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for Wellesley College

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

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# Section 1

## Environmental Justice

**Leah Nugent**, *Environmental Justice in Hazardous Waste Regulations*

**Elizabeth Yows-Johnson**, *Hydraulic Fracturing on Native American Reservations: Fort Berthold and Bakken Shale Boom*

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## Executive Summary

Native American communities and communities of color in the United States face similar, disproportionate environmental and human health impacts. In the 1970s, communities of color and indigenous peoples across the nation began to protest these inequitable conditions. The resulting environmental justice (EJ) movement calls for the fair treatment of all people in the development, enforcement, and implementation of environmental regulations.<sup>1</sup>

The federal government's primary law addressing EJ inequities was not passed until 1994. In 1994, President Clinton passed Executive Order 12898, which required all federal agencies to consider EJ principles in the decision-making process. EO 12898 applies to nearly all major federal actions, including hazardous waste regulation and activities affecting air and water quality standards. Unfortunately, EO 12898 has been primarily ineffective.

Before the EO's implementation (1990), 50% of African Americans and 60% of Hispanics lived in counties where two or more air pollutants exceeded federal air quality standards, compared to 33% for whites.<sup>2</sup> These figures remain largely unchanged. And two decades after the EO was passed, 36 Native reservations around the country are still fighting industrial waste facilities and development plans on their lands.<sup>3</sup> These facts suggest that communities of color continue to face inequitable adverse environmental and health impacts, despite federal regulations intended to protect them.

The following papers explore the challenges of incorporating EJ principles into federal policy. Both propose that increased representation and empowerment of vulnerable communities is needed in order to address EJ concerns. The first paper examines the implementation of EJ principles in the permitting process for hazardous waste facilities in Kettleman City, California, a primarily Latino community. The second paper considers the integration of EJ policies into resource extraction regulations on Native American lands.

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<sup>1</sup> U.S. Environmental Protection Agency, *EPA Plan 2014* (Washington D.C.), 3 <http://www.epa.gov/environmentaljustice/resources/policy/plan-ej->

<sup>2</sup> Robert Bullard, *Unequal Protection: Environmental Justice & Communities of Color* (San Francisco, Sierra Club Books, 1994), 12

<sup>3</sup> *Ibid.*, 182.

# Section 1.1

## Environmental Justice

### *Environmental Justice in Hazardous Waste Regulations*

by Leah Nugent

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

# Environmental Justice in Hazardous Waste Regulations

## Summary

Communities of color in the United States face disproportionate adverse environmental and human health impacts from hazardous wastes. The environmental justice (EJ) movement recognizes the unique challenges faced by these communities, and advocates for participatory decision-making and equal policy enforcement and compliance (Bullard, 1994, p. 11). Federal hazardous waste regulations such as the 1976 Resource Conservation and Recovery Act (RCRA) are intended to address EJ concerns by preserving environmental and human health for all groups equally. The RCRA requires waste facilities to apply for permits that ensure compliance with environmental health standards (U.S. EPA, 2014b). The RCRA's permit process must also take into account EJ principles, as required by Executive Order 12898 (Federal Register 1994).

Despite the RCRA and EO's provisions concerning hazardous waste, these laws fail to address key EJ concerns confronting communities of color. This is reflected in the case of Kettleman City, a small town in California, whose population is over 95% Latino (Census 2010). California's EPA recognizes Kettleman's low socio-economic status and its location adjacent to numerous sources of pollution make it one of the most vulnerable in the state (DTSC, 2014c, p. 77). Recently, California approved the expansion of an enormous hazardous waste facility near Kettleman. During the permit review process, California's EPA scrupulously followed all the requirements of the RCRA and EO 12898, and even required the company to follow regulations beyond those required by law.

This rigorous review process, however, failed to address the environmental and health concerns of the community. Kettleman residents suffer from elevated rates of cancer, asthma, and birth defects, which the government acknowledges are caused by the city's exposure to multiple sources of pollution (see Appendix 2). While the specific cause of each problem has yet to be determined, the RCRA's piecemeal solution to environmental problems is inadequate for addressing broader EJ issues. Kettleman is an example of a national EJ problem, which condemns communities of color to face disproportionate environmental risks, and denies them the right to participate in decisions about the kind of environment in which they will live. In light of these concerns, President Obama should issue a new executive order that grants people this right, and that also allows regulatory bodies to consider the combined impact of multiple sources of pollution.

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## **Glossary of Acronyms**

**CalEPA:** The State of California's Environmental Protection Agency.

**CEQA:** The California Environmental Quality Act. A California hazardous waste management regulation that requires the state government to produce publicly available Environmental Impact Reports (EIR).

**CWM:** Chemical Waste Management Inc. The company operates the largest hazardous waste facility in the West. The facility is located 3.5 miles from Kettleman City, California.

**DTSC:** Department of Toxic Substances Control. A department within CalEPA (see above) that approves RCRA hazardous waste permits.

**EJ:** Environmental Justice.

**EO 12898:** Executive Order 12898. Signed by President Clinton in 1994, the EO requires all federal agencies to consider environmental justice issues during decision making processes.

**EPA:** Environmental Protection Agency (federal).

**PCBs:** Polychlorinated biphenyls (PCBs), banned in the United States. A dangerous chemical that is linked to birth defects and cancer.

**RCRA:** The Resource Conservation and Recovery Act of 1976.

# Environmental Justice in Hazardous Waste Regulations

## Introduction

Environmental justice (EJ) is a movement that attempts to address adverse environmental and human health impacts that are disproportionately borne by communities of color (Bullard 1994). The federal government recognized the goals of the EJ movement as early as 1976 by adopting comprehensive regulations intended to protect environmental health equally among all groups, regardless of race, ethnicity, or income; these regulations apply to *all* federal actions. However, the efficacy of federal EJ regulations is questionable, because even when these regulations are followed, communities of color continue to face the negative impacts of environmental hazards to a greater degree than white communities (Bullard 1994). In fact, some scholars have concluded that existing regulatory frameworks allow for the continuation rather than contribute to the amelioration of environmental injustice (Ibid, p. xvi).

In particular, hazardous waste regulation in the United States has been unable to address EJ principles of environmental equality. For example, hazardous waste facilities continue to be disproportionately located in low-income communities of color, where they pose serious risks to the health of local residents. The primary federal hazardous waste regulation, the Resource Conservation and Recovery Act (RCRA) of 1976, attempts to address this problem. The law stipulates that before any facility may manage hazardous waste, it must first show that it has met exacting human health and environmental standards (EPA 2014b). Only at this point is the facility granted a federal permit, which allows the facility to operate (Ibid). While the RCRA, as a federal regulation, must engage with EJ concerns regarding unequal treatment of communities of color, there is much evidence suggesting that the procedures set out in the RCRA, and other federal/state regulations, do not adequately address environmental justice problems.

Evidence of this kind is provided by environmental justice controversies in Kettleman City, a small town in southwest California, which is the site of Chemical Waste Management (CWM), the largest hazardous waste facility in the West (Leslie, 2010, p. 1). In 2008, CWM applied for a federal permit that would allow it to expand its facilities by 50% (henceforth called the “permit”). In response, California’s EPA, which approves hazardous waste permits on behalf of the federal government under the RCRA, was required to conduct a rigorous permit screening process—one that insures that hazardous waste facilities uphold stringent health, environmental, and EJ standards.

Federal guidelines are clear that the state permit screening process *must* be equivalent to federal standards; for example, states must obey Executive Order 12898, which requires federal agencies to take EJ principles into consideration (EPA 2010).

California's EPA scrupulously followed the procedures outlined in the RCRA. It was also careful to follow the requirements in Executive Order 12898. In fact, the EPA of California spent a total of five years reviewing CWM's permit request, and in the process conducted "the most comprehensive [review] in the Department's history" (DTSC 2014a). The state also solicited public opinion, as required by law, by holding twenty-three public meetings and reviewing over 5,500 public comments on the expansion permit (Ibid). After this extended review, in May 2014, the state approved CWM's permit.

The permit process faithfully followed the procedures set out in the RCRA. It also respected the EJ concerns of Executive Order 12898. The process as a whole, however, failed to address the causes of the problems facing Kettleman City, a Latino community that opposed the expansion. For example, while the state asked for the opinions of local residents, as required by the RCRA, that law does not require the state to act on those concerns. As a result, the state was free to grant a permit to CWM despite the wishes of residents.

This paper argues that existing EJ and hazardous waste regulations are unable to address the longstanding environmental justice problems that confront poor communities of color. Existing regulatory frameworks are unable to do so, I suggest, because they lack accountability provisions and do not insure adequate community participation in decision-making. To address these issues, the president should issue an executive order that incorporates resident participatory decision making and state accountability measures into the hazardous waste permit process.

## **Environmental Justice in the United States**

The U.S. environmental justice (EJ) movement emerged in the 1970s. Inspired by the civil rights movement, EJ argues that the current policy structure provides economic benefits and environmental protection for affluent whites while shifting costs to the poor and people of color (Bullard, 1994, p. xvi). EJ activists characterize current policies as promoting unequal enforcement of laws and prioritizing profit over wellbeing (Ibid). The movement seeks to redress the disproportionate and discriminatory impacts on disenfranchised communities of color. It also attempts to incorporate disadvantaged groups into environmental decision-making, and to promote equal protection for *all* groups, regardless of income, race and ethnicity (Ibid, p. 10-11).

