quality, or could affect the nation's ability to meet its energy needs domestically. The implications are far reaching because the decisions made in Colorado over fracking should be an indicator of the path that states will take in the future as the federal government continues to devolve environmental issues down to their authority.

B. Key Players

1. Governing Bodies

The most important key player in the fight over fracking in Colorado is the state's governing bodies who will, in the end, have the final say on the issue. Colorado's Governor John Hickenlooper is an oil geologist by training and a member of the Democratic Party who has been governor since 2011 and is up for reelection in 2014 (Harder, 2013). Governor Hickenlooper and the state assembly have the authority to ban the fracking practice all together, pass a statewide moratorium, or to pass legislation that supersedes local municipal regulations on the practice of fracking, thus promoting development. The fact that Governor Hickenlooper is an oil geologist by training makes him an interesting player because he has a greater understanding

of what is going on in the fracking process than the average citizen and policy maker. Currently, the Colorado Oil and Gas Conservation Commission (COGCC) is the governing body charged with regulating fracking. The COGCC regulates fracking through inventorying chemicals, dealing with disclosure, regulating well casing and other drilling permitting standards, owner notifications, etc. (“COGCC hydraulic fracturing,” 2011). The COGCC seeks to influence the fracking discussion through information on its website about the fracking process around the state and how their regulation ensures the safety of Colorado’s residents.

Being a home-rule state, Colorado typically pushes for local control as much as possible and has devolved decisions involving fracking to localities in many cases. So far, the state has elected to give the power to localities with oversight from the COGCC. Local municipals have the power to manipulate zoning codes in order to either promote or hinder the fracking process. Local municipals also have the authority to issue a vote to their residents in order to pass a moratorium or ban the process all together.

Colorado’s Supreme Court is also a major governmental stakeholder because decisions involving fracking deal with issues of federalism. On the issue of federalism, it is noteworthy that the Colorado Supreme Court has held that “in instances where municipal and state law conflicts, state law supersedes local ordinances.” (Aguilar, 2014) This reserves the power for the state to make a final ruling even if it is in opposition to local ordinances. The implications of this ruling are important because many localities have passed ordinances that appear to be contrary to the state government’s oil and gas policies and will be contested in court. Also, the Colorado Supreme Court has also ruled that fracking “can’t be banned” which holds precedents against any potential bans to come out of counties or the state (Aguilar, 2014). This ruling is important

because many counties have already passed fracking bans which are illegal based on past precedents.

Colorado's governing bodies will continue to play a crucial role in shaping the public policy surrounding fracking. The fracking issue is sure to test the foundation of federalism within the state and holds many implications for how the state government and local municipalities will interact with each other on future environmental issues. Each governing body is being charged with examining the many variables involved with the fracking process and will in the end set the fracking policy in Colorado.

2. Natural Gas Industry

The natural gas industry has a vested interest in the policy making process involving fracking in Colorado due to the vast amount of shale gas trapped beneath the state. Colorado currently ranks fifth as a natural gas producer in the United States and sits on an estimated 23 trillion cubic feet of natural gas reserves which is about 8.5% of all the U.S. reserves (U.S. Department of Energy, 2011 & Heller, 2012). Companies such as Antero Resources, EnCana, and WPX Energy are in the midst of the natural gas boom in Colorado with companies such as Noble Energy and Anadarko Petroleum planning to invest heavily in drilling operations in Colorado (Heller, 2012).

Currently, the natural gas industry is caught between a rock and a hard place as to whom they would like to have the regulatory authority over fracking. Over the past few years, industry groups such as America's Natural Gas Alliance and the American Petroleum Institute as well as large producers such as Halliburton and Chesapeake Energy have fought to keep fracking regulation at the state level (Davis & Hoffer, 2012). The natural gas industry has sought to avoid

federal regulation that might slow drilling operations by working directly with the states who have been streamlining the process due to poor economic conditions. This relationship has been beneficial to the natural gas industry and the states by putting more wells in production in a short amount of time and more dollars in their pockets.

However, local control is quickly becoming the natural gas industry's worst enemy as localities begin to zone out or ban the fracking process. The natural gas industry is now taking a stance against local control by spending millions of dollars to fight ballot initiatives. In fact, reports state that the Colorado Oil and Gas Association and other pro-industry groups contributed over \$600,000 to fight ballot measures in four Colorado counties that sought to pass moratoriums or ban the fracking process (Rael, 2013). Other sources report that the pro-fracking campaign cost the industry over \$875,000 to fund their losing effort in the four Colorado counties (Wines, 2013). Regardless of the figure, it appears that the natural gas industry has found real opposition in the form of local control.

Clearly, the natural gas industry is a powerful stakeholder shaping public policy because of the large shale play in Colorado. In order to extract the 8.5% of the nation's natural gas reserves from underneath Colorado, the industry is going to need to come up with a comprehensive political strategy that is going to maintain control at the state level. It appears that though it is not in the industry's best interest to have federal regulation, it is not in their best interest to leave the decision to emotion driven communities and voters.

3. Other Key Industries

Colorado has several key industries that have a vested interest in the regulation of fracking due to competition for common resources. The recent expansion of fracking is

beginning to put pressure on Colorado's agricultural industry as well as its tourism and outdoor recreation industry.

a. Agriculture

Agriculture is one of the largest industries in Colorado and holds cultural relevance to the Colorado way of life. Agriculture has always been a driving force behind the Colorado economy with approximately 36,100 farms stretching over 11.5 million acres (Clark, 2011). Recently, the industry was praised by Governor Hickenlooper for helping lead the state out of the recession ("Food & agriculture," 2013). The agricultural industry's importance in Colorado has given it a stronghold on the state's water resources over the years. The COGCC reported that agriculture accounted for 85.5% of Colorado's water use in 2010 ("Water sources and," 2010). These resources had contributed to more than \$5 billion annually in economic output and has a growing export industry that increased by 20% in 2011 to \$718 million ("Food & agriculture," 2013). These figures make the agricultural industry a titan in dominating resources in Colorado. However, the recent development of the oil and gas industry due to the fracking process has begun to threaten the agricultural industry's ability to secure water resources and produce its products.

The fracking process requires anywhere from 3-7 million gallons of water per well (Schmidt, 2013). This makes the oil and gas industry a thirsty rival for water resources as they increase the number of wells being fracked. The oil and gas industry estimate they will use about 6.5 billion gallons of water in Colorado this year and have begun flexing their economic ability to buy it (Healy, 2012). Farmers and ranchers in Colorado typically pay about \$30 per acre foot of water, but competition has increased costs, and oil and gas companies have begun

paying as much as \$1,000 to \$2,000 for an equal amount of water from city pipes (Healy, 2012). The price increase stands to earn \$4-5 million for a city's water department but spells disaster for small farmers who cannot afford to compete with the gas companies' large checkbooks (Healy, 2012). The agricultural industry has taken the stance that a reduction in water resources will not only affect their crops and livestock but will negatively affect wildlife, wetlands and streams that depend on agricultural runoff to survive (Finley, 2012).

Competition for water is not the only concern that the agricultural industry has about fracking. Farmers are also concerned that fracking could pose a threat to the well-being of their crops and livestock. These fears are backed by a Cornell University study that found links between hydraulic fracturing and sickness in farm animals (O'Brien, 2013). The study cited 24 incidents across six states where livestock on farms adjacent to drilling sites died or suffered illness potentially following exposure to fracking chemicals (O'Brien, 2013). Colorado's agricultural industry is driven by livestock, mainly cattle, who feed on open range pasture that is now becoming dangerously close to fracking operations.

The agricultural industry will continue to be a stakeholder jockeying for position with the natural gas industry for common resources. As I examine how policy is being shaped by the different variables, special attention will be paid to the agricultural industry as a stakeholder who is directly affected by fracking policy.

b. Tourism and Outdoor Recreation

Another industry that is a key stakeholder in fracking policy is Colorado's tourism and outdoor recreation industry. Like the agricultural industry, tourism and outdoor recreation holds cultural significance in Colorado and is a large economic revenue source. Outdoor tourism is the

largest market of the tourist industry in Colorado and is a significant economic driver. Tourism and outdoor recreation is a thriving industry that has improved in recent years, giving much promise to the economic stability of the industry. In 2011, Colorado had a record 57.9 million travelers who spent a record \$14.6 billion by touring to historic places, enjoying cultural activities, participating in eco-tourism and agritourism (“Tourism & outdoor recreation,” 2013). Colorado also has a concentration of outdoor industry companies estimated to be about 12% of the nation’s total, which accounts for over 107,000 jobs and \$10 billion in annual economic output in the state (“Tourism & outdoor recreation,” 2013). The economic power of the industry has been used by anti-fracking activists to combat the discussion about fracking jobs. Merrily Mazza, a candidate for Lafayette city council was quoted saying “Colorado tourism accounts for over \$16.6 billion in travel and spending and supported over 144,600 jobs in 2011...Fracking threatens tourism with towering, well-lit and noisy drilling rigs operating 24 hours a day, marring the wild and scenic landscapes that attract tourists.” (Richardson, 2013) Not only would fracking reduce several quality of life factors that attract tourism but many of the tourism jobs are driven by fishing, rafting, and skiing which all require water. Currently, recreation has a water appetite that accounts for 5.64% of Colorado’s water use (“Water sources and,” 2010). As the natural gas industry begins to take a larger portion of the water, it will be taking water away from some of Colorado’s largest tourist industry drivers.

The potential environmental concerns of fracking could also have a negative effect on the natural beauty of Colorado that draws thousands of tourists every year. Water contamination could spell disaster for fish and wildlife which could topple Colorado’s hunting and fishing industry. This has far reaching implications for some small rural communities whose single-largest economic driver is hunting and fishing (Raabe & Willoughby, 2013). These communities

could be crushed by a sudden drop in the population of fish or large game due to water contamination or other potential environmental harms from fracking. Hunting and fishing does not only support small rural communities but contributes \$1.8 billion as an industry that supports over 21,000 jobs in Colorado (Raabe & Willoughby, 2013). The potential hits to these permanent industries have many fracking opponents arguing to preserve Colorado's nature based industries.

The tourism and outdoor recreation industry is a major stakeholder in the fracking debate in Colorado not only due to its economic impact but also because it is embedded in Colorado's identity. Special attention will be paid to how the tourism and outdoor recreation industry attempt to shape fracking public policy to see if fracking can not only overcome the economic argument but also the attractiveness angle. The perception that fracking is ruining Colorado's peaceful tourist destinations could prove to be as detrimental to the fracking argument as economic tradeoffs.

4. Environmental Groups

Environmental groups have a vested interest in the Colorado's fracking policy because the state has been a leader in environmental protection. Environmentalists have begun forming coalitions in Colorado with an agenda to ban fracking across the state. One of the largest coalitions is "Protect Our Colorado" which currently has thirty-nine organizations as members which span across several industries ("Protect our Colorado," 2014). The environmental group has made it its mission to ban fracking in Colorado due to the potential health risks associated with fracking ("Protect our Colorado," 2014). Thus far, the coalition has attempted to educate the public about the potential risks of fracking and has seen some success in shaping public

opinion and fracking policy. After the coalition enjoyed a fracking ban passing in Longmont, Kaye Fissinger of one of Protect Our Colorado's members Our Health, Our Future, Our Longmont, stated "The overwhelming victory in Longmont and the launch of Protect Our Colorado signals that more and more Coloradans are waking up the dangers of fracking...It's time that Governor Hickenlooper start representing the people of Colorado instead of the oil and gas industry by banning fracking in our state." (Food and Water Watch, 2014) The coalition and its members will continue to play an active role in fracking policy by shaping public opinion.

5. General Public

As with any issue involving public policy, the general public is a key player affecting public policy pertaining to fracking. So far, the public has taken an active role in influencing fracking policy through activism and much debate but most directly through voting. In three cities, Coloradan's voted to ban fracking or pass moratoriums in order to slow the expansion of fracking across the state (Eaton, 2013). After a recount, a fourth was added to the list when Broomfield, Colorado voters passed a five year moratorium on the fracking process (Hood, 2013). These results show that so far, the public is seeking to set policy that is extremely restrictive or bans the fracking process all together. The result has been a push to include a ballot measure for the November election that would "give local governments across the state the power to protect the health and safety of residents by banning or restricting oil and gas drilling and other industrial activities now permitted by state law." (Aguilar, 2014) Such a ballot measure holds implications to not only effect fracking policy in Colorado, but shape environmental federalism across the board for the state. Such a measure that would give localities the power to restrict or ban anything that is seen as harmful to the health of residents, regardless or state of federal law that permits the process, would make localities autonomous

agents and could destroy the cooperative nature of intergovernmental relations through federalism.

C. Variables

There are several variables that are shaping the public policy around fracking in Colorado. I will examine how economic influences, environmental factors, public opinion, outside influences, and emerging legal issues are each playing a role in shaping the fracking policy in Colorado. Understanding the dynamics of these variables should shed light on what has motivated recent policy action with regards to fracking and add to the understanding on how state and local levels of government are influenced to make decisions on large environmental issues.

1. Economic

One of the most widely talked about variables affecting fracking policy is the economic costs and benefits of the process. Fracking has opened the door for oil and gas production in Colorado where extraction would not otherwise be economically viable. In fact, 95% of all wells in Colorado are fracked (Wilking, 2013). However, the economic boom felt by the expansion of fracking is not always long lasting and has left several Colorado towns worse off than they were before production began.

a. Potential

The fact that Colorado is home to 8.5% of the United States natural gas reserves with 23 trillion cubic feet of recoverable natural gas has the potential to make a great economic impact on the state (U.S. Department of Energy, 2011). In 2010, oil and natural gas development

produced more than \$3 billion in total government revenue (Rocky Mountain Energy Forum, 2013). Of that \$3 billion, \$498 million was from direct severance taxes and royalties (Headwater Economics, 2012). The Rocky Mountain Energy Forum (2013) estimates that, if balanced policies are employed, the oil and natural gas industry could produce more than \$9.1 billion annually by 2030 in total government revenue. These figures are extremely attractive to any state coming out of the recent recession. Colorado, which has a good track record of weathering recessions since 1957 by entering them later than other states and recovering faster, was not so fortunate during the Great Recession (Pankratz, 2013). Colorado saw its unemployment rate raise similar to the national six percent and saw economic instability rise over 20% (Pankratz, 2013& Rosenberg, 2012). Fracking appears to be the godsend that Colorado was looking for to get its economy moving again after the recession.

The new jobs provided by fracking helped stimulate Colorado's economy and help it climb out of the recession. During the recession, drilling, extraction, and support activities dropped by 4,159 from 25,895 in 2008 to 21,736 in 2009. However, the industry began climbing as fracking practices increased around the state. From 2009 to 2010 the amount of drilling, extraction and support activities jobs increased by 3.09% (672 jobs) and then leaped 15.49% (3,471 jobs) from 2010-2011 (Lewandowski & Wobbekind, 2013). In 2012, the oil and gas industry was employing a total of 111,476 people with 51,230 in direct jobs and 29,254 (3,375, 13.04% increase in jobs) being employed directly in drilling, extraction, and support activities (Lewandowski & Wobbekind, 2013). Not only was fracking providing much needed jobs to Colorado's residents, but the wages were substantially higher than the state's average. In 2012, the average wage for jobs related to oil and gas industry and oil and gas activities was \$74,811 (48.6% higher than Colorado's average wage of \$50,330) and the average core oil and gas wage

was \$101,171 (101% higher than Colorado's average wage) (Lewandowski & Wobbekind, 2013). The abundance of high paying jobs related to the oil and gas industry were vital in pulling Colorado out of the recession and have the potential to continue providing economic prosperity to the state. This has to be taken into heavy consideration when considering that the state's unemployment rate is still hovering around 6.8% (O'Reilly, 2014). Future restrictions on fracking could only exacerbate the unemployment rate and increase economic instability in Colorado's recovering economy.

The oil and gas industry plays a vital role in Colorado's economy as an economic driver, a tax base, and a source of quality employment. The reality is that the 111,000 jobs, contributing \$21 billion to the states' economy, and more than \$3 billion in total government revenue are directly dependent upon fracking practices because 95% of the wells in Colorado are fracked (Lewandowski & Wobbekind, 2013 & Headwater Economics, 2012 & Wilking, 2013). The magnitude of the potential effects of a statewide ban of fracking could send Colorado plummeting back into a recession. Policy makers must tread carefully when considering the other variables influencing fracking policy because at the end of the day, the economic effects are very real and will be felt in all industries across the state.

b. Downfalls

With the economic prosperity brought by the boom in oil and gas production due to fracking, so do the traditional risks and effects on mineral boom towns. As we have seen with mineral rushes in the past, the temporary influx of economic prosperity is often short lived and often leaves towns worse off than before the boom. As highlighted by Christopherson (2011), 98% of the jobs created by fracking are concerned with the developing of gas wells and are not

needed after the well has been drilled. These findings are supported by Weber (p. 1580, 2012) who found that “each million dollars in gas production created 2.35 jobs in the county of production, which led to an annualized increase in employment that was 1.5% of the pre-boom level for the average gas boom county.” This suggests that reports surrounding employment increases from fracking are vastly overstated and short lived. Small rural communities also feel the boom-bust cycle of the fracking industry in terms of public services such as road use and increases in healthcare costs. The fracking process greatly increases truck traffic especially on small rural roads that local municipals will have to maintain even after the operations have moved on, thus cutting into any revenue increases they see from fracking. Other service industries feel the same boom and bust as workers move in and move out. The housing market can feel the effects for years after the boom because during the boom, temporary industrial workers may cause housing values to exceed normal levels and levels of nearby areas without drilling (Weber, 2012). This means that any homes bought during the time of the fracking boom in a small town will be at an artificially inflated price and potentially backed by artificially increased revenue from the temporary boom in the town’s economy. The results have potential for residents of small rural towns to be left in shambles as they try to balance their small economies after the initial fracking boom is over.

The western slope of Colorado can attest to the effects of the boom-bust cycle of the oil and gas industry. Shawn Bolton, who is a Republican county commissioner who also runs a construction business serving oil and gas companies, reported that four years ago he had around 125 employees working in the western slope of Colorado, but now has only a handful of his 70 employees are still working in the state (Healy, 2012). Not only did the construction industry feel the boom and bust of the oil and gas industry, but so did the housing market. Healy (2012)

reported that in 2008 rental vacancy rates were less than 1% in the western Colorado city of Grand Junction with “space so tight that energy workers were living in hotels, squeezing out tourists who come for rafting or biking.” This influx in population contributed to Grand Junctions economy and overall revenue. However, after the boom, the county’s unemployment rose higher and continues to be greater than the rest of the state (Healy, 2012). This real life example of how the boom-bust cycle induced by the oil and gas industry can affect Colorado communities will weigh heavily on communities and policy makers as they mull over the fracking policy.

These economic factors must also be taken into account with the potential disruption of local tourism, quality of life, and potential environmental hangover from the fracking process. I have already discussed how hunting, fishing, and outdoor tourism is the single-most important economic driver for some small rural communities in Colorado. Policy makers must take these variables into account when examining the economic factors influencing fracking policy, because it is not as simple as looking at job creation and revenue potential. Policy makers must take in to account the fragile economies of the small rural communities who sit atop the vast natural gas reserves in Colorado.

2. Environmental Factors

The most widely talked about and hotly debated variable affecting fracking policy in Colorado is the potential environmental benefits and dangers. The environmental aspect of fracking is interesting because the benefits are highly intangible and work toward broad goals whereas the potential environmental dangers are highly tangible and are felt locally. This

dichotomy makes different environmental factors appeal more to different groups which has in turn fueled the debate and inspired much research.

a. Bridge Fuel

One part of the pro-fracking argument that often gets downplayed, but that is crucial to framing the argument for fracking, is that the process is used to retrieve a bridge fuel. This means that the fracking process is a temporary means to get a fuel that is more environmentally friendly than burning coal or oil and that will allow the United States to be more energy independent until more advances are made in renewable fuels. Natural gas emits the lowest carbon dioxide per calorie of any fossil fuel and is an energy source that can abundantly be found in the United States (Soeder & Kappel, 2009). Understanding that natural gas is a better alternative than other fossil fuels, and that the potential natural gas supply comes from domestic sources helps move the pro-fracking agenda along because it appears to be the quickest way for the United States to reach its energy goals.

Currently, natural gas provides 22% of the United States energy demands and not only burns cleaner than coal and oil, but is more affordable at about one fourth the cost of oil (Reser, 2013). It is pretty attractive to policy makers and citizens when they realize that their energy needs can be met in a way that is better for the environment and is more affordable. It is important to note that the Energy Information Administration estimates that the United States has more than 1,744 trillion cubic feet of technically recoverable natural gas, which equates to about a 120 year supply (Reser, 2013). As a policy maker or a citizen, one might be reluctant to believe that we have a 120 year supply of natural gas, but in terms of a bridge fuel, even 60 years

could make a huge impact on the United States reaching its energy goals and emission goals while we develop more renewable resources.

It is important when considering the environmental variables associated with fracking to keep in mind that natural gas is meant to be a temporary solution only. Natural gas may not be as clean as other renewable energy sources that the United States is developing, but it is much cleaner than other alternative fossil fuels. The reality is that while natural gas produces 117,000 pounds of carbon dioxide per billion btu of energy consumed, oil produces 164,000 and coal produces 208,000 pounds per billion btu of energy consumed (Schapiro, 2006). It also produces substantially less carbon monoxide, nitrogen oxide, sulfur dioxide, particulates, and hydrocarbons than oil and coal (Schapiro, 2006). That means that for the time being, as the United States develops more renewable energy sources, it could begin reducing its greenhouse gas emissions and its overall carbon footprint. Not only does natural gas put substantially less greenhouse gasses into the atmosphere, but when considering the tens of thousands of premature deaths each year associated with coal combustion, it could save lives and save the government millions of dollars in health costs (Schapiro, 2006). It is important to consider the potential health effects of switching to a cleaner fuel in the meantime, while allowing the technology and resources needed for renewable energy to develop.