The EJ movement initially began as grassroots activism and community protest against pollution in local neighborhoods. As this suggests, hazardous waste mismanagement has played an especially important role in the movement. This is because poor communities of color have historically been the site of polluting industries and hazardous waste landfills. Vernon, a Los Angeles community, exemplifies this trend. Vernon's population is 59% African American and 38% Latino American (Bullard, 1994, p.156). Despite the existence of hazardous waste laws (the RCRA) intended to protect the environment and human health, Vernon is the site of eighteen companies that annually discharge 33 million pounds of dangerous chemicals (Ibid). All eighteen are located in a neighborhood only one square mile in size. Although the RCRA's regulations were applied in Vernon, the law could not protect this community of color from pollution.

Waste management and inequality is also evident in the implementation of other federal hazardous waste policies. For example, in a 1992 assessment of the federal Superfund law, which restores areas that are polluted with toxic wastes, the report discovered that compared to communities of color, penalties for pollution were 500% higher for white areas (Bullard 1994: 9). Furthermore, listing hazardous sites on the national priority lists for cleanup took 20% longer in communities of color, and cleanup efforts began 12-42% later (Ibid 9-10). Additionally, a famous 1989 report, *Toxic Wastes and Race*, discovered that 60% of all African Americans (15 million people) lived in areas with one or more abandoned toxic waste sites. Race, the report concluded, "is the single most important factor in [predicting] the location of abandoned toxic waste sites," and was even a more powerful predictor than income (Ibid 17).

Unfortunately, this same form of discrimination persists today. For example, a new version of the *Toxic Wastes and Race* report (2007) analyzed the progress made toward meeting EJ goals in the past twenty years. The report concluded that despite the increasing prevalence of environmental justice discourses, "disproportionately large numbers of people of color still live in hazardous communities, and... are not equally protected by environmental laws" (Lessnau 2007). In fact, 90% of all states disproportionately sited toxic facilities in communities of color; ten states did so at least 30% more frequently than in white communities (Ibid). These conditions persist despite the fact that federal policy requiring all federal agencies to take into account EJ considerations has been in effect since 1994 (see section "Executive Order 12898"). These figures suggest that existing EJ regulations have been unsuccessful in addressing the challenges faced by communities of color.

## **Hazardous Waste: Applicable Laws and Regulations**

This section examines the ways in which existing federal hazardous waste legislation attempts to protect all groups, including communities of color, from adverse environmental and human health impacts. It specifically focuses on the implementation of federal regulations by state governments such as California, which issue permits for hazardous waste facilities. While the state regulations discussed below apply to California, they provide an example of a more general process that occurs across the nation—how states implement federal waste policy.

### ***Executive Order 12898***

In response to the environmental justice movement, in 1994 President Clinton signed Executive Order 12898. This order required all federal agencies to incorporate EJ concerns into the implementation of *all* federal regulations—to address the “disproportionately high and adverse human health or environmental effects of [their] programs, policies, and activities on minority populations and low income populations” (Federal Register 1994). Unfortunately, as demonstrated by the 2007 study measuring the progress toward meeting EJ principles (see previous section), the goals of the executive order have not been reached.

In an effort to strengthen EO 12898, in September 2011, the U.S. EPA released Plan EJ 2014, which recommitted the agency to advancing environmental justice principles. The plan’s goals include “protect[ing] the environment and health in overburdened communities, empower[ing] communities to take action to improve their health and environment, [and] establish[ing] partnerships with local, state, tribal, and federal governments and organizations to achieve healthy and sustainable communities” (EPA 2011a, p. i).

The plan outlines specific strategies for addressing environmental justice challenges during the permitting process (see next section). These strategies include creating opportunities for communities of color to participate “fully and meaningfully” at all stages, and providing tools that allow permitting authorities to address environmental justice in their decisions. The goal of these strategies is “to enable overburdened communities to have full and meaningful access to the permitting process and to develop permits that address environmental justice issues to the greatest extent practicable under existing laws” (Ibid, p. 42).

### ***Resource Conservation and Recovery Act***

The Resource Conservation and Recovery Act (RCRA) of 1976 was an early piece of legislation that was designed to protect human health and the environment from toxic wastes, reduce waste generation, and insure proper waste management (EPA 2014b). The regulations established a “cradle-to-grave” system for managing hazardous waste, beginning from their manufacture (cradle) and ending with their proper disposal (grave). Most significantly, companies that treat, store, or dispose of hazardous waste were required to obtain a permit from the EPA or an authorized state agency.

The permitting process established by this act was intended to ensure that facilities maintain key safety standards, including emergency procedures, reporting requirements, and unit-specific standards (EPA 2014b). The regulation also prescribes the ways hazardous wastes must be cleaned up, in case of spills. Those seeking RCRA-mandated permits must go through a rigorous regulatory process intended to ensure that they adhere to appropriate standards. The process requires a mandatory period of public comment that specifically allows affected communities to voice their concerns regarding permit approval.

The RCRA allows the federal government to authorize states to operate its hazardous waste management plans, and is one of many federal laws that allows states to implement federal waste legislation; in fact, by the late 1990s, states had already approved 90% of all federal environmental permits and 75% of environmental enforcement actions (Klyza & Sousa, 2008, p. 250). The federal EPA is one of the primary organizations that monitors state waste management programs. If state waste regulations and enforcement are deemed sufficient, the federal EPA delegates authority to the state EPA to implement the federal RCRA. Authorized states have additional powers to evaluate and accept RCRA hazardous waste facility permits.

However, in order to be authorized by the federal EPA, states *must* maintain hazardous waste management programs that are “equivalent to, consistent with, and no less stringent than the federal program” (U.S. EPA, 2011, p. 134). States that fail to do so may be stripped of their powers to regulate hazardous waste; under such conditions, the federal government would assume responsibility for the state’s hazardous waste program. Thus, while federal regulations like Executive Order 12898 apply only to federal agencies, state agencies implementing the RCRA must incorporate these federal regulations or create equivalent state regulations.<sup>4</sup>

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<sup>4</sup> For example, California adopted a provision in its Public Resources Code (2001) that mandates the California EPA to follow similar EJ provisions as those in EO 12898. The state also adopted the California Environmental Quality Act (CEQA) of 1970, which, like the federal National Environmental Policy Act (NEPA), requires state agencies to prepare an Environmental Impact Report (EIR) that examines environmental values during decision-making.

## Implementation of EJ: Kettleman City Case Study

Concerns regarding the ability of federal hazardous waste legislation (RCRA) to address environmental justice issues persist today. One example of the limitations of existing legal frameworks is provided by California's acceptance of a controversial hazardous waste permit to expand the size of the state's largest hazardous waste facility: Chemical Waste Management (CWM). CWM is 3.5 miles southwest of Kettleman City, a poor community of color situated halfway between San Francisco and Los Angeles. 96% of Kettleman's population of 1400 residents are of Latino heritage (the state average is 38%; see Census 2010). Furthermore, more than one out of five residents (23.1%) live below the poverty line (Ibid; the state average is 15.9%). Kettleman City exemplifies many of the environmental justice problems faced by marginalized groups. In addition to CWM's facility, residents are exposed to a range of other sources of pollution. These include diesel emissions from two highways and pesticides from agricultural fields (see Appendix 1), where half of Kettleman residents work (Leslie 2010).

California's EPA (CalEPA), which granted the permit allowing CWM to expand its hazardous waste activities, spent a total of five years meticulously following all requirements of the RCRA and Executive Order 12898. Despite these efforts, however, the state failed to consider the EJ concerns of residents. This is because the regulations are lacking in mechanisms to insure either EJ accountability or community decision-making; as such, they do not require the state to engage with the community's environmental justice concerns. Consequently, with the granting of the CWM permit, Kettleman City residents find themselves confronting yet another set of environmental and human health risks.

### *Chemical Waste Management Inc. Operations and Expansion Permit*

To understand the EJ issues surrounding the approval of CWM's expansion, it is important to understand the ways in which CWM manages hazardous waste. CWM began its operations in 1975 and received an RCRA permit to manage hazardous waste as early as 1979 (Cullen, 2005, p. 2). The 1600 acre plant (equivalent to 1,200 football fields) dwarfs Kettleman in size; it is eleven times larger than the city (CWM 2014, p. 1). CWM accepts most solid, semi-solid and liquid wastes, with the exception of radioactive, biological, and infectious wastes, and primarily serves as a site for the disposal and storage of hazardous waste (U.S. EPA & DTSC 2011). The site manages three solid waste landfills (one for hazardous waste), a PCB treatment and storage unit, and three bulk storage

units for hazardous waste (CWM 2014). CWM also operates a Final Stabilization Unit that binds hazardous wastes to heavy metals so they won't be able to leach into the environment (DTSC 2013a; Baylen 2010).

The CWM has established numerous monitoring stations around its premises (see Appendix 2). These stations are mandated by CWM's current RCRA permit, which requires the company to monitor air, soil, and water quality in case of accidental chemical releases from the facility (U.S. EPA & DTSC 2011). The company has three monitoring stations that detect facility air emissions; these monitoring stations have been in place since 1986. The stations collect air samples every twelve days. The facility's landfills have twenty soil quality stations. In terms of ensuring water quality, CWM prevents any surface water (including rainfall) that has touched hazardous waste from flowing outside the facility's boundaries. The site also has forty-eight groundwater monitoring wells, which collect information every 3 months (Ibid). Thus, CWM is already engaged in systematic monitoring intended to preserve environmental and human health.