However, concerns have begun to surface about the amount of methane that is released into the atmosphere because methane is the main component of natural gas. Methane is a powerful greenhouse gas that has a substantial footprint over a smaller time horizon than coal (Reser, 2013). Reser (2013) cites a Cornell study whose findings suggest that “shale gas has a footprint that is at least 20% greater than coal, and perhaps more than twice as great on the 20-year horizon and is comparable to coal when compared over 100 years.” The EPA has begun

addressing these concerns about methane through federal emission standards. The EPA published federal air standards in August 2012 entitled “Oil and Natural Gas Sector: New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants Reviews,” which aim to reduce methane emissions by 26% (Reser, 2013). If these air standards are effective in reducing methane emissions driven by shale gas, fracking and natural gas may still have a viable environmental argument. However, it could be the case that the United States could be trading one dirty energy source for another.

Policy makers and other stakeholders must take into account how much natural gas could benefit the overall health of the United States, as well as its ability to help the United States meet its energy goals for the time being. Even though shale gas may produce more methane than other fossil fuels, it still produces substantially less carbon dioxide, carbon monoxide, nitrogen oxide, sulfur dioxide, particulates, and hydrocarbons. In the scope of greenhouse emissions, even if shale gas is an equal trade, the potential health benefits from a reduction in these other gasses could still make it a more environmentally friendly option. Quality public policy always considers the future and in this case, must see natural gas as a bridge fuel and needs to assess its merits as just that; “a bridge fuel.” Only after natural gas is prioritized by its own merits can we begin examining the environmental risks associated with the process to get the fuel; fracking.

b. Water use

The amount of water used by fracking has been a hot topic for many industries that are in competition with drilling companies for water resources. Several sources report that various amounts of water used during the fracking process ranging from a few thousand gallons to several millions of gallons of water. The Colorado Oil and Gas Conservation Commission

(COGCC) reports that fracking requires approximately 50,000 to 300,000 gallons to frack a shallow coalbed methane well, approximately 800,000 to 2 million gallons to frack a deeper tight sand gas well, approximately 250,000 to frack a vertical well, and up to 5 million gallons to frack a horizontal well (“COGCC frequently asked,” 2011). Schmidt (2013) reported that fracking operations use between 3 and 7 million gallons of water per well and Hagemeyer & Hutt (2009) report that a typical deep shale gas well requires a total of 3 million gallons of water for the fracking process. Clearly geology has a lot to do with how much water it takes to frack but for the sake of extracting shale gas, it is safe to say that it takes somewhere between 2 and 7 million gallons per well. To better understand how much a million gallons of water is, the COGCC has stated that it is about the amount used by a 1,000 megawatt coal-fired power plant in 2.5 hours, a golf course in 5 days, or 1.5 acres of corn in a season (“COGCC frequently asked,” 2011). These are good examples that make it easier to conceptualize what the potential tradeoffs could be in order to commit more water to fracking. Cost-benefit analyses could be used to find the optimal tradeoff between coal energy production, golf course watering, agricultural acres, and wells that are fracked.

In 2010, fracking used about 4.5 billion gallons of water which can be compared to the 30 billion gallons used for recreation and the 4.6 trillion gallons used by agriculture in Colorado (“Water sources and,” 2010). Even though the projected amount of water needed for fracking in Colorado is projected to climb to 6 billion gallons of water by 2015, it still only constitutes a small percentage of water use in the state (“Water sources and,” 2010). Even though the COGCC’s water estimates for fracking are conservative with regards to how quickly wells have spread across the state, these figures all but silence the debate about water consumption in

Colorado. The fracking process still would only be using a small fraction of the water used by agriculture and outdoor recreation.

The only rational argument that can be made about the water consumption by fracking is the economic impacts and environmental impacts that would be made if water was diverted away from agriculture or recreation toward fracking. The possible economic impacts on the agricultural and recreation industries could be the loss of crop and livestock production, loss of small family farms, and the loss of tourism and recreation revenue. These economic impacts could be mitigated through proper cost-benefit analyses, as well as adopting best practices in all three industries that would result in the most efficient use of water all around. However, there are potential environmental impacts stemming from diverting water away from agriculture and recreation in favor of more fracking.

When water is used for irrigation in agriculture and for recreation, it often supports wildlife and wetlands and can flow back into Colorado's rivers where it can be used again (Finley, 2012). Most fracking water is lost from the hydrological cycle forever because it is common practice to dispose of wastewaters by injecting it deep below the Earth's surface (Finley, 2012). This reframes the argument about water consumption by fracking from a discussion of gross water consumption numbers, to a discussion of net water that can be used again for another activity. Many fracking operations have begun recycling fracking water which helps their net return of water to the water cycle. In the end, the stakeholders in Colorado will have to weigh the costs and benefits of using water in one process over the other, but by the numbers it does not seem that water consumption by fracking will be a huge variable shaping public policy. Water consumption will influence some public policy that will set standards to

insure that fracking is being done with the most water efficient methods, but this is common with other industries as well.

c. Water contamination

Probably the single-greatest environmental fear associated with fracking is water contamination. Horror stories have been told around the nation about how local resident's drinking water has been contaminated by fracking. However, most of these stories lack scientific evidence and fracking has not been linked to widespread surface or ground water contamination. For instance, the EPA released initial conclusions that fracking contaminated groundwater near Pavillion, Wyoming (Tollefson, 2012). The study was momentous in finally linking fracking to water contamination and was seeking peer review despite heated criticism over its methodology. However, the EPA decided to drop the study and hand it over to the state of Wyoming instead (Lustgarten, 2013). The EPA argued that the state would be able to resolve the issue more quickly, but one cannot help but be curious as to why the agency would hand over the study that seemed to have the weight to gain federal regulation over fracking. The Wyoming case is not the only study that the EPA has recently abandoned involving fracking and water contamination. The EPA has also dropped investigations in Dimock, Pa. and Parker County, Texas (Lustgarten, 2013). As Lustgarten (2013) points out, there may have been several political factors at work as to why the EPA has dropped the investigations, but regardless of the reasons, there has not been a solid study linking fracking to water contamination. Fracking has been able to avoid federal regulation thus far and will continue to avoid federal regulation because it appears that even the EPA has elected to follow the principles of environmental new federalism and let studies be handled by the states. It appears that the federal government will continue to sit out the debate on fracking and will continue to allow the states to be green laboratories searching for solutions.

With the expansion of fracking in Colorado, it's become a hot bed for studies trying to link fracking with water contamination in its "green laboratory." A recent peer reviewed study by a team from the University of Missouri may just be the link that anti-fracking Coloradans were looking for to close the book on fracking (Postel, 2013). The study highlighted that over one hundred of the chemical components commonly used in fracking as known or suspected endocrine disrupting chemicals (Kassotis, Tillitt, Davis, Hormann & Nagel, 2013). The team took samples from several water sources in Garfield County which is a drilling dense region of Colorado including groundwater and surface sites where fracking fluid had been accidentally spilled as well as from the Colorado River (Postel, 2013). The team found that "Of the 39 unique water samples, 89%, 41%, 12%, and 46% exhibited estrogenic, anti-estrogenic, androgenic and anti-androgenic activities respectively." (Kassotis, Tillitt, Davis, Hormann & Nagel, 2013) Using this data, the team findings suggest that natural gas drilling operations may result in elevated endocrine-disrupting chemical (EDC) activity in surface and ground water (Kassotis, Tillitt, Davis, Hormann & Nagel, 2013). EDC's have adverse effects on the reproductive system in both men and women and with fracking on the rise; populations may face greater health risks associated with EDC's such as cancer (Mosbergen, 2013). These findings appear to be a game-changer for stakeholders in Colorado whose drinking water appears to be the source for the first scientifically proven contamination caused by fracking. With the potential for a statewide ban to be on the ballot in November, the implications of this study are far reaching and be directly involved with emerging fracking policies.

d. Disposal and Seismic Activity

After the fracking process has occurred, nearly all of the water injected into the well must be recovered and disposed of (Soeder & Kappel, 2009). Disposing of fracking fluid creates a

whole host of environmental concerns also. The most common methods of disposing fracking fluid are sending the water to wastewater treatment plants, reinjection into the ground, or placing wastewater in an open evaporate tank (Soeder & Kappel, 2009). Each of these processes has its own pros and cons leaving it up to the drilling operation to choose the method that works best for them. Wastewater treatment plants make it possible to recycle fracking water, but are not overly effective in removing salts and other dissolved solids making it a poor choice for most operations (Soeder & Kappel, 2009). This is not to mention that the massive amounts of wastewater produced by fracking can quickly overwhelm a wastewater treatment plant, thus slowing down the process. Evaporate ponds can be effective in dry climates but must be properly lined in order to protect groundwater contamination and are often much slower than the alternatives (Soeder & Kappel, 2009). Reinjection seems to be the preferred way to dispose of wastewater by most fracking operations because it is cost effective and quick. However, reinjection also has a host of environmental issues associated with it, most notably seismic activity.

The link between wastewater injection as a disposal technique and seismicity has begun making news around the nation in fracking intense states. It is important to understand that the fracking process itself is not the cause of the recent increase in seismicity, but the disposal of fracking fluid through well injection has been linked to induced earthquakes (Ellsworth, Robertson & Hook, 2014). Wastewater injection of produced fracking water has been linked to earthquakes in Arkansas, New Mexico, Ohio, Oklahoma, and Texas (Warner & Shapiro, 2013). The process has also caused interstate tensions between Pennsylvania and Ohio as wastewater from fracking operations in Pennsylvania has been injected near the Ohio-Pennsylvania border causing earthquakes in Ohio (Rabe & Borick, 2013). This poses a real problem for policy

makers and natural gas companies who are seeking to keep fracking regulation at the local level because interstate conflicts often attract federal attention.

In Colorado, a study by the United States Geological Survey found that a powerful 5.3-magnitude earthquake felt near Trinidad last year was induced by disposal of fracking waste underground (Finley, 2012). The team also found from a study of the Raton Basin in southern Colorado and northern New Mexico that “from 1970 until 2001, five quakes of magnitude 3 or higher were recorded. They counted 95 quakes of that magnitude between 2001 and 2001, and concluded that oil and gas operations caused the majority, if not all, of the quakes since 2001.” (Finley, 2012) These findings definitely call in to question the safety of injection as a way to treat fracking wastewater especially as fracking operations increase in Colorado. However, despite the department’s findings and the well documented history of wastewater injection causing seismic activity, Colorado authorities have taken the stance that more research needs to be done (Finley, 2012). It is understandable that Colorado authorities do not want to jump to the conclusion that the disposal of fracking fluid is causing earthquakes without more scientific research in the state because it could potentially cause public outcry. However, pro-fracking stakeholders are just one large earthquake away from losing control of the situation and should carefully consider other modes of disposal in order to protect their fracking interests. Advancements in wastewater treatment and recycling appear to be the future of disposing produced waters if fracking continues in Colorado.

e. Fugitive Gas and Spills

Fugitive greenhouse gas emissions are a growing concern in Colorado as the number of wells expands. There are over 51,000 wells in Colorado being fracked, most of which has

occurred in the last four years (Coleman, 2013). As the number of wells increases, so does the amount of fugitive gas that is being admitted into Colorado's atmosphere. The greenhouse nature of methane which is the main component of natural gas has the potential to greatly affect air quality in Colorado and possibly surrounding states. Methane is up to 105 times as powerful as carbon dioxide as a greenhouse pollutant and unlike water contamination, does not just affect a localized resource (Coleman, 2013). This makes regulating fugitive gas emissions a high priority for anyone who is trying to keep fracking regulation at the state level because it creates an interstate issue that could attract the attention of federal regulation. The release of methane is one concern but fracking wells also leak volatile organic compounds that cause asthma, cancer, and severe illness (Coleman, 2013). These health concerns posed to Colorado residents are also something that is shaping fracking policy and must be considered when weighing the costs and benefits of fracking.

With the known chemical nature of fracking fluid, spills pose a large environmental risk. Unfortunately, the amount of chemical spills resulting from oil and gas drilling in Colorado is something of an epidemic and is likely to influence the regulatory framework surrounding fracking. Reports using data from the Toxic Release Tracker from the COGCC's spill database found that Colorado saw 495 chemical spills in 2013 from the oil and gas industry (Ferner, 2014). Of the 495 spills, 71 spills impacted groundwater and 41 spills impacted surface water bringing greater concern to the safety of fracking in Colorado (Ferner, 2014). It is one thing to assess the potential for water contamination from fracking when the process is done without mistakes, but it adds to the complexity of the issue when policies must address the number of spills and their potential effects on Colorado's water. The potential for water contamination

from the fracking process, disposal of wastewater, and spills greatly increases the risk of the general public's being exposed to contaminated water.

3. Public Opinion

The importance of public opinion in shaping fracking policy in Colorado has been amplified by the environmental new federalist approach that has pushed the decision of regulating the practice down to the voters in many circumstances. The state of Colorado has been one large city council meeting since the fracking debate started in Colorado, and come November 2014, the people could have the final say on if fracking will be allowed to continue in the state. The prospect of a state wide ban had both sides operating at full force to educate voters on their side of the fracking issue through social media, traditional media, community engagement, and films.

a. Social Media

Social media has been revolutionizing the way in which campaigns are won, and the presence of fracking on social media is likely to have a large influence on fracking policy in the coming future. Opponents of fracking have a large national social media footprint that has not only influenced votes across the country, but also played a large role in the initial votes in Colorado. Around the time that four Colorado cities passed moratoriums and bans, the top ten fracking opposition groups had a combined 2.1 million Facebook likes and 1.2 million Twitter followers, whereas fracking support groups only combined for 28,000 Facebook likes and 70,000 Twitter followers (Levick, 2013). This overwhelming difference in social media outreach appears to have played a large role in influencing public opinion during the initial votes in Colorado after taking in to account that the industry outspent activist groups \$875,000 to \$26,000

on city-specific campaigns (Wines, 2013 & Levick, 2013). The difference between money spent on traditional campaign strategies and each side's presence on social media illustrates that the online presence opponents of fracking is clearly having a larger effect on public opinion in Colorado. It is interesting that amount of money that activist spent on city-specific campaigns was just 2.97% of what the industry spent, and the industry's likes and followers are just 2.97% of the likes and followers that fracking opponents possess. It is almost uncanny that the percent differences are identical but it does make for an interesting argument about the exchange rate between social media support and dollars, and the way that they translate into votes.

Investment in likes and followers seems to have a clear advantage over dollars spent in the campaigns surrounding fracking because social media investments continue to make an impact long after they are "spent." For example, during the average 24-hour period this fall, the #fracking hash tag averaged 1,500 tweets from 993 separate account users who had 1.7million combined followers themselves, which then generated 3.3 million estimated impressions (Levick, 2013). Clearly, not all of those impressions were made in Colorado, but when taking in to account that those 3.3 million estimated impressions were the average during a typical 24-hour period in the fall, it is likely that many of these impressions were made on Colorado residents. Dollars spent of city-specific campaigns have the advantage of knowing the direct market that they are being seen by, but they lack the multiplier effect felt by social media posts. Social media posts also have the advantage of reaching a broader audience that has ripple effects because most people make their political decisions based on what their friends and family think. Social media has the potential to reach more people in a single voter's support system a city specific campaigning, meaning that they have a greater ability to impact votes by influencing a person's entire support system. Not to mention, social media posts remain online as long as the

user leaves them up as opposed to campaign signs that must be taken down after elections, thus giving social media the advantage of longer shelf life to influence public opinion. This implies that the campaign ran by opponents of fracking during the fall of 2013 already has a large head start on any social media campaign that will be deployed by the industry to influence elections in the fall of 2014.

Special attention needs to be paid to the social media campaigns ran by each side because it is likely to have a large effect on future fracking policy in Colorado. If decisions about fracking policy do come down to the voters in Colorado, it is likely that the social media campaigns ran by each side will play a large role in shaping public opinion and in essence public policy.

b. The Denver Post

Other media outlets besides social media have had their own feeding frenzy over the policy debate surrounding fracking in Colorado. Davis & Hoffer (2012) present data showing that the number of stories that covered fracking in The Denver Post was 13 in 2009, 20 in 2010, and 54 in 2011. The large jump in the amount of stories about fracking in The Denver Post was largely due to the expansion of fracking in Colorado, and namely in the Niobara play which is located closer to Denver and Colorado Springs than the older plays in Weld County and the western slope (Davis & Hoffer, 2012). The location of the expansion of fracking may have also had something to do with the amount of stories that were critical of fracking in The Denver Post. In 2009, 9 of the 13 (69%) articles about fracking were critical of the practice and highlighted some concerns (Davis & Hoffer, 2012). That number dropped to 3 of the 10 (30%) being critical of fracking in 2010 and then jumped to 41 of the 54 (76%) in 2011 (Davis & Hoffer, 2012). It

must also be taken into account that The Denver Post enjoyed a large circulation rate that ranked 14th in the nation with a daily circulation of 353,115 in 2011 (Harden, 2011). The clear media bias to report stories that were critical of fracking gave opponents of fracking the advantage in swaying public opinion through the paper's readership and likely contributed to the base of residents who are against fracking. The stellar average circulation of The Denver Post, and its tendency to be critical of fracking when covering the process, is yet another variable that has and will continue to shape the public opinion of fracking in Colorado.

c. Community Engagement and Quality of Life

Political activism is one of the staples of American Democracy but we often forget to discuss how political activism by citizens can contribute to the overall public opinion. The debate over fracking in Colorado has brought a “tsunami of outraged citizens” into city council meetings expressing their concerns to their local elected officials who were approached by the oil and gas industry to have fracking occur in their back yards (Doe, 2013). Heller (2012) shared his experiences of a public hearing that took place in the Paonia Junior High gym on January 4, 2011. Heller (2012) tells the story of how more than 400 people packed into bleachers and hundreds more stood in the back as they expressed concerns about water consumption, truck traffic, an outdated risk-management-plan, the quality of their roads, and other quality of life variables. He goes on to recount the scene at the Bureau of Land Management's office in Montrose, Colorado on February 9, 2011 which was the last day of extended comment. Heller (2012) discussed how he observed a flash mob, speeches, and signs from about a hundred protestors from the North Fork Valley and mentioned that the manager from the Uncompahgre Field Office had received thousands of letters against drilling.

Heller's observations are not unique and attest to the scene in many rural cities around Colorado. The reason that fracking has met such hard opposition in rural Colorado comes down to the quality of life variables that were mentioned by Heller in his experience. Citizens from rural towns are afraid of losing their peaceful communities to an army of trucks hauling water, chemicals, and gas. Even if fracking was not associated with so many environmental concerns, it is likely that the industry would still find large opposition from the public who reside in the small rural communities around Colorado who don't want development infringing on their way of life. The prospect of change and the amount of civil engagement from residents in rural communities is an important factor that has swayed public opinion, and has been somewhat effective in not allowing fracking to spread into their communities especially since most of the regulation of the process comes down to local control.

d. Films

Any discussion about media attention and implications on fracking policy must discuss the impact of the many films that have been released about fracking. The most notable film about fracking was an anti-fracking documentary named *Gasland*. Not only did *Gasland* have 1,900,761 views on YouTube, 73,694 likes on Facebook, and 1.4 million web page views, but it also has been seen by over 1,000,000 people on HBO, was nominated for an Academy Award in 2011 and won several other awards (The BritDoc Foundation, 2014). The popularity of the film has made it a force in swaying public opinion about fracking across the United States. The film hits close to home for Colorado residents as it featured three Weld County landowners whose wells were allegedly contaminated by oil and gas development ("Gasland correction document," 2011). The impact of these allegations caused the COGCC to respond by publishing a document disproving that the landowner's water was not contaminated by oil and gas development in order

to control the melee, however it's hard to imagine that the document reached as many Coloradans or had as large of impact on residents as the award winning documentary ("Gasland correction document," 2011). The makers of *Gasland* have since released another documentary entitled *Gasland II* and there have also been major motion pictures such as *Promised Land* that promote an anti-fracking message. The impact of these films on public opinion around the world has been tremendous in shaping public opinion about fracking and has no doubt had an impact in shaping fracking policy around the country. It cannot be discounted that these films will most likely have some impact on the fracking policy that emerges in Colorado.

4. Outside Influences

It is important to always consider outside influences that may be pushing a certain policy agenda or an event that brings a problem to the attention of the general public. As pointed out by Kingdon (p. 16, 2002) "A crisis or prominent event might signal the emergence of such problems." Oftentimes, major events or crisis can play a large role in moving a problem up a policy agenda and bringing action.

a. Flooding

In the case of fracking and Colorado, the crisis that brought special attention to fracking policy was the historical flooding that occurred in September 2013. The floods in Colorado added a new level of complexity to the debate surrounding the safety of fracking and the possibility of water contamination. The floodwaters caused a total of 17 produced water releases amounting to 26,285 gallons of wastewater that collected at the surface of drilling wells (Ferner, 2013). Stakeholders who were nervous enough about the safety of fracking produced waters being disposed of without contaminating drinking water realized all new fears as the flooding

brought wastewater to the surface. The flooding also brought new concerns about wastewater being washed out of evaporation pits and into streams and rivers (Jarvis, 2013). Even though reports from the Water Quality Control Division of the Colorado Department of Health and Environment showed that Colorado's rivers and streams showed no evidence of oil and gas pollutants, the fear that they could have may be just as bad for pro-fracking stakeholders (Jarvis, 2013). Stories about the flood and potential release of fracking chemicals spread across media outlets from The Huffington Post to *Rolling Stone* magazine and everyone in between. The flooding could not have come at a more influential time either taking into account that it happened just two months before many counties in Colorado would be voting to pass fracking moratoriums and bans. The impacts by this crisis event on fracking policy in Colorado cannot be ignored as it brought new attention and angles to the issue and moved regulating fracking up the policy agenda.