CWM's expansion permit allows the company to expand its hazardous waste landfill by 5,000,000 cubic yards; the expansion alone is seven times greater than the size of Kettleman City (DTSC, 2014d). The permit also allows the company to pile waste to an elevation of 1018 feet (50 feet higher than the original permit) (Ibid). Previously, the hazardous waste facility's landfill was filled to capacity. The expansion permit, however, provides enough storage capacity to allow the company to accept waste for another thirty-two years (Ibid, p. 9). The facility will also use an additional 400 trucks a day to transport hazardous wastes; this raises health concerns for Kettleman City, which is located at the intersection of two major highways (see Appendix 1).

### ***Kettleman City: Sources of Contamination***

Kettleman City is a small settlement in southwest California's San Joaquin valley. The town initially grew up around oil extraction, in the 1920s (Cullen 2005). As oil supplies dried up in the 1950s, the construction of the California aqueduct encouraged a shift to agriculture as the dominant occupation. In the process, large numbers of people from Latin America moved to Kettleman, which became increasingly Spanish speaking, and dominated by Latino immigrants. Their descendants make up much of the current population (Ibid).

Kettleman City, like many other low-income communities of color (see Vernon example, page 3), is confronted with multiple sources of contamination that expose residents to

disproportionate environmental and health risks. The city is situated at the junction between two major highways: Interstate 5, and Highway 41, and has a large number of stalling areas for diesel trucks (see Appendix 1). The resulting air pollution may account for the elevated asthma levels in the town (Lund 2003). Kettleman is also bordered by agricultural fields. Nearly half of the population works in these fields, raising concerns about the impact of pesticides on the community's health (Leslie 2010). Even the geography negatively affects residents: the groundwater is contaminated by naturally occurring benzene and arsenic; consequently, people must buy bottled water (DTSC, 2013c, p. 259). In a community where one out of five people are below the poverty line (Census 2010), buying water is an additional socioeconomic challenge. The city is also adjacent to Chemical Waste Management Inc. (CWM), a hazardous waste facility which accepts 346,000 tons of hazardous waste a year (the weight of over 100 Toyota Camries) (DTSC, 2013c, p. 259).

Existing regulatory frameworks concerning the environment have not been designed to show how each of these sources of contamination affect Kettleman City residents. However, the cumulative effect of these sources of pollution appears to have had certain tangible impacts on the health of Kettleman's population. For example, Kings County, where Kettleman City is located, has one of the highest asthma rates in the country: 21%, compared to a state average of 14.8% (Lund 2003) Kettleman City residents are particularly vulnerable to asthma,<sup>5</sup> because of the town's close proximity to two highways, which allow over 9000 trucks to pass the city daily.

Recently, Kettleman began experiencing a high number of birth defects in a short period of time. Eleven infants were born with birth defects between 2007 and 2010; three of these babies died (Sahagun 2014). Two were born with cleft palates (Ibid). Maria Saucedo lost two children due to severe birth defects and a miscarriage (Grossi 2013). One mother, Magdalena Romero, had a child who was born with Down syndrome, two heart murmurs, and a partially missing lip. The baby, America, was also unable to breastfeed. Although Magdalena fed her child using a special tube, America lived only five months (Leslie 2010).

While studies have failed to show that CWM is responsible for these problems, the company acknowledges having mismanaged polychlorinated biphenyls (PCBs),<sup>6</sup> a highly dangerous

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<sup>5</sup> Because Kettleman City's population is so small, no data exists for asthma rates in the census data.

<sup>6</sup> This paper uses the example of PCBs to demonstrate the community's vulnerability to chemical exposure, as opposed to a chemical regulated under the RCRA. Instead, PCBs are regulated under the Toxics Substances Control Act of 1976. However, this paper discusses PCB chemical exposure because these chemicals are well-known, well-studied pollutants with clear adverse health impacts. Scientists have already identified the ways in which PCBs can travel through the atmosphere and into living tissue. Other hazardous chemicals, including those regulated by the RCRA, may

chemical. PCBs are a class of artificial chemicals that were commonly used in transformers and other electronic equipment, until they were identified as a carcinogen and banned by the EPA in 1979 (EPA 2014a). Various animal studies identify PCBs as endocrine disruptors, which interfere with the normal functioning of the reproductive system and cause various birth defects. Among these are cleft palates, the same birth defect that occurred among Kettleman babies (McGovern 2006, Watanabe and Sugahara, 1981).

CWM is sited 3 miles away from Kettleman City, a considerable distance for pollutants to travel. However, PCBs can travel very long distances when released into the air. These chemicals easily accumulate in living tissue, such as human body fat, thus potentially creating serious health issues. In the past six years, CWM admits to releasing nearly .9 lbs of PCBs into the air (TRI 2013).<sup>7</sup> While this number seems small, it is a hundred million times greater than the tolerable daily intake<sup>8</sup> for an adult male (Green Facts 2014). The example of PCBs demonstrates the potentially catastrophic impact of chemicals released from CWM, even in very small amounts. Notably, Kettleman City is at risk of potential exposure to PCBs because CWM is the only facility in California that may dispose of this dangerous chemical.

The fact that Kettleman residents are faced with multiple sources of toxic contamination is not an accident: Kettleman, like many other communities of color, is a vulnerable community. According to a study by California's EPA, Kettleman is in the top 10% of the most vulnerable Californian communities (in terms of socio-economic structure and pollution exposure).<sup>9</sup> This finding makes sense, given the quality of life in Kettleman. Kettleman's 96% Latino population is not only a disadvantaged community of color, but also suffers economically. An astonishing 21% of the population is below the federal poverty line, with the median household income amounting to \$35,625, 2 times smaller than the average Californian (Census 2010). Additionally, over half of town residents do not have a high school diploma (Greenaction 2014).

Environmental groups such as Greenaction argue that Kettleman is being specifically targeted as a toxic dump site because it is a poor community of color. If true, this violates equality clauses under multiple environmental statutes. Statistics regarding permits granted to waste

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pollute residents in similar ways, yet they are less well known and understood compared to PCBs; thus, PCBs stand in as an example of chemical exposure for hazardous wastes in general.

<sup>7</sup> The PCBs were released either from the CWM's PCB treatment unit, or from its Final Stabilization Unit which has a smokestack. However, as noted previously, most of the facility's activities involve storing wastes; the site lacks incineration facilities.

<sup>8</sup> Tolerable daily intake describes the amount of a chemical that a human can intake daily over their lifetime without experiencing adverse health impacts.

<sup>9</sup> The study, known as the CalEnviroScreen, examines factors such as community stressors (income, etc.) and a variety of different pollutants in order to score different communities based on their vulnerability to pollution (DTSC, 2014c).

processing facilities in California support this view: of fifty-five permitted facilities in California, DTSC approved 54 of them in areas with significant non-white populations or impoverished groups (Greenaction, 2014, p. 6).

As this implies, Kettleman is not the only poor Latino community in California that bears disproportionate environmental and health burdens. For example, CWM's hazardous waste facility in Kettleman is one of three hazardous waste facilities in the entire state, all of which are sited in struggling, predominantly Latino communities. Furthermore, the three toxic dumps are all located in Kings County, even though the county only produces 3% of the hazardous waste that it manages (DTSC 2014b).

Throughout the United States, people of Latino heritage also face exceptional environmental burdens. In a 2008 survey of Latino voters, 34% noted that they lived or worked near a toxic site (Sierra Club, 2012). These sites are regulated by federal policies, including (but not limited to) the RCRA, which must consider EJ principles in the siting of hazardous sites. Nevertheless, as these statistics demonstrate, a significant number of Latinos live and work near such sites. Not coincidentally, many also face disproportionate health risks. For example, Latino asthma rates are 360% greater than those of non-Latino whites (Ibid). Increasing asthma rates are strongly correlated with the proximity of individuals' homes to a toxic site; thus, it makes sense that Latinos experience higher asthma rates. Additionally, in 2008, nearly 1/3rd of Latino voters in the above-mentioned survey lacked health insurance; these individuals are particularly vulnerable to environmental health threats, but they lack the resources required to treat the disproportionate burdens they are forced to endure (Ibid).

Toxic sites may also be increasing cancer rates among U.S. born Latinos, whose rates are 22% higher than foreign-born Latinos (Ibid). This suggests that environmental factors in the U.S. are increasing the prevalence of cancer among Latinos. It is important to note that the Sierra Club's survey was done among Latino voters only - the United States is also home to nearly 11 million undocumented immigrants. Immigrants are especially vulnerable because they have few rights or protections, must live and work in the most marginal of circumstances, and run the risk of being deported; thus, they lack political influence to address violations of their rights. As a result, environmental issues for undocumented immigrants tend to be invisible to the public.

As the foregoing suggests, Kettleman City is one example of a much broader problem—a problem of environmental justice for minority populations across the country. As a poor community of color, Kettleman has been singled out as a site where many forms of waste and contamination

may be disposed of. As a result, its non-white population has been disproportionately burdened with environmental health risks.