5. Emerging Legal Issues

a. Subsurface Trespass

One topic that has attracted the attention of a lot of legal scholarship is issues with subsurface trespass due to the migration of shale gas and chemicals enabled by fracking. Legal issues begin to arise due to the fact that fracking operations often encroach on adjacent properties because it is difficult to control the movement of fissures, frack fluids, and proppants across property lines (Pierce, 2011). The movement of fracking fluid and proppants into another's land below the surface can constitute a trespass for which mineral owners could recover damages and sue for their share of the royalties because each "landowner has a legal right that others shall not enter on or harm the land or take or interfere with the oil and gas under the land by operations conducted on the land." (Lamarre, 2011) However, subsurface trespass is not so clean cut when

talking about fracking because it is seen by many courts as essential to drilling operations. Being essential to drilling operations has led several courts to apply the rule of capture which “gives a mineral rights owner title to the oil and gas produced from a lawful well bottomed on the property, even if the oil and gas flowed to the well from beneath another owner’s tract.”

(Lamarre, 2011) Applying the rule of capture eliminates many instances that could be seen as subsurface trespass by awarding owners for electing to drill in order to provide for the greater good by providing them a shelter from adjacent landowners seeking damages. The rule of capture can be seen as an incentive to be the first to drill to ensure that they get their share due to the migratory nature of natural gas because adjacent landowners will be pulling from the same reservoir.

A less extreme doctrine that shields property owners from the liability of subsurface trespass is the correlative rights doctrine. The doctrine states that “each owner has a right to a fair and equitable share of the oil and gas under his land.” (Lamaree, 2011) Colorado has its own version of the correlative rights doctrine that could be applied in order to settle disputes of trespass. Colorado legislation states that “[t]o prevent or to assist in preventing waste, to avoid the drilling of unnecessary wells, or to protect correlative rights, the commission...has the power to establish drilling units of specified and approximately uniform size and shape covering any pool.” (Younger & Bolda, 2010) This would provide the framework for Colorado to avoid issues of subsurface trespass caused by fracking by ensuring for each landowner to get their equitable share of the oil and gas under their land.

So, Colorado appears to have the legal framework set in place to combat cases of subsurface trespass by ensuring that adjacent landowners get their share of the oil and gas under their land, but what about landowners getting their share of the environmental risks associated

with fracking? It cannot be ignored that the fracking process has the potential to trespass into adjacent properties, resulting in produced water bubbling up on the surface of adjacent properties and leaving proppants below their surface. Even if fracking is legally classified as essential to the drilling process, if adverse environmental effects are felt by adjacent landowners, Colorado courts could have a whole new issue of trespass on their hands. The potential environmental risks associated with fracking as well as the potential for significant subsurface trespass makes a sticky legal question that courts will have to work through in order to protect personal property rights. Potential legal issues involving subsurface trespass could play a role in shaping fracking policy because the potential liability placed on property owners and drilling companies whose actions harm another landowner's land are tremendous.

b. Split-Estate

One of the largest legal issues pertaining to fracking in Colorado is laws governing mineral rights in what is termed as a "split-estate" situation. Split-estate is a relic from historical homesteading acts that encouraged development of the West (Mall, 2012). Basically, a split estate is when one person owns the surface of their land, but the mineral rights (namely the oil and gas) beneath their land is owned by someone else (Mall, 2012). Not only can someone else own the oil and gas rights beneath a person's property, but the oil and gas rights also take precedence over the surface owner's rights (Mall, 2012). This creates a real problem for Colorado landowners who are trying to keep fracking off of their property, because in many cases they do not own the oil and gas beneath their land and do not have the right to keep drillers off of their property. Currently, Colorado has 5.2 million acres of split estate land which presents a large problem for landowners who are against fracking on their property, but have no legal rights to keep drillers from extracting the gas that lies beneath their land (Mall, 2012). This

problem has been exacerbated by developers who have been quietly reserving mineral rights to land that they sell in order to cash in on drilling operations if fracking comes knocking (Lee, 2013). Many Colorado landowners have been greeted with a rude awakening, whether they are for fracking or against it, when they realize that they have no rights to the gas that lies beneath their land and cannot elect to cash in on the opportunity or keep fracking off their property. This adds a new level of complexity to questions of subsurface trespass also, because the trespass could have occurred by drilling from a person who owns the mineral rights of a piece of property but not the surface land. This creates many legal questions as to who would be liable from trespass on adjacent properties, and also raises questions of trespass onto the owner's surface land if adverse environmental effects are felt due to the mineral owner's actions. Due to split-estate situations, mineral owners could be subject to subsurface trespass allegations and suits for damages not only from the owners of adjacent properties, but also the owner of the land above their minerals.

In some cases, the mineral rights are owned by the federal government and are being managed by the Bureau of Land Management who has already released a draft rule that would govern fracking on all federally managed oil and gas resources both below public lands and federally owned private lands (Mall, 2012). This adds another dynamic to the situation because the federal government and state government stand to make a sizeable amount of revenue if fracking is to take place on public lands and federally managed private lands.

It would appear that banning fracking would be the only way for desperate landowners to keep drilling operations off of their property; however, this has created an even larger legal battle. Colorado's constitution guarantees the right for the person who owns the mineral rights below a property to be able to access those minerals (Harder, 2013). If a city or county decides

to ban fracking, they are in essence denying the mineral owner their right to access the minerals below the property. This issue has already brought about legal action against cities like Longmont who banned fracking and is now being sued by the state over the issue of people being able to exercise their mineral rights (Harder, 2013). This is a sticky legal issue because courts should be obligated to rule in favor of an individual (or the federal government) who owns the mineral rights to a piece of property, even though the owner of the surface of the property and the city that the property resides in both do not want fracking to occur on the property based on past precedents. Unfortunately, trying to revise the split-estate policy. Clearly, the split-estate issue poses a host of legal questions surrounding fracking and will hold many implications for future public policy in Colorado as the courts sort through personal property rights.

c. Court Precedents

There are several Colorado Supreme Court precedents that are being tested over the issues regarding the right to frack and the right to ban fracking. As stated above, the court has set precedents protecting an individual's right to access their mineral rights in a split-estate situation. This precedent resulted in the city of Longmont being slapped with a lawsuit from the state over the issue of protecting individual's mineral rights (Harder, 2013). Another precedent that has been set by the Colorado Supreme Court is that local governments cannot ban oil and gas operations ("Municipals fracking bans," 2013). The precedent was set by "the landmark 1992 case of *Voss v. Lundvall Bros.* in which the Colorado Supreme Court ruled that Greeley's land use ordinances did not permit the city to halt the drilling of gas, oil or hydrocarbon wells within its borders." (Aguilar, 2013) The implication is that not only is it illegal for cities to ban fracking based on split-estate laws and precedents, but it is also illegal based on precedents set by past attempts to ban oil and gas operations. Not to mention, the court has held on many

occasions where municipal and state laws conflict that state laws supersede local city ordinances. These precedents have been the legal foundation for suits that have been brought against Fort Collins and Lafayette which have recently voted to ban fracking. All of these precedents paint a pretty clear picture that the cities will lose their lawsuits because it is illegal to ban fracking as an oil and gas operation.

However, the legal issues do not stop at banning fracking as an oil and gas operation. Opponents of fracking have begun the process to add a ballot measure for the November election that would give local governments the power to ban or restrict oil and gas drilling and any other industrial activities in order to protect the health and safety of their residents (Aguilar, 2014). This measure would effectively give localities the ability to ban fracking but also holds implications for other activities such as crop spraying to be banned under the same principles. The push for greater local control over environmental issues is the foundation of environmental new federalism; however it undermines the process of higher levels of government devolving the decision down because it is more efficient and seeks to seize local control from the start. If this measure were to make the ballot and pass, it would all but separate local municipals from the Colorado Constitution and the United States Constitution for that matter. The measure is probably nothing more than a pipe dream because it would most likely be promptly struck down as unconstitutional by the Colorado Supreme Court if it were to pass, but it is something to be monitored as the language of the measure is tweaked. If nothing else, this ambitious measure is evidence of the presence of environmental new federalism and continues to bring up questions about which level of government can most effectively and efficiently deal with environmental issues.

Chapter Four

Discussion and Analysis

I. Current Fracking Regulation

Now that I have highlighted the major variables shaping fracking policy in Colorado, the current regulatory framework regulating fracking can be examined to see how the state has attempted to overcome the many concerns associated with fracking. The details of Colorado's regulatory policies with regards to fracking should shed light on the state's ability to overcome pitfalls associated with environmental new federalism.

A. Regulation Out of Colorado's "Green Laboratory"

With environmental new federalism in full effect, Colorado has the opportunity to regulate fracking in any way it sees fit. The state has answered with several innovative and environmentally conscious regulations. Colorado has been true to its identity by approaching fracking regulation as one of the most environmentally friendly states in the United States and has been able to pass some of the most comprehensive fracking regulations in the country. However, as highlighted in the previous chapter, there are still several environmental concerns that have continued to emerge such as EDC contamination in Colorado's water and seismic activity near disposal sites.

1. Chemical Disclosure

The first innovative fracking regulations that Colorado implemented were Rule 205 and Rule 205A, which dealt with chemical inventories and disclosure. Previously, based on exemptions from the Bush Administration, companies did not have to disclose the chemical

contents of their fracking fluids despite potential threats to public health (Reser, 2013). Texas was the first state to pass chemical disclosure measures, but did not require companies to disclose all chemicals used in order to protect trade secrets (Reser, 2013). Colorado was able to overcome this argument from the industry in order to pass regulations that required full disclosure of all chemicals used in fracking and their concentrations. The final rule states that vendors and service providers must report any additives used for a hydraulic fracturing treatment with the exemption of information claimed as trade secrets (“COGCC hydraulic fracturing,” 2011). However, the vendor, service provider, or operator has to provide the chemical and concentration of chemicals claimed as trade secrets to the COGCC upon receipt of a letter from the Director because the information may be necessary to respond to any adverse effects from a spill or accidental release (“COGCC hydraulic fracturing,” 2011). The regulation’s final leverage with the industry of trade secrets was that it does not seem possible to reverse engineer any of the fracking fluids because operators only have to report the chemicals and concentrations but do not have to indicate into which products they were infused (Jaffe, 2011).

The ability to cross the trade secret hurdle was a big win for the COGCC and fracking regulation in Colorado because it was the first state to require full chemical disclosure. Once again, this stands as evidence of a state acting as a green laboratory and having the ability to work with both the industry and environmentalists to pass legislation that they could both agree on and support. Environmentalists were pleased to finally know exactly what chemicals were being pumped into the ground and the industry was able to come away with a rule that still protects their trade secrets.

2. Air Pollution

More innovation may be on its way out of Colorado's green laboratory as the state has made it a priority to address the release of methane and other fugitive gasses. Colorado has begun drafting groundbreaking rules for the oil and gas industry to target worsening air pollution in the state, namely by controlling methane emissions in order to mitigate the greenhouse effects from its release (Finley, 2013). Governor Hickenlooper is enthusiastic about the potential regulations by stating that "These are going to amount to the very best air quality regulations in the country," and commended executives from the state's largest producers for their input and compromise (Finley, 2013). This confident statement by Governor Hickenlooper is indicative of Colorado's character as an environmentally friendly state and has the potential to serve as a model for states around the country, much as the COGCC's disclosure rules have. The first draft of the regulations would force companies to capture 95 percent of all toxic pollutants and volatile organic compounds they emit, which would cut overall air pollution by 92,000 tons a year (Finley, 2013). These steep air pollution standards resulting in a reduction of 92,000 tons a year in air pollution would be roughly equivalent to taking every car off the road in the state for a year (Finley, 2013). With the support from industry leaders, Colorado appears to be on the right track for producing yet another set of groundbreaking regulations for fracking.

However, not everyone has been so receptive of the Air Quality Control Commission's first draft of the new regulations. Stokols (2013) stated that "Environmentalists ripped the administration's initial draft of those AQCC rules...arguing that they don't do enough to regulate methane..." The state will have to continue to work diligently with both environmentalists and industry leaders to find compromise. Stokols (2013) did go on to highlight that most environmentalists support Hickenlooper and believe the governor could put

an end to the rising anti-fracking rebellion by requiring the industry to inspect their wells more often in order to tighten the air quality rules.

As with any policy, the Air Quality Control Commission still has a lot of work to do before the rules regulating methane and air pollution in Colorado will be final, but it appears that Colorado is getting the right support from both sides to produce sound policy. It is intriguing that Governor Hickenlooper and the Air Quality Control Commission have gotten both sides to come to the table and consider compromises that could amount to the best air quality standards in the country. It may be the fact that Governor Hickenlooper is a supporter of fracking or that potential bans have put the industry's back against the wall, but it seems likely that Colorado will produce comprehensive air quality standards within the next few months that should have a profound effect on the expansion of fracking in Colorado and regulatory action around the country.

3. Regulating Other Environmental Concerns

The COGCC has attempted to mitigate other environmental concerns such as water contamination through standards for well casing and cementing, well pressure monitoring, and pit permitting, lining, monitoring, and secondary containment (“COGCC hydraulic fracturing,” 2011). For example, the COGG casing requirements ensure the safety of aquifers and maintain safety against water contamination by isolating production wells (“COGCC hydraulic fracturing,” 2011). The commission's standards also provide for inspections and notification for landowners whose land is going to be fracked. These measures among others attempt to mitigate the potential adverse environmental affects that could result from the fracking process.

4. Back to the Lab Again?

The commission's regulations have done a fair job thus far in protecting the public against potential health concerns surrounding fracking, but as highlighted earlier, recent studies have found the presence of EDC's contaminating water near drill sites. It is also important to remember that despite having regulations in place to mitigate spills and their effects, Colorado saw 495 chemical spills in 2013 from the oil and gas industry, 112 of which impacted water in some way (Ferner, 2014). It is also noteworthy that the COGCC has not released any regulations addressing the safety of disposing of fracking fluids by injection and the potential for seismic activity.

If Colorado is going to continue allowing fracking to expand, the state is going to have to tighten regulations on spill and disposal. Much has been done to mitigate potential risks that could occur during the fracking policy such as well casing and chemical disclosure for health purposes. However, if they do not begin to address potential risks surrounding the process of fracking such as spills and disposal, it is likely that the entire operation could suffer. It is going to take policy entrepreneurship or a crisis event to bring these issues to the forefront of Colorado's green laboratory, but the state has the capacity to deal with these issues much like it has chemical disclosure and the potential air quality standards. It would be prudent for the COGCC to take action to mitigate spills by working diligently with operators to adhere to higher safety standards with regards to handling hazardous materials in order to mitigate spills. The potential for seismic activity due to injection must also be addressed by promoting safer disposal methods until more permanent regulations can be set. The industry has a fragile relationship with the public and cannot afford for a crisis or focusing event surrounding water contamination from a spill or an earthquake caused by disposal of fracking fluid to prompt a statewide vote to ban fracking.

II. Public Opinion

Public opinion is a key variable that has been shaping fracking policy in Colorado and will continue to as the November election nears. So far, public opinion has reflected an anti-fracking message due to the number of cities that have already had votes to pass fracking bans and moratoriums. This message is consistent with a nationwide poll that found a growing opposition to the expansion of fracking prior to the vote in Colorado. However, a more recent poll showed that more Colorado voters support fracking than oppose it. The potential support of fracking by Colorado voters could hold far reaching implications for the expansion of fracking in the state and for Governor Hickenlooper's reelection campaign.

A. Voting so far

So far, opposition to fracking has a perfect 5-0 record in ballot measures to place moratoriums or ban fracking. This appears to be reflective of the growing opposition of fracking across the nation. Data from the Pew Research Center (2013) illustrated the growing opposition to the increased use of fracking as the percentage of people who opposed increased use of fracking grew from 38% in March 2013 to 49% in September 2013. The center also reported that Independents and Republicans were more likely to oppose fracking by September which was reflected by their 13 points and 12 points shifts, respectively (Pew Research Center, 2013). Democrats stayed fairly constant with 59% opposing fracking (Pew Research Center, 2013). This data appears to be supported by the results that were seen in Colorado just two months later as fracking was defeated in four cities.

In 2012, Longmont started the voter attack on fracking by passing a ban by 6,376 votes with 59.64% of the total vote (Turner, 2012). In 2013, fracking was defeated in Fort Collins by

5,413 votes, in Boulder by 16,842 votes, in Lafayette by 1,773 votes, and finally after multiple recounts, Broomfield passed a 5 year moratorium of fracking by 20 votes (Colorado election results, 2013 & Quinn, 2013). This is to say that so far, 82,428 (61.32%) votes have been cast to either ban the fracking process either temporarily or indefinitely. These election results appear to indicate that voters in Colorado are opposed to fracking which has the implication that if a measure to ban fracking statewide were to be on the ballot, it would be met by strong support from voters, at least in the Front Range cities.

B. Support of Fracking in Colorado

Interestingly, even though four Colorado cities passed fracking bans in November of 2013, polling data conducted from November 15-18, 2013 by Quinnipiac University revealed that overall Colorado voters support fracking (Malloy, 2013). Malloy (2013) found that 47 percent of the 1,206 registered voters surveyed said that fracking is an extremely or very important issue in Colorado. This is important because it points to fracking as one of the most important issues that will help shape the results of the 2014 election. The survey also found that more Colorado voters support fracking for natural gas and oil 51-34 percent (Malloy, 2013). As expected, there was an ideological divide with Republican's broadly support fracking 80-9 percent and Democrats being opposed to the process 54-26 percent (Malloy, 2013). What is interesting is that Independents supported fracking 51-31 percent (Malloy, 2013). Clearly, the issue of fracking is split down party lines in Colorado, so the strong support demonstrated so far by Independents could be the difference if a measure were able to make it to the ballot in 2014. It will be interesting to see if public opinion in Colorado will follow the trend of growing fracking opposition over time that was reflected by the Pew Center Poll. Thus far, Republicans

strongly support the process, but if they follow the 12 point shift in fracking opposition seen by Republicans across the nation; the margin of support for fracking in Colorado could suffer.

The independent support of fracking may be Governor Hickenlooper's saving grace as he works to round up the votes he needs for reelection. Hickenlooper only received a 48 percent approval rating, while 46 percent disapproved during the November poll (Malloy, 2013). Though Hickenlooper showed to have a slight edge on all of his possible opponents from the Republican Party, only 42 percent of respondents thought he deserved to be reelected and 49 percent thought he did not deserve to be reelected (Malloy, 2013). These approval ratings tell the story that Governor Hickenlooper is essentially clinging to a small lead where he is seen as the lesser of two evils. In terms of his reelection bid, he will need to find a way to attract Independent voters, while avoiding isolating his Democratic base. Currently, Colorado is quite divided and concerned about several key issues including jobs, gun policy, education, taxes, and fracking. Though fracking does pit Hickenlooper at odds against a lot of his liberal, environmental, Democratic base, it seems to be the issue most politically palatable to work through in order to attract Independent voters because the economy and jobs was the number one issue for Colorado voters at 89% (Malloy, 2013). His strategy appears to be to appease his base enough with strict environmental restrictions on fracking, while supporting fracking to continue to appeal to the 52% of Independents who support fracking and are concerned about the economy and jobs (Stokols, 2013 & Malloy, 2013). The governor needs fracking to continue in order to continue to create more jobs and stimulate the Colorado's economy enough to satisfy enough independents to vote his way. It will be interesting to see how Governor Hickenlooper's rhetoric about fracking will adapt in the coming months if public opinion about fracking around the state begins to drop as it did around the nation last year. If the Air Quality Control

Commission is able to pass sweeping air pollution control regulations, it could potentially lighten the voter's opposition to fracking and appease more potential voters.

Governor Hickenlooper's reelection is important for fracking in Colorado because he has been a supporter of fracking from the beginning. If Hickenlooper is not reelected, the political landscape for fracking could change drastically. The result could be greater expansion of fracking or more extensive bans. Regardless, fracking supporters know that with Hickenlooper they have a pro-fracking candidate which could be either his saving grace or his vice during the November election.

C. Social Media

Based off of last November's votes, the social media presence of groups opposing fracking could play a huge role when it comes to a statewide ban of fracking. Last November, social media pressure was the defining factor that put groups who oppose fracking in the driver's seat to ban fracking in the four cities. The social media carry over for last November has already given opponents of fracking a head start with swaying public opinion for this year's election, but it will be interesting to see its influence in getting a measure on the ballot to ban fracking statewide.

III. Legal Aspect

The fracking debate in Colorado appears to be far from over and still extremely divided. Whether the practice will be banned or allowed to expand will be greatly influenced by the election in 2014 and has the potential to shape the future landscape of the state. The legal landscape of Colorado will also be greatly influenced by the decisions made about fracking

because the Colorado Supreme Court already has five challenges to the split-estate framework of the Colorado Constitution.

Colorado courts are charged with presiding over the fracking debate from the aspect of personal property rights. Due to the split-estate structure of the state, the courts should be obligated to rule in favor of mineral owners who have the right to drill, even though they do not own the surface of the land. This seems to infringe on the surface owner's personal property rights because the drilling operation will "sit" on top of their property in order to access the mineral owner's property deep below the surface. The legal question of which owner's property rights supersedes the others and to what extent has been answered on the side of mineral owners in the past, but with new questions of subsurface trespass, the courts must consider how the process may violate other owner's property rights in new ways.

For instance, if owner A owns the mineral rights below surface owner B's property, by law he or she has the right to access those minerals despite that they have to drill from on owner B's property. Due to the nature of the fracking process along with horizontal drilling techniques, it is likely that the fracking fluid used below surface owner B's property will move beyond the borders of owner B's surface property and into the adjacent property owners land. Now let's consider the situation that the adjacent property is also a split-estate whose mineral rights are owned by owner C and whose surface is owned by owner D. This is to say that the fluid used for fracking can expand into owner C's mineral rights

Not only would A's actions have directly have encroached into owner C's mineral rights, but it is likely that some of the gas recovered by owner A's drilling will have come from owner C's reservoir. Colorado law protects owner C's rights to their mineral rights through a correlative

rights doctrine that gives he or she the right to their “equitable share” (Younger & Bolda, 2010). However, there is still a matter to be dealt with due to the chemical nature of fracking fluid and the fact that proppants will be left behind.