### ***Concerns of Kettleman Residents***

Many residents are convinced that the cause of the town's birth defects is the same hazardous waste landfill that currently seeks to expand. Spurred by these tragedies, Kettleman residents have sought ways to engage with public discourse, primarily through the media, to publicize their troubles. When the DTSC granted the permit for the site's expansion, one resident (Maria Saucedo) stated: "for them [California's EPA] to go ahead and approve this permit means our lives and our children's lives are not important" (Sahugun 2014). Residents have also formed their own organization, *El Pueblo Para el Aire y Agua Limpia* (People for Clean Air and Water), to protest against CWM's permit.

During the permit's public comment period, however, it became clear that Kettleman residents were concerned with a variety of problems. Over 90 residents opposed the expansion permit because Kettleman City was already in the top 10% of the most vulnerable communities in California (DTSC, 2014c). One resident, Dolores Moreno, a resident who had lived in Kettleman for 43 years, said she had seen a significant increase in illnesses in recent years (Ibid, p. 242). Moreno identified "pollution" in general as the cause of these issues and explains, "That's why I don't agree at all [with the expansion permit]. I prefer health... I don't want death or money" (Ibid). A 35-year resident, Maricela Mares-Alatorre, noted that the air quality in the neighborhood was already so bad that three out of seven days that week, children couldn't play outside at recess. Maricela was concerned that this number would increase to seven out of seven if the hazardous waste facility was approved, and 400 more trucks a day traveled through town (Ibid, p. 262). It is unclear that CWM has caused the problems that concern the local population; regardless, however, Kettleman residents have good reason to be concerned about the expansion, adversely affected as they are by multiple sources of pollution, including CWM.

However, the RCRA and EO 12898 do not have any specific regulations to address the health concerns from several sources at once. In fact, these regulations do not have provisions for analyzing the additive impacts of multiple sources of pollution on the community. Nor do these regulations ensure that resident concerns are addressed in the final permitting stages.

The limitations of the existing regulatory framework are revealed by the following: before granting the expansion permit, the Department of Toxic Substances Control (DTSC) imposed

additional health requirements upon CWM. However, these requirements did not address resident concerns that their community was disproportionately impacted by various illnesses such as cancer, birth defects, and anemia. While the DTSC did provide some provisions to deal with asthma rates, the DTSC was only able to regulate a small number of the total trucks that travel through the city; while this shows the DTSC's good intentions, the agency is unable to use the RCRA and EO 12898 to address the broader concerns of the community: pollution from *all* sources, not just from the waste facility. Additionally, while EO 12898 and the RCRA ensure that residents' voices are heard, via public comment and public hearings, no provisions require that the agencies *act* upon community concerns; in the case of the expansion permit, as demonstrated, the DTSC chose not to act upon the main concerns of the community, which extended far beyond the potential health risks posed CWM alone.<sup>10</sup>

### ***The Permit Process: DTSC***

In 2008, the Department of Toxic Substances Control (DTSC), the branch of the California EPA that reviews RCRA waste permits, received an application from Chemical Waste Management Inc., to expand their facilities near Kettleman City. For the next five years, DTSC conducted a thorough investigation of the permit's potential impacts on environmental and human health. This section argues that the DTSC adhered closely to the requirements of EO 12898 and the RCRA. I further argue that, despite the DTSC's efforts, EO 12898 and the RCRA do not contain adequate measures to address the underlying EJ problems present in neighborhoods such as Kettleman. Thus, even though the DTSC followed the required policy processes, it was not compelled to include the community in the decision-making process regarding the proposed expansion. Nor did it address the fact that the area is already at risk from multiple sources of pollution.

From the very start of the permit process, the DTSC went to considerable lengths to conduct scientific studies in Kettleman City. The DTSC did so to assess the impact of the waste facility on community health. In 2009, Kings County, where Kettleman City and CWM are located, conducted its own environmental assessment, as required by law. This assessment was also reviewed by the DTSC. The state also reviewed CWM's record of compliance with regulations by examining its

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<sup>10</sup> It is also important to note that some residents supported the facility, on economic grounds. Kettleman resident Alvaro Preciado, a local official with a young son, admitted that the community is subject to environmental injustice. At the same time, however, he notes that many people in the community were losing jobs because CWM workers spend money in local Kettleman businesses; with a decrease in the waste facility's worker force, due to the long delay in the permit's acceptance, Kettleman businesses began to suffer, as did the economic situation of the town (DTSC 2014c).

records dating back to 1983. Consequently, the state fined CWM \$300,000 in 2013 for failing to report 72 small chemical spills (DTSC, 2014b, p. 7). According to the DTSC, however, these spills posed no health threats to the local communities; thus, while the RCRA allows state agencies to deny permit requests based on a company's past environmental law transgressions, the DTSC still approved the expansion permit.

In 2010, DTSC conducted a new study, which focused on the causes of Kettleman's birth defects. This study was not required by any federal regulations, but was conducted at the request of California Senator Boxer and the Governor Schwarzenegger. They pressed the DTSC to conduct this study after major media outlets such as the LA Times began to report negatively on Kettleman City. The DTSC study did discover pollutants in the air, water, and soil, but it could not identify the specific cause of the birth defects (DTSC, 2014f, p. 2).<sup>11</sup>

The DTSC also made significant efforts to involve the community in public discussion about the proposed permit. The DTSC extended the public comment period to over 115 days, much longer than the mandated 45 days (DTSC 2013b). This process generated over 5,500 public comments; the agency subsequently released a public document replying to the public's concerns, as dictated by the RCRA. The DTSC also organized twenty-three public meetings over the course of the permit process to discuss the community's concerns (DTSC, 2014b). At these gatherings, professional interpreters provided English-Spanish translation services. This is especially important for Kettleman City, where over 20% of residents unable to speak English at all (DTSC, 2014c, p. 77) and another 43.7% speak it less than well (Census 2010).

DTSC staff also took their own initiative to explore EJ issues that were not required by the RCRA or EO 12898. First, they carried out a survey of residents and businesses to better understand the community perspective (DTSC, 2014c, p.23). The DTSC also conducted an environmental justice study, which concluded that the town was indeed disproportionately affected by pollution. The study also noted that the most pressing need was to address air and water pollution (DTSC, 2014b, p. 6). Notably, the study concluded, Kettleman's air and water pollution was caused by a host of factors. These included diesel emissions from nearby highways, and arsenic groundwater poisoning. These additional steps taken by the DTSC demonstrate the agency's good faith in attempting to respect EJ principles.

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<sup>11</sup> In addition to DTSC's studies, the U.S. federal EPA also conducted four environmental health studies that analyzed the risks posed by toxic air pollutants emitted from CWM, which assessed air quality records between 2007 and 2011. The studies concluded that air pollution from CWM adhered to all federal policies and posed minimal risks to the health of Kettleman residents. - DTSC, 2014b

In response to concerns of Kettleman City residents, the DTSC modified the CWM's permit to include additional health and safety provisions, resulting in the "most comprehensive [set of protections] that DTSC has ever issued" (DTSC 2014a, p. 3). The DTSC went to far as to require CWM to construct an entire new system to contain chemical spills, and insisted on additional air, water, and soil sampling and monitoring around the landfill. Due to residents' concerns with asthma, DTSC required CWM trucks to adhere to stricter diesel-emission standards. The agency also required the company to explain the results of its monitoring to residents in an annual meeting. DTSC even required additional groundwater monitoring, despite the fact that the hazardous waste facility is located in the mountains and its water table is completely separate from Kettleman's ground and surface water (making it physically impossible for pollution from CWM to contaminate Kettleman's water; DTSC 2014e, p. 14).

In May 2014, six years after CWM initially applied for the expansion permit, the DTSC approved the request. This occurred only after the agency had exceeded the requirements of EO 12898 and the RCRA. The review process included more public feedback than required by law. It also included supplementary scientific studies to assess the dangers posed by CWM's waste facility. These efforts to address Kettleman's EJ concerns are impressive. However, even though the DTSC appears to have had the best of intentions, it ultimately failed to deal with issues of most concern to Kettleman City residents.

As the Kettleman case suggests, RCRA's permit system is not designed to address the central EJ concerns of communities of color. As the DTSC's own study noted, the town is confronted with disproportionate environmental health problems, which come from multiple sources. The permit process, however, only allowed the agency to mandate that the company reduce diesel fuel emissions. Instead of addressing the community's central problems of pollution from *all* sources, the RCRA permit process only allowed the DTSC to address a relatively minor amount of new air pollution that would be caused by the proposed expansion. The RCRA permitting process thus approaches EJ issues from a piecemeal perspective that is inadequate for addressing broad environmental and health concerns.

### ***Public Debate Over the Permit Process: CWM and Environmental Groups***

The approval of the CWM's expansion permit has sparked a huge controversy. Two particularly vocal groups are the hazardous waste industry and environmental groups. On the one hand, CWM advertises itself as "safe and essential for California's environmental stewardship."

(CWM 2014) CWM emphasizes that all scientific studies conducted by the federal EPA and DTSC show no link between pollution from the waste facility and Kettleman City's birth defects and cancers. In addition to claiming that it has done no harm, CWM also asserts that it is doing a great deal of good. The company argues that it brings economic prosperity to Kettleman City: the facility generates \$17.5 million in economic activity for local businesses (Ibid). The company has also provided financing for community health surveys and clean bottled water.

Environmental groups, however, have argued that the DTSC permitting process did not conform to the law. For example, the group Greenaction claimed that the environmental impact report (SEIR)<sup>12</sup> required by the permit process violated due process, by discriminating against Kettleman residents (Greenaction 2014). During a 2009 hearing in Kings County, Kettleman's predominantly Spanish-speaking population was not given as much time to testify as English speakers; their time at the podium was preemptively cut short. When residents objected to this inequitable treatment, they were violently removed by the police. In fact, it was clear that Kings County had prepared in advance for the event, by contracting a large number of police and police dogs to be present (Ibid). The environmental groups argued that the permit process violated the intentions of the RCRA by failing to ensure an equitable public hearing. The DTSC responded by publicly acknowledging that the use of police intimidation was "unacceptable" (DTSC, 2014c). At the same time, however, the DTSC noted that a recent court case had upheld the legitimacy of the SEIR, even while the agency acknowledged that the public hearing imposed discriminatory measures upon residents (Ibid, p. 359). DTSC also claimed that all other public hearings had been conducted in an equitable manner.

The public debates surrounding the expansion permit are an example of "abortion politics." As described by Pielke, controversies regarding controversial issues like abortion cannot be definitively resolved through the collection of scientific information, which seeks to uncover a singular "truth" (Pielke 2004) Instead, stakeholders on different sides of the issues have different *values*. It is these values that determine the way they interpret information—and also what they regard as relevant information. Nowhere is this clash of values clearer than in the case at hand. On one hand, Chemical Waste Management Inc. (CWM) places scientific evidence, and a respect for the specific procedures required by existing regulatory framework, at the heart of its argument. The company asserts that environmental damage caused by the industry must be *proven* through

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<sup>12</sup> EIRs are required by state law and federal law and analyze the environmental impacts associated with the expansion permit.

scientific analysis. It also emphasizes that it has followed procedure to the letter. On the other hand, environmental groups argue that the company has violated the intent of the law, and has failed to follow procedure. The organization also casts doubt on the adequacy of the scientific analyses. As a result, Greenaction claims, CWM has broken federal and state environmental justice laws, and should not be granted a permit.

Ironically, while the argument between CWM and Greenaction is based on different values, both groups share the same underlying assumptions about the permit process. For example, Greenaction argues that the permit process violated EJ principles and thus the permit must be denied; by restricting their objections to a consideration of the permitting process, the organization limits the kinds of injustices it may address to what the permit process allows. Similarly, CWM assumes that if it cannot be shown that the facility is emitting pollutants that are adversely impacting the community's health, and if it follows procedure, the permit should be accepted. However, neither of these perspectives address the fact that the community *does* face disproportionate environmental burdens, from numerous sources.

Nor does CWM or Greenaction engage with the issue that neither RCRA nor EO 12898 include residents in the decision-making process; the regulations merely allow for resident feedback and require a written response from the state agencies. Thus, resident concerns must be heard but they can be entirely ignored. Whether or not government agencies decide to act on these concerns is at their own discretion. Indeed, as described previously (see page 12), this is precisely what has happened in Kettleman City, where concerns about the community's drinking water and air pollution have yet to be addressed. While the public debates between CWM and Greenaction focus on different values, neither side succeeds in addressing the more fundamental problem: that Kettleman City is a poor community of color confronted with serious environmental contamination.

## **Recommendations**

The foregoing analysis suggests that the president should issue a new executive order that addresses environmental justice implementation concerns. Executive orders apply to all federal agencies, as well as state agencies implementing policies (such as the RCRA) on behalf of the federal government.<sup>13</sup> An updated EJ executive order that focuses on *implementation* and

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<sup>13</sup> President Obama has already demonstrated his leadership in preserving environmental protection and addressing environmental justice concerns and would most likely be receptive to advancing additional EJ goals. In fact, in 2011, Obama already released the "Memorandum of Understanding on Environmental Justice and Executive Order 12898." This document ordered federal agencies to review and update their EJ strategies and provide annual progress reports on their progress in achieving EJ goals.

*accountability* of federal EJ regulations is essential, especially because in the past twenty years, the effects of Executive Order 12898 have been minimal.

The analysis presented above suggests four implementation and accountability mandates that should be included in the executive order. First, approved state agencies must include a minimum of one representative (per X number of people) from local communities impacted by the proposed permit in the decision-making process; these representatives would be selected by local residents. The representatives would be required to inform their constituencies about the details of any and all proposed plans. They would also be required to collect local opinions regarding the permit process, and convey those opinions to the relevant state agencies. Finally, they would be responsible for ensuring that the concerns of their constituents were addressed in the decision-making process. If those selected failed to represent the interests of their communities, the communities would have the right to replace them.

Second, federal/applicable state governments should conduct a demographic and sociological study of local communities impacted by the permit process. Thereafter, the government would release a public participation plan for each proposed permit. This plan would identify all relevant stakeholders, and would detail the ways in which the government would distribute information about the permit process to the community, including public hearing notices, newspaper ads. The executive order should also outline a minimum number of public hearings and public outreach initiatives, to ensure that such initiatives are as inclusive and participatory as possible. All notices should be language appropriate, as determined by the demographic study. Companies seeking permits would fund these public outreach initiatives.<sup>14</sup>

In addition to a demographic study, the federal/approved state agency should conduct studies that identify and analyze the impacts of multiple sources of pollution on communities impacted by the permitting process. These studies should examine all existing environmental problems, as well as any additional adverse impacts associated with the permit's acceptance. The federal/approved agency would, at minimum, publish a plan for public review during the public comment period that addresses the synergistic impacts of pollution on the community, if any, and would devise ways to address these solutions.

Finally, to ensure accountability, federal agencies should perform investigations of state-run federal hazardous waste programs every five years, to ensure that such programs are being run

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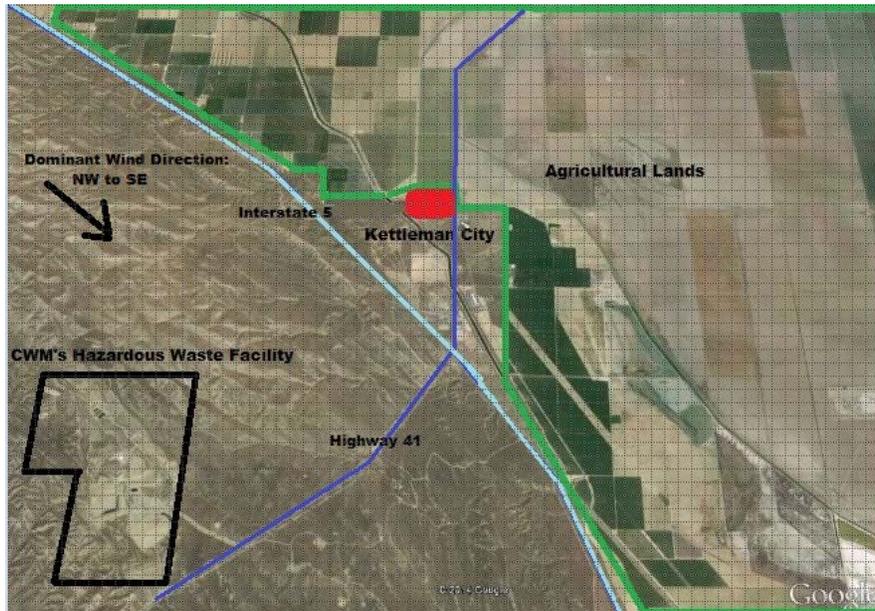
<sup>14</sup> A similar public outreach strategy is currently utilized in New York. New York's efforts resulted in collaborative efforts between the permitted industry and the community; consequently, the industry voluntarily agreed to reduce its emissions to 49% from current conditions, which greatly reduced environmental concerns in the area (Dunn and Weiss 2012: 760).

according to federal standards. States that do not meet federal standards must submit remedial action plans, describing the ways in which the agency will correct its activities. States whose remedial action plans failed to produce results within two years would have their permitting rights temporarily suspended. This provision is especially important because so much of federal waste regulation is administered by the states (Klyza & Sousa, 2008, p. 250). The federal government already has the right to suspend state permit authorization, if the states are not adequately implementing federal legislation. A specific five-year investigation plan, however, would ensure constant state adherence to and enforcement of federal EJ principles.

These proposals provide examples of the kinds of implementation and accountability measures needed to ensure the adoption of EJ principles in hazardous waste management at the state and federal level. Such strategies must include specific provisions of accountability to ensure adequate implementation.

## Appendices

1. Kettleman City and nearby sources of pollution. Note that CWM is located in the mountains.



*Source: Google Earth.*

2. Location of air, soil, surface water, and groundwater monitoring at the Kettleman hazardous waste facility.



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## Section 1.2

### Environmental Justice

***Hydraulic Fracturing on Native American Reservations:  
Fort Berthold and the Bakken Shale Boom***

**by Elizabeth Yows-Johnson**

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## Hydraulic Fracturing on Native American Reservations: Fort Berthold and the Bakken Shale Boom

### Summary

Many Native American reservations around the country sit on top of lucrative mineral resources. From coal, to uranium, to natural gas, Native resources have attracted industry exploration for decades. One form of mineral extraction, hydraulic fracturing, or fracking, removes natural gas from deep beneath the surface level. Hydraulic fracturing technology development over the past decade has allowed the industry to expand into areas where gas extraction was previously not possible. One of these sites is the Bakken Shale reserve in North Dakota. One-third of the natural gas extracted from the Bakken Shale has come from drilling on Fort Berthold, the Three Affiliated Tribes reservation. Fort Berthold has seen a boom in fracking in the past several years, with that has come significant revenue for the tribe. But in addition to economic gain, the tribe is concerned about environmental degradation caused by fracking. The tribe is currently implementing regulations to protect tribal land, but lacks the infrastructure and power to fully ensure security.