The fracking process will result in fluid being pushed into owner C’s mineral rights and can move onto owner D’s surface property and also surface on B’s property. The result is that owner A’s actions encroached onto the property of the other three owners which constitutes a trespass. The courts could rule to protect owner A’s drilling rights by stating that fracking is essential to the drilling process and therefore owner A is not liable for any reasonable trespass into the other owner’s properties. However, providing a liability shelter for owner A’s trespass has far reaching implications due to the chemical nature of fracking fluid and the reality that proppants will remain under the surface long after the process is done. With studies emerging linking fracking to water contamination, such as the University of Missouri’s study that found EDC’s contaminating water in Colorado near fracking sites, there is the potential for owners B and D to be exposed to adverse health conditions (Kassotis, Tillitt, Davis, Hormann & Nagel, 2013). What if the drilling activity of mineral owner A contaminated both B and D’s drinking water? Then, is the drilling company liable for malpractice, or is owner A liable for authorizing the use of fracking to access their mineral rights? Is owner C liable for their share of the adverse effects along with their share to the financial benefit? Situations such as this could arise and bring up several legal questions that the state will have to answer if the court rules in favor of mineral owners.

Not ruling in favor of mineral owners also creates many legal questions and could shake the foundation of Colorado’s Constitution. Colorado’s Constitution has split-estate ownership built right in to its framework, and it guarantees the right for the person who owns the mineral rights

below a property to be able to access those minerals (Harder, 2013). If the court restricted those rights by revising split-estate ownership, then the state would be required to compensate any mineral owners who are denied access to their minerals based on the Fifth Amendment which states that private property cannot be taken by the government without compensation (Harder, 2013). This means that the state could be on the hook for billions of dollars in order to compensate mineral owners and avoid other potential legal battles associated with fracking. The state would not only be hit with the obligation to compensate mineral owners, but they would also be losing out on the economic benefits of fracking that would contribute billions to their economy.

The recent action of the five cities in Colorado that placed bans on fracking has pushed these legal questions to the forefront of the court's agenda. The court set the precedent in "the landmark 1992 case of *Voss v. Lundvall Bros.* in which the Colorado Supreme Court ruled that Greeley's land use ordinances did not permit the city to halt the drilling of gas, oil or hydrocarbon wells within its borders." (Aguilar, 2013) This ruling by the Colorado Supreme Court equates to governments cannot ban oil and gas operations ("Municipal fracking bans," 2013). This makes it clear that the fracking bans passed in the five Colorado cities are illegal. The same situation played out in *Northeast Natural Energy, L.L.C. v. City of Morgantown*, which involved a West Virginia city claiming that it had the power under the state's home-rule authority to zone out fracking (Nearpass & Brenner, 2012). The court found that though the city did have an interest in control of its lands "the State's interest in oil and gas development and production throughout the State...provided for the exclusive control of this area of law to be within the hands of the rulemaking bodies at the state level." (Nearpass & Brenner, 2012) This situation almost mirrors the existing legislative framework of Colorado, so it is likely that the

Colorado Supreme Court will rule in the same way. In order to uphold the bans, the court would have to rule contrary to passed precedents in order to allow more cities or the state to pass a ban on fracking. It is unlikely that the Colorado Supreme Court will rule in favor of the local municipalities on the basis that it must protect the federalist foundation that state law supersedes local municipalities.

The model of federalism where state law supersedes local municipalities could be tested by a ballot initiative that is attempting to gain traction with opponents of fracking. The measure would “give local governments across the state the power to protect the health and safety of residents by banning or restricting oil and gas drilling and other industrial activities now permitted by state law.” (Aguilar, 2014) Such a measure would make local governments autonomous agents with regards to environmental issues by allowing them to ban anything industrial action in the name of public health and safety. In essence, the idea behind this ballot initiative leans on the framework of the matching principle where environmental issues are regulated by identifying the best match between a level of government and the geography of the environmental problem (Powers, 2011). The argument is that localities should be able to rule on environmental issues that take place within their geography because they most directly affect their residents. However, the effects of a locality’s environmental regulation do not stay within its geography. Methane released from fracking in one city does not stay in the atmosphere above that city but affects the states air as a whole. Also, the loss of fracking jobs in one city does not only affect the economy of that city, but rather the entire state.

Even though a ban on fracking may be what the voters want in November, the legal impacts of upholding a ban could shake the foundation and stability of Colorado. There are definitely some legal issues that the court will have to juggle such as subsurface trespass and split-estate

rights, but these issues do not carry the magnitude of allowing localities to ban any industrial process in the name of public health and safety.

IV. Environmental New Federalism

Colorado has been given a great opportunity to choose how to regulate fracking without any federal oversight because the state can make decisions based of its history, environment, economic needs, and legal framework. The Colorado experience holds implications for the future regulation of environmental issues and environmental new federalism.

A. Did Colorado Fall Victim?

The first thing that needs to be addressed is did Colorado fall victim to the major pitfalls associated with environmental new federalism. Due to the complexity of the fracking issues and the many variables influencing fracking policy in Colorado, it would have been easy for the state to give in to the tragedy of commons, race to the bottom, race to the top, or inappropriately apply the matching principle. However, it appears that the state has been able to balance the variables influencing fracking policy and come up with regulation that has promoted expansion in the industry, but has also been the most environmentally stringent policies set in the country. There have been some hiccups with the tragedy of commons, but the state has taken action to address some of the concerns of spillover and some environmental issues as they have arisen. One area in which the state is in current turmoil is decisions associated with the matching principle. Overall, the state has done well balancing the variables and coming up with environmental policy that protects the state's interests, identity, residents and environment.

1. Race to the Bottom

One of the most widely talked about concerns relating to environmental new federalism is for states to “race to the bottom” by undercutting other states’ regulation in order to attract industry. When considering Colorado’s regulatory structure, it becomes obvious that the state did not fall victim in to the race the bottom paradigm. The COGCC has a comprehensive regulatory structure that addresses chemical disclosure, well casing, pit permitting and lining standards, spill cleanup, etc. with standards that are equal or greater than other states around the country. Texas was the first state to pass chemical disclosure measures, but allowed operators to withhold information that was deemed “trade secrets” and further extended the protection of industry trade secrets by limiting the individuals who may challenge operator’s trade secrets (Reser, 2013). These trade secret protection measures were heavily supported by gas producers in Texas and make it attractive for other companies to move in because of the extensive protection of their chemical formulas. However, Colorado resisted the temptation to undercut Texas’ regulations and actually went beyond their regulations to require full chemical disclosure upon request (“COGCC hydraulic fracturing,” 2011). Colorado has continued to avoid racing to the bottom by proposing the most stringent methane emissions measures in the nation, participating in reviews by the STRONGER (State Review of Oil & Natural Gas Environmental Regulations), and through chemical disclosure transparency on Fracfocus.org (“Hydraulic fracturing information,” 2011). These actions by the state and the COGCC provide strong evidence that Colorado did not fall victim to the race to the bottom paradigm present within the framework of environmental new federalism.

2. Race to the Top

Throwing around statement such as “the best air quality standards in the nation” and being the first state to require full disclosure begins to raise questions about Colorado’s ability to

avoid racing to the top of fracking regulation. It is true that Colorado has jumped to the top of environmental standards through its fracking policy thus far. However, it appears that the state did not fall victim to the race to the top paradigm due to the industry's support of its regulations, expansion of the fracking process and new wells, and smaller bans in comparison to other states around the country.

a. Industry Support

One of the greatest fears associated with passing stringent environmental and public health regulations of an industrial process is the potential to dissuade companies from investing in a state. The reality is that drilling operations are mobile and they operate in a buyer's market where they can afford to shop for the best shale play with the fewest impediments. There is a reason why drilling is so widespread in Texas and that reason is that the regulatory structure streamlines the process and allows the industry to operate without having to jump through too many hoops. Based on this phenomenon, one would expect that Colorado's regulatory standards that exceed states like Texas would dissuade companies from investing there because they could operate with fewer obstacles elsewhere. Yet, in spite of its tough standards that have been emerging, fracking has continued to expand in Colorado. One of the reasons is industry buy-in. Despite very polarized opinions of fracking in Colorado, the state has been able to put together regulations that both the industry and the environmental groups can get behind. Governor Hickenlooper sees it as the state's role to be the "convener" who facilitate the discussion between the oil and gas industry and the environmental groups in order to formulate policy that they can all live with (Harder, 2013). This approach has resulted in both sides giving up something to create a "good rule" in regards to chemical disclosure and for the industry to support the state's ambitious air quality regulations (Jaffe, 2011 & Finley, 2013). These actions

have helped Colorado avoid discouraging the development of the industry and have allowed for the amount of new wells to grow rapidly over the past four years.

b. Expansion of the Industry

The growth in the number of gas wells in Colorado is strong evidence that the state has not raced to the top. The number of natural gas wells in Colorado grew steadily from 20,568 in 2006, to 32,000 in 2012 (U.S. Department of Energy, 2014). This steady growth in the number of natural gas wells contributes to the evidence that increased regulation in Colorado has not deterred companies from electing to invest in the shale plays in Colorado. Most noteworthy is the growth of 3,187 wells from 28,813 in 2010 to 32,000 in 2012, because this growth came after the state implemented its full disclosure regulations (U.S. Department of Energy, 2014). Clearly, the increased regulation by the state has not slowed the growth of the industry.

c. Extent of Bans

The most noticeable evidence of Colorado avoiding the temptation to race to the top is the fact that it has not passed a statewide ban on fracking yet. Despite five cities in Colorado passing bans or moratoriums on fracking, the state has still not raced to the top in terms of not allowing the process. New York has had a statewide moratorium on fracking since 2008 while the state reviews the safety of the process (“Anti-fracking protest rocks,” 2014). It is not surprising that New York has raced to the top in terms of fracking policy when considering their willingness to sue the EPA over a lack of environmental protection in several instances as noted earlier. This is an interesting occurrence for the study of environmental new federalism because the inability of one state to avoid the pitfalls of racing to the bottom or the top could affect other states not only economically or environmentally, but also by forcing the federal government to

step in and regulate. The ban on fracking in New York is clearly the top in regards to regulating the fracking process, and unless Colorado passes a statewide ban, any regulation that allows the fracking process will keep it behind in the race to the top. Identifying the proper amount of regulation for fracking will be the only true measure for establishing where the top and where the bottom is in terms of regulation, but for the time being it appears that Colorado is somewhere near the top but still in the not at the top.

3. Tragedy of Commons

The tragedy of commons is a great concern for environmental new federalism, because as decisions devolve down closer to individuals, they are more likely to be influenced by human nature. Human nature is a treat to the public well-being because the tragedy of commons assumes that individual actors are driven by short-term self-interests to pollute a commonly held resource even though they know their collective action will eventually damage or destroy it (Powers, 2011). In the case of fracking in Colorado, there definitely are some instances where it can be argued that the state has fallen victim to the tragedy of commons.