While providing the tribe with increased security, the tribe's governing body and Native activists are hoping to increase environmental justice protections. Environmental justice seeks to protect disadvantaged groups from environmental harm and consequential adverse human health effects. Fracking technology has been very controversial because of its potential to negatively impact human health and pollute groundwater. For these reasons, tribes around the country have banned fracking, and most recently, New York state banned fracking entirely. The Three Affiliated Tribes hope to be able to continue fracking on their reservation, but guarantee safety for the tribal members against harmful pollution.

This brief will explore the history of fracking in the United States and North Dakota and how it has been regulated at the federal level. Fracking's regulation and history will be framed within the context of environmental justice, looking at Fort Berthold as an example of the intersection of fracking and environmental justice policies. Within this, the ways in which tribes are allowed to regulate mineral extraction on their land must be considered. This information will be used to understand how the Three Affiliated Tribes can use Indian mineral rights and federal fracking regulations to protect their land and people against environmental injustices.

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## Introduction

As the United States has attempted to move away from foreign oil dependency, exploration for domestic energy alternatives has led to an increase in renewable energy, offshore drilling, and hydraulic fracturing. Hydraulic fracturing, or fracking, is the process by which natural gas or oil is extracted when water, sand, and chemicals are injected underground through a well. This process cracks shale, a sedimentary rock, and releases trapped oil and natural gas into the well. Fracking's prominence has increased greatly over the last several decades, but not without significant debate. Fracking's controversy originates in the method's potential damage and pollution to underground waterbeds, air pollution, and negative human health effects. Fracking has been exempted from important federal regulatory policies, including the Safe Drinking Water Act. Consequently, fracking is primarily regulated by state level policies. Many are concerned that the lack of unified federal fracking oversight leaves citizens vulnerable to environmental injustices and the environment exposed to irreparable pollution.

Until recently, the fracking industry has been primarily located in Texas and Alaska where natural gas and oil deposits were more easily accessible. But as fracking technology has developed, the industry has expanded across the country. North Dakota's industry has seen significant growth, and has now become the second largest natural gas producing state in the country.

North Dakota's largest oil and gas reserve is located under Bakken Shale deposit, in the state's Northwest corner. Much of the extraction from the Bakken Shale is taking place in Fort Berthold, which is home to the Mandan, Hidatsa, and Arikara tribes, or the Three Affiliated Tribes. Just in 2011, \$180 million dollars was generated in revenues from Indian wells.<sup>15</sup> Since 2010, the entire Three Affiliated Tribes nation has earned more than \$500 million and generated more than 30 million barrels of oil.<sup>16</sup> The reservation has been especially attractive to oil companies because the land falls under federal jurisdiction, or is privately owned, and has fewer restrictions or regulations than state owned lands. Many Natives and fracking opponents are concerned that the fracking is continuing the historical exploitation of these tribes and their land. Opponents are seeking to mitigate fracking's potential environmental degradation, and environmental injustices on the Fort

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<sup>15</sup> U.S. Department of the Interior, *Oil and Gas Lease Utilization, Onshore and Offshore: Updated Report to the President*, May 2012, 16.

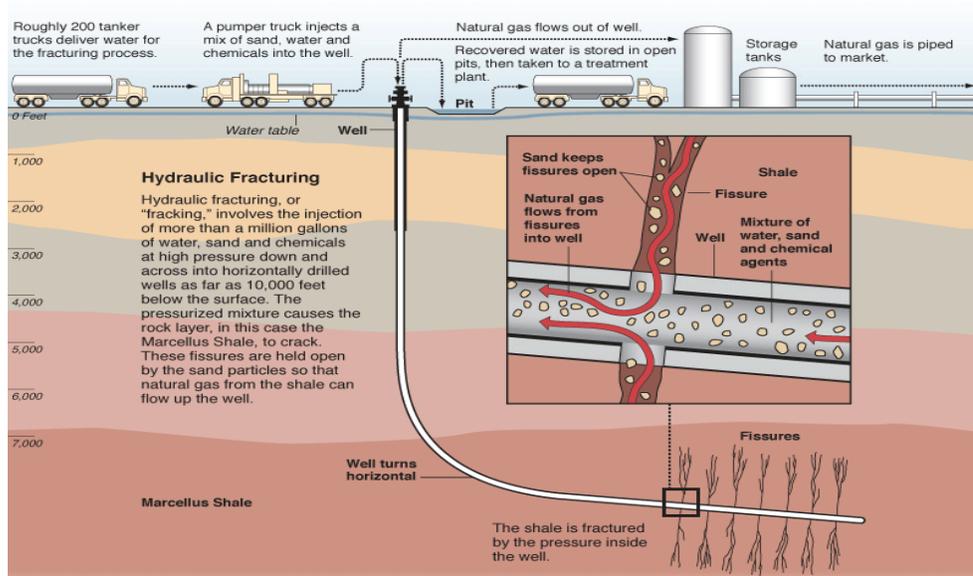
<sup>16</sup> Sierra Crane-Murdoch, "The Other Bakken Boom: A Tribe Atop the Nation's Biggest Oil Play," *PERC Case Studies*, November 28, 2012.

Berthold Reservation. This brief will explore fracking regulations, environmental justice issues, and how the Three Affiliated Tribe members can use policy to protect their land and people.

## What is Hydraulic Fracturing?

Hydraulic fracturing is the method used to extract natural gas and oil that is embedded in bedrock, sometimes miles beneath the surface. The extraction of natural gas occurs in several steps. First, a wellbore is drilled vertically underground, which will serve to transport water into the ground and natural gas up to the surface. The well features horizontal branches that extend hundreds of feet in order to access as much oil per wellbore as possible. After the well is dug and put in place, small explosions fracture the rock. The rock is then injected with a high-pressure mixture of water, sand, and chemicals. This mixture allows the natural gas to escape into the well and move up to the surface where it is captured or burned off. It is estimated that there are up to 354 trillion cubic feet of natural gas located in the United States.<sup>17</sup> In 2013, 26 million cubic feet of natural gas was consumed in the United States.<sup>18</sup>

Figure 1: Process of Hydraulic Fracturing<sup>19</sup>



<sup>17</sup> "U.S. Crude Oil and Natural Gas Proved Reserves," *Energy Information Association*, December 4, 2014.

<sup>18</sup> "Natural Gas Consumption by End Use," *Energy Information Association*, November 28, 2014.

<sup>19</sup> "What is Hydraulic Fracturing?" *ProPublica*, <http://www.propublica.org/special/hydraulic-fracturing-national>.

*Figure 1* demonstrates the fracking process. As can be seen, the chemicals are pushed through the well below drinking water tables. There is concern that leaks in the wells or permeation of the chemicals up through the soil could lead to municipal water pollution. Additionally, wastewater storage pits have the possibility for leaking harmful chemicals into the soil, leaching into underground water supplies. Uncertainty as to whether or not the chemicals could gradually percolate through the soil motivates environmental activists to ban fracking or create more stringent regulations for the industry. Proponents of fracking argue that because groundwater wells typically have less than a 1,000 foot depth than there is no real possibility for chemicals to contaminate the waterbeds from fractured shale, which is located 5,000 feet or more underground.<sup>20</sup>

Excess natural gas is burned off in “flares.” Often companies do not have enough transport pipes or high-capacity pipes to move natural gas to storage facilities. When this happens the excess gas is burned on site. Companies try to avoid flaring, but it can sometimes be more economical to burn off the gas than to expand piping infrastructure. Fracking opponents also work to decrease flaring because not only is it wasteful, but it emits greenhouse gases, and can also cause dangerous industrial accidents. Just in 2012, it is estimated that North Dakota lost \$1 billion worth of gas through flaring, which is a green house gas emissions equivalent of adding one million more cars to the road.<sup>21</sup>

Fluids used in fracking can be composed of acid, gel, or water, with hydraulic fracturing using water. The composition of the mixture injected through the well is generally 60 percent water, 40 percent “proppant,” which is the porous sand or concrete that fills the fractures, and less than 1 percent of chemicals. Between three and twelve chemicals are used, which includes biocides and metal stabilizers.<sup>22</sup> In 2011 the Pennsylvania Department of Environmental Protection collected a list of 78 chemicals known to be used in the state’s fracking, with up to 200 different chemicals known to be used by the industry. Some chemicals include hydrochloric acid, which is classified as hazardous under the 1980 Comprehensive Environmental Response, Compensation, and Liability Act.<sup>23</sup> Other hazardous chemicals that have been reported to be found in fracking spills include formaldehyde and naphthalene, both carcinogens; arsenic; ethylene glycol, which can cause kidney

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<sup>20</sup> “Drilling,” <http://www.hydraulicfracturing.com/#/?section=drilling>.

<sup>21</sup> Ryan Salmon and Andrew Logan, “Flaring Up: North Dakota Natural Gas Flaring More than Doubles in Two Years,” *Ceres*, July 2013.

<sup>22</sup> “Chemical Use in Hydraulic Fracture,” *Frac Focus*, <http://fracfocus.org/water-protection/drilling-usage>.