The most glaring instance of the tragedy of commons influenced by fracking in Colorado is the findings of EDC water contamination by the University of Missouri's study (Kassotis, Tillitt, Davis, Hormann & Nagel, 2013). In this instance, the combined short-term self-interests of the people who decided to drill in order to receive personal benefit despite knowing that their actions could potentially contaminate drinking water resulted in a common resource being damaged for the entire public. The findings only suggested that the contamination was from fracking, so it cannot be said with certainty that this example will stand as Coloradans falling victim to the tragedy of commons until further evidence is presented. However, the initial results

would point to a common resource being damaged due to the collective action of self-interested individuals.

If the tragedy of commons is expanded beyond pollution to include individual self-interest that collectively has a negative effect on a publicly held good, then quality of life and water consumption can also be added to the list of pitfalls that Coloradans fell in to. Individuals' self-interest to cash in on fracking has resulted in the quality of life being damaged in several communities due to the disposal of fracking fluid by injection. The seismic activity resulting from the disposal of fracking fluid from combined self-interested actors who were driven to get rid of the wastewater as quickly as possible resulted in the public safety being damaged by increasing seismicity. Once again, more research has to be done to further link seismicity to the disposal of fracking fluids, but the initial results would imply that the self-interest of individuals to dispose of wastewater through injection has resulted in the quality of life for the public being damaged.

The water consumption by fracking operations is also a self-interested action that damages a public resource because the massive amounts of water used for fracking could be used by homes or other industries that benefit a greater portion of the public. Although the amount of water used by fracking is just a fraction of the water used by agriculture or recreation who compete for the same water resources, cost and benefits of using water for fracking instead force these competing industries to take in to account the net water returned to the water cycle and the overall benefit of the industry to the public. It is also important to consider that the majority of new fracking would take place near more metropolitan areas than rural areas in Colorado, so it is important to weigh the costs and benefits of expanding the use of fracking and limiting the water resources of local municipals. However, thus far water consumption by fracking has not been

tied to water shortages for agriculture, recreation or homes, so it cannot be concluded that Colorado fell victim to the tragedy of commons based on water consumption. Further research must be done to examine the environmental impact of using water resources for fracking instead of other competing uses in order to evaluate if the process is damaging the public common water resources.

4. Inappropriate use of the Matching Principle

Colorado has kept regulation of the fracking process at the state level by charging the COGCC with the duty of regulating the process. This seems like an appropriate scope for regulating fracking within the state because the geography of Colorado makes it so shale plays stretch over large portions of the state. Due to the fact that fracking stretches over a large portion of the state, it seems appropriate to keep regulation at the state level in order to promote efficiency through uniformity. However, being the strong home-rule state that it is, Colorado has also allowed for local municipals to maintain a lot of the regulatory power to decide if they are going to let fracking into their communities. Local municipals have the right to control what goes on in their lands and control zoning laws which can inhibit or streamline the fracking process. Local zoning control fits in to appropriate use of the matching principle because localities are the closest to the fracking issue and can most efficiently make decisions based on their limited jurisdictions.

However, one problem associated with the matching principle is that it underplays the influences of economic disparity or public opinion. Examples of both influences hitting Colorado municipals have already been seen. The influence of economic disparity has driven Garfield County to allow fracking to expand quickly without truly assessing the potential for

adverse environmental effects. The result has been water contamination that which has expanded past their jurisdiction and into the water resources for surrounding counties. On the other side, local municipals have banned fracking based on strong public opinion. These decisions to ban fracking have resulted in legal disputes because they violate an individual's personal property rights. In both cases, the matching principle was not appropriate because the scope of fracking was too large for the municipal to regulate soundly. The state has showed capacity to overcome the influence of economic disparity relating to the concern of water contamination by passing statewide fracking regulations pertaining to water. However, its capacity must continue to be monitored as it addresses the most recent findings of water contamination resulting from fracking. The state does appears to be the proper match for regulating fracking because it was less sensitive to public opinion by taking legal action against the municipals in order to protect the personal property rights of the residents. Overall, the state seems to have avoided large inappropriate use of the matching principle because it has tightened statewide regulations when concerns have arisen over environmental issues and it has avoided the influence of public opinion by following its existing legal framework. It will be important to monitor how the state uses the matching principle in the future to keep the regulation of fracking efficient, but in the meantime it appears that the state is seeking to maintain regulatory control. One important issue that the state will have to address is how stringent municipal's zoning laws can be with regards to fracking. This is because municipals could essentially zone out fracking, which would be the same as banning the process, but to limit that right would limit the local government's home-rule power.

Chapter Five

Conclusions

I. The Colorado Experience

Fracking policy is likely to continue to evolve in the near future as Colorado gets more familiar with the process and continues to be influenced by the variables that have helped to shape policy thus far. Initial conclusions point to the state having the capacity to avoid the pitfalls of environmental new federalism by creating balanced policy with the environment and industry in mind. The state has been able to avoid racing to the bottom or the top thus far by creating policies that have been innovative in terms of their industry support and environmental protection. Colorado has had some issues with the tragedy of commons in terms of water contamination and seismic activity that have both been linked to fracking by initial studies. Due to the fact that these are only initial conclusions about fracking's role in these environmental issues, I think it is too early to declare that the state has fallen victim to the tragedy of commons. These issues will need to be addressed by the state in the near future in order to protect public health and protect its image as an environmentally friendly state, but it appears that the risks are limited based on the amount of research that has tied fracking to these adverse effects.

Colorado also has been faced with several legal questions associated with inappropriate use of the matching principle, but based on past precedents I do not feel that the state has fallen victim to using the matching principle inappropriately. It is likely that the Colorado Supreme Court will rule that the fracking bans passed by the five cities were unconstitutional based on the Colorado Constitution. If the courts rule in favor of the state, they will be ruling in favor of fracking policy being set at the state level and for the protection of individual property rights.

Such a ruling would undo any inappropriate use of the matching principle by the state and keep Colorado out of that pitfall of environmental new federalism.

The state will need to continue to adapt to changes in the variables shaping fracking policy in order to protect other industries and communities from feeling the boom and bust of a shale gas rush. Colorado must balance the interests of its residents in terms of protecting the environment and other key industries, but based on Quinnipiac University's polling data, the state must focus on the creation of jobs and the development of its economy (Malloy, 2013). Fracking is vital to drilling for oil and natural gas in Colorado, so for the state to continue to enjoy the economic benefits of the industry, fracking must continue. The state does have the power under environmental new federalism to decide what the policy looks like that allows fracking to expand while protecting the state's other interests, so it needs to continue to be innovative and true to its identity.

II. The Colorado Experience as a Model for Other States

Given the basis of environmental new federalism as a model that seeks to give the power of regulation over environmental issues back to the states, it becomes important to address the merits of Colorado's policy actions as a model that could be followed by other states. The issue of fracking in Colorado has provided key insight into a state that has had a reputation as one of the greenest states in the United States, but also has the ability to be one of the nation's leaders in natural gas production. The tension created between Colorado's long history as an environmentally protective state and its vast shale plays was crucial in shaping fracking policy in Colorado and produced the most valuable lesson for other states faced with regulating challenging environmental issues under environmental new federalism.

The greatest thing that can be taken away from the Colorado experience as a model for other states as they continue to retain regulatory power is that they do not have to compromise on their identity, nor their ambitions to create effective policy. In the case of fracking in Colorado, the state was able to pass regulations of full chemical disclosure in order to protect its environmental and public interests while retaining industry support by building a structure that still protected trade secrets. These regulations came after chemical disclosure had been exempted at the federal level and after Texas and other states implemented regulations that did not require full disclosure. This is important because it shows that Colorado did not simply follow the “first mover” states example of standard of regulations, but rather insisted that more be done to protect the environment and public health. It is also important to note that the “first mover” states did not influence Colorado to attempt to race to the bottom or the top because the resulting policy action out of the state provided more protection for public and environmental health and also did not impede fracking from expanding. Colorado’s air quality legislation that is currently being discussed stands as another example of how Colorado has been able to stay true to its environmentally protective identity in a way that the industry can support it and still continue to thrive. These policies not only stand as a model for how other states can regulate the issue of fracking, but the way Colorado arrived at these policies is even more valuable for states seeking a model to build regulation for complex environmental issues.

Under environmental new federalism, states have the ability to work more flexibly with the industries that want to operate within their borders. This has the implication for states and their home industries to become great neighbors working towards common goals if the states are willing and able to bring all of the stakeholders together to arrive at reasonable regulations. It is not farfetched to believe that states can work with environmentalist and industry leaders to create

policy that they both can get behind. In fact, the case of fracking in Colorado is not the only success story of where the state was able to work with the industries within its borders to pass regulation that both protected the environment and promoted development. Another example is Montana who has been able to turn a profit from its timber management while also having superior environmental performance (Adler, 2005). Virginia has also been able to bring both sides together to great solid policy by implementing a program where individual quotas are transferable for state fisheries in order to combat over fishing (Adler, 2005). This policy was applauded by environmentalists and fishers alike, because it took both sides' interests and created a policy that allowed fishers to thrive while maintaining quotas that the environmentalists could support.

The key has been for states to create policies that avoid the pitfalls of racing to the bottom and falling victim to the tragedy of commons in order to cater to industry interests or racing to the top in order to appease environmentalist's concerns. States have set out with clear missions of what their environmental goals are and then have worked with their industries in order to create regulations that will help them achieve their environmental standards while streamlining any regulations so the industries can operate with minimal impediments. The variables influencing environmental policies are quite different in states around the country and so it has been beneficial for the states to be able to set policies geared toward protecting their environments and maximizing the benefits of their resources without federal oversight muddling up the process.

III. Environmental New Federalism vs. Cooperative Environmental Federalism

In conclusion, I find that the framework of environmental new federalism has been beneficial in allowing states to create regulations that are reflective of their environmental identities and cater to their specific needs. Cooperative environmental federalism served well in its role by setting federal baselines for the states to follow in early stages of broad environmental policy much like cooperative federalism did for the nation with continuing New Deal programs after World War II. However, just like how cooperative federalism as the overarching model for intergovernmental relations became bloated, inefficient, and ineffective, so has cooperative environmental federalism. The states have already out performed the federal government's cooperative federalist programs such as CERCLA and they have demonstrated the capacity to overcome the pitfalls of environmental new federalism much like Colorado has with the issue of fracking.

Environmental new federalism should continue to expand as the framework behind regulation of environmental issues because giving the power back to the states has shown to a more efficient and effective form of governance. States have been able to work with the industries that operate within their borders in order to create policy that both promotes industrial development and adheres to their environmental goals. Devolution to the states makes policies more flexible and responsive to the residents of a state because the state has the power to create policy based solely on the variables within the state. The need for jobs and environmental effects felt within Colorado have been able to influence state policy to address concerns much quicker than they would have if citizens were waiting on the federal government to adjust regulations. The result has been that state specific regulations have immediately benefitted the states where they have been created and have served as a model for other states around the nation much like Colorado's chemical disclosure regulation has. Case in point, based on Colorado's

experience with fracking and other success stories of states passing policies that are in line with their specific interests, I find that environmental new federalism should continue to expand as the framework guiding environmental policy in the United States.

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