<sup>23</sup> “Chemicals and Public Disclosure,” *Frac Focus*, <http://fracfocus.org/chemical-use/chemicals-public-disclosure>.

damage; endocrine disruptors such as ammonium chloride, xylene, and boric acid; and neurotoxins like toluene and ethylene glycol.<sup>24,25,26</sup>

The chemical composition of fracturing fluid has raised concerns that fracking can lead to water pollution and hurt humans exposed to the chemicals. Exposure to the chemicals could occur through underground water pollution, wastewater spills, and leaks in the wells. Opponents of fracking cite these issues as reasons to ban fracking and seek environmental justice.

### **What is environmental justice?**

The EPA defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations and policies.”<sup>27</sup>

Historically minority communities, including indigenous peoples, have been subjected to environmental pollution and targeted as hosts of landfills, polluting factories, bus depots, and toxic waste dumpsites. The national environmental justice movement took way during the 1980s and took root through several mainstream civil rights organizations. The movement’s first major activism work took place in Warren County, North Carolina where a primarily African American community hosted a highly toxic PCB waste site.<sup>28</sup> Over the past several decades community-based activist movements have occurred around the country, seeking justice from their government and the polluters.

Environmental justice gained regulatory traction in the 1990s under the Clinton administration. In 1994 President Clinton signed Executive Order 12898, which directed federal agencies to address human health issues and environmental justice in their programs.<sup>29</sup> While this executive order was a step forward in dealing with environmental justice issues at the federal level, it has not provided adequate regulatory protection.

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<sup>24</sup> Laura Arenschiold, “Haliburton delayed releasing details on fracking chemicals after Monroe County spill,” *The Columbus Dispatch*, July 21, 2014.

<sup>25</sup> “Q+A: Environmental fears over U.S. shale gas drilling,” *Reuters*, December 23, 2009.

<sup>26</sup> “MU Researchers Find Fracking Chemicals Disrupt Hormone Function,” *School of Medicine*, <http://medicine.missouri.edu/news/0214.php>.

<sup>27</sup> Environmental Protection Agency, “What is Environmental Justice?” <http://www.epa.gov/environmentaljustice/>.

<sup>28</sup> Robert D. Bullard, *Unequal Protection: Environmental Justice & Communities of Color*, (San Francisco:Sierra Club Books, 1994), 5.

<sup>29</sup> “The Environmental Justice Movement,” *National Resources Defense Council*, <http://www.nrdc.org/ej/history/hej3.asp>.

## *Indigenous Environmental Justice*<sup>30</sup>

Like minority communities throughout the United States, Native Americans have also been subjected to disproportionate rates of environmental justice problems, particularly with waste dumping and mineral extraction. There are certain factors unique to environmental justice issues on reservations, including tribal sovereignty and governance; deep, often spiritual, connections to the “homelands;” intersections between human health and indigenous spirituality, and the continuing legacy of colonization. Under current federal regulations and agreements, tribes are defined as domestic, dependent nations with the right to self-govern. The nature of this sovereignty means that their relationship to the federal government is comparable to the relationship between states and the federal government. When considering environmental justice and Native American rights, the traditional tribal relationship with the land must be taken into consideration. Many tribes have “sacred sites,” that are unique to specific, irreplaceable locations. Additionally, some tribes still maintain traditional subsistence lifestyles, where they support themselves from agrarian or herding practices. When Native Americans are exposed to environmental injustices, not only can their health be threatened, but the tribe’s historical way of life and culture is threatened also.

The regulation and control of tribes over their land has been mottled by layers of changing policy. Land and mineral rights have consistently changed over the past two centuries, with tribes being relocated, lands being lost, and ownership rights becoming privatized to individual Native Americans. While tribes combat similar justice issues that are seen in communities of color around the country, attempts to implement environmental justice regulations are complicated by this legacy of colonial policies. Many tribes have implemented policies that have banned harmful mineral extraction processes. The tribes that have not done so call upon the federal government to enforce stricter environmental safeguards.

## **Fracking History and Regulations**

The first commercial fracking well was installed in the United States in 1949 in Duncan, Oklahoma. Since then over one million wells have been built.<sup>31</sup> As technology developed, horizontal drilling allowed hydraulic fracturing to become more lucrative, expanding the industry across the country.

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<sup>30</sup> “What is Indigenous Environmental Justice?” *Native American Science*.  
<http://www.nativeamericanscience.org/courses/environmental-justice-1/indigenous-ej>.

<sup>31</sup> “A Historic Perspective,” *Frac Focus*, <https://fracfocus.org/hydraulic-fracturing-how-it-works/history-hydraulic-fracturing>.

Congress has favored the industry through various policies, including industry exemption from the 1974 Safe Drinking Water Act. In 2005, Congress exempted the natural gas industry from the Act's Underground Injection Control Program, which regulates potentially polluting chemicals injected underground. This exemption specified the "underground injection of fluids or propping agents pursuant to hydraulic fracturing related to oil, gas or geothermal production activities."<sup>32</sup> This exemption from the Safe Drinking Water Act has been referred to as the "Halliburton Loophole."<sup>33</sup>

The oil and gas extraction industry has also been excluded by the EPA from Section 313 of the Emergency Planning and Community Right to Know Act, which mandates that toxic chemical releases must be reported to the public Toxics Release Inventory database. The EPA argues that the industry does not need to be included under this law because producers already report to state agencies that make company's chemical information public. Reporting of chemicals from each extraction site would "overwhelm" the EPA, and is thus best monitored at the state level.<sup>34</sup> A limited number of chemicals are required to be reported at the federal level, which includes those listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act. Otherwise publicly listing the chemicals used in fracking fluid is voluntary, and can be posted to *fracfocus.org*, the national hydraulic fracturing chemical registry. But public disclosure at a national level is often not done because the specific chemicals used are considered trade secrets.

Federal fracking regulation does exist under the Clean Water Act, which requires companies to obtain permits authorized by the state in order to discharge wastewater and build treatment facilities. Critics of the Act argue that the standards are out of date and that the concentrations permitted in wastewater does not adequately protect water quality.<sup>35</sup>

## **Fort Berthold: A Case Study**

### *Background: Fracking in North Dakota*

The Bakken Shale deposit extends from Northwestern North Dakota across Northeastern Montana, and into Southern Saskatchewan. Oil exploration began in North Dakota in the 1940s, but

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<sup>32</sup> Environmental Protection Agency, "Natural Gas Extraction – Hydraulic Fracturing," <http://www2.epa.gov/hydraulicfracturing>.

<sup>33</sup> "Fracking Laws and Loopholes," *Clean Water Action*, <http://cleanwater.org/page/fracking-laws-and-loopholes>.

<sup>34</sup> "Chemicals and Public Disclosure," *Frac Focus*, <http://fracfocus.org/chemical-use/chemicals-public-disclosure>.

<sup>35</sup> <http://www.nrdc.org/energy/fracking-wastewater.asp>

not until horizontal drilling became available was the Bakken Shale drilled. Over the past several years fracking of the Bakken Shale has boomed, attracting companies from around the country and world.

*Figure 4&5: Fort Berthold is located on the Bakken Shale reserve.*



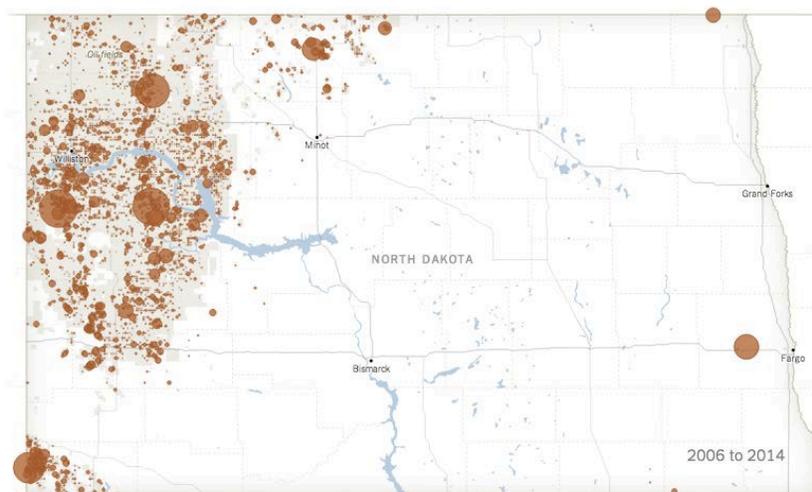
Since 2006 production on the Bakken has increased 150 fold, with 8000 currently active wells. Estimates predict that there could be up to 50,000 wells installed, producing as much as fourteen billion barrels of gas over the next twenty years. There are few gathering pipelines across the Bakken, however, and at least a third of the natural gas is being burned off. State regulators, the industry, and environmentalists all hope to bring this number down significantly. Unfortunately, the state does not currently have the infrastructural oversight in place to monitor the vast amount of pipelines that would need to be installed.<sup>36</sup> Citizens and Native residents are concerned that the lack of state oversight will lead to increased leaks and spills.

North Dakota's primary fracking regulatory body, the North Dakota Industrial Commission, has not upheld the state's policies, which are meant to impose fees on companies that have wastewater or oil spills, or that violate other safety measures. The Commission is composed of three elected officials, often whom are recipients of campaign donations from industry executives and political action committees. This corruption within the board has caused the body to seek reparations for only a small fraction of the spills, which have increased steadily since 2006, as seen in *Figure 5* below.<sup>37</sup>

<sup>36</sup> Edwin Dobb, "The New Oil Landscape: Fracking Frenzy in North Dakota Has Boosted the US Fuel Supply – But at What Cost?" *National Geographic*, March 2013.

<sup>37</sup> Deborah Sontag and Robert Gebeloff, "The Downside of the Boom," *New York Times*, November 23, 2014.

Figure 5: Oil and Wastewater Spills 2006-2014.<sup>38</sup>

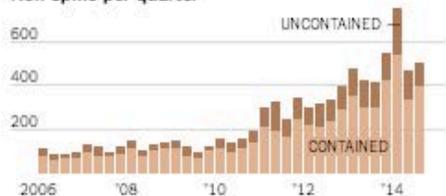


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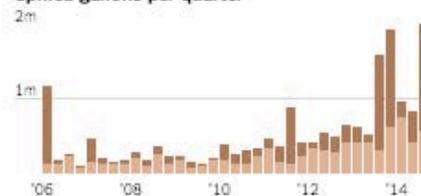
### Oil and Wastewater Spills

More than 18 million gallons of oil and toxic wastewater were spilled in North Dakota from January 2006 to October 2014. Most individual spills were contained to the immediate drilling area, but many of the largest spills polluted surrounding farms and waterways.

New spills per quarter



Spilled gallons per quarter



### Fracking on Fort Berthold

#### Indian Land Rights and Fort Berthold

Fort Berthold, like many other Native reservations, has gone through many changes since the late 19<sup>th</sup> century due to shifting tribal land rights regulations. Following the General Allotment Act of 1887, the Three Affiliated Tribe's reservation lands were allotted to individual Native Americans as individually owned federal trust acreage. The Act parceled tribal lands into individual allotments, with the intent to assimilate Native Americans by limiting collective, land ownership. Allottees in Fort Berthold were also granted subsurface rights, but in 1984 under the Fort Berthold Reservation Mineral Act, 150,000 acres of these allotted subsurface mineral rights were given back to the tribe.

The 1938 Indian Mineral Leasing Act established a series of rules that still influences resource management on the reservation today. The Act prohibited the state from taxing tribal mineral income, established a royalties system, and increased the transparency of federal regulation.

<sup>38</sup> *Ibid.*

Royalty amounts, which are generally at 12.5 percent, and lease terms were made and enforced by the U.S. Geological Survey and the Bureau of Indian Affairs, which still control and dispense royalties today.<sup>39</sup> The 1982 Indian Mineral Development Act gave more control to tribes. Tribes were allowed to enter into a variety of extraction agreements, including leases and joint ventures, negotiate employment preferences, business subcontracting, and improved environmental controls. But the Bureau of Land Management still ultimately has final control over any mineral extraction permit approvals. In 2005 the Tribal Energy and Self-Determination Act increased tribal jurisdiction over leasing and business agreements for mineral exploration and extraction.<sup>40</sup>

Fort Berthold totals 988,000 acres in Western North Dakota. Allottees own 373,000 acres of this land. The tribe itself owns 90,000 surface acres and 230,000 subsurface acres. One-third of the revenue earned on Fort Berthold has gone to the tribal government and the other two-thirds, in the form of royalties and lease payments, has gone to individual tribal members who hold mineral rights, or allottees.<sup>41</sup> The Division of Energy and Mineral Development, a department of the BIA, has helped Fort Berthold at each stage of the extraction, including helping the tribe's market their resources, providing technical assistance during lease negotiations, and help develop long-term economic plans.

Federal offices became more involved at Fort Berthold following hearings addressing delays from the Department of Interior in lease approval. As a result of these hearings the Office of Indian Energy Development created a resource management office on the reservation with staff from six federal offices including the Bureau of Indian Affairs, Bureau of Land Management, and the United States Geological Survey. This office helped expedite leasing permits, bringing more drilling to the reservation. Drilling became more attractive on the reservation when in 2008 the tribe came to an agreement with the state to cap drilling taxes on the reservation at 11.5 percent, with the state collecting the taxes and passing half of the revenue back to the tribe. This agreement has attracted more developers who now don't have to be wary of high taxes from both the state and tribe. Before

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<sup>39</sup> Bureau of Land Management, "Questions and Answers about Leasing," [http://www.blm.gov/wo/st/en/prog/energy/oil\\_and\\_gas/questions\\_and\\_answers.html](http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/questions_and_answers.html).

<sup>40</sup> Maura Grogan, "Native American Lands and Natural Resource Development," *Revenue Watch Institute*, 2011.

<sup>41</sup> Sierra Crane-Murdoch, "The Other Bakken Boom: A Tribe Atop the Nation's Biggest Oil Play," *PERC Case Studies*, November 28, 2012.

this agreement only one fracking well existed on tribal land, but between 2008 and 2010 160 new wells were built on the reservation.<sup>42</sup>

As fracking on the reservation has increased, the tribal government still lacks the capacity to manage oversight for all of the gas production, despite the assistance from federal agencies. The current lack of infrastructural capacity creates regulatory hurdles for the tribe, who lack the ability to ensure all drilling is environmentally sound. Being able to properly oversee fracking is especially important, as the tribe owns a third of the reservation's acres, and the royalties from this land are funneled into the tribal government's treasury. The tribal government reinvests this money in public services on the reservation and also redistributes money back to tribal members annually. While this money has helped the tribe's economy, and supported individuals, for the tribal members who do not have legal stake in the land gained from privately owned subsurface rights, it has become important to ensure that revenue from fracking does not come at the expense of the tribal land's health.

## *Stakeholders*

### *Tribal Council*

As of this fall, the former longstanding chairman of the Three Affiliated Tribes council, Tex Hall, lost his seat, in part due to his support for relaxed fracking safety measures. Mark Fox, the new elected Chairman, and the other six Tribal Business Council members are seeking to protect the tribal members from health problems, in addition to protecting their land, which has cultural and spiritual significance for many members. Mark Fox formerly served as the tribe's tax director, under Tex Hall. In reference to taking the right precautions, Fox stated, "Twenty years from now, if we do it right, we should have things that last us forever. But, if we have worse unemployment, worse health, worse poverty, worse crime, then we've failed. We were better off leaving it in the ground."<sup>43</sup> Following Fox's election to Chairman, he has emphasized his commitment to these principles.

Mark Fox, and the tribe's new attorney, Damon Williams, who was a former attorney for the EPA, have promised to implement tighter environmental regulations, creating stricter standards for spill cleanups. They also promise that the money the tribe earns from fracking will go to projects

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<sup>42</sup> *Ibid.*

<sup>43</sup> Sierra Crane-Murdoch, "The Other Bakken Boom: A Tribe Atop the Nation's Biggest Oil Play," *PERC Case Studies*, November 28, 2012.

that will improve the life of the 12,000 tribal members, such as new roads and drug and alcohol treatment centers.<sup>44</sup> The council also hopes to decrease flaring on the reservation, and is trying to expedite negotiations to build a proposed pipeline that would run through tribal land.<sup>45</sup>

The council hopes to implement more stringent regulation on fracking, but recognizes the economic benefit fracking has brought to the reservation. Reservations have historically had significantly higher rates of poverty than the rest of the country. Due to this, any major economic opportunity for a tribe will normally be pursued. Fort Berthold is no exception, and many residents welcome the fracking industry.

### *Tribal Member Opponents & Supporters*

Now that the boom is in full swing on the reservation, many tribal members resent the fracking growth. Tribal members who do not have allotted mineral rights or can't work on the drilling sites have seen little economic benefit. Those who do have mineral rights but do not want their shared tract drilled can be overruled by a simple majority of allottees who agree to lease the land. The boom may have brought more jobs to the reservation, but the increased demand for housing from migrant workers has actually increased the cost of living. Many Indian families, some who have lived on the reservation for generations, can no longer afford to, and are forced to move elsewhere.<sup>46</sup> Regarding member's resentment, Mark Fox noted, "people think that when there's more money floating around, our lives should be better, but the average person hasn't seen that happen."<sup>47</sup> Additionally the influx of migrant workers to the reservation has increased the crime rates, particularly rates of drug use and violence. There is unfortunately little to do in the area, and when combined with poverty, recreational drug use and trade has significantly increased.<sup>48</sup> However, the tribe does not possess criminal jurisdiction over non-tribal members, even when they commit crimes on the reservation. The inability to try criminals makes it very difficult for the tribal police force to crack down on drug crimes.

Much of the money that the tribe has earned from royalties has gone to improving public infrastructure and services. Many improvements are necessary due to the boom itself. Heavy truck

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<sup>44</sup> Ernest Scheyder, "Can American Indian Reformers Slow an Oil Boom?" *Reuters*, November 3, 2014.

<sup>45</sup> "Tribal Head to Speed North Dakota Pipeline Talks," *Associated Press*, November 21, 2014, <http://fuelfix.com/blog/2014/11/21/tribal-head-to-speed-north-dakota-pipeline-talks/>.

<sup>46</sup> *Ibid.*

<sup>47</sup> *Ibid.*

<sup>48</sup> Sari Horwitz, "Dark Side of the Boom," *The Washington Post*, September 28, 2014.

traffic has damaged the rural roads, necessitating repairs. The tribe has also funneled money into building more public housing and improving their regulatory structures.

Tribal activists also hope to protect reservations natural environment and promote Native environmental justice issues. Theodora Bird Bear, an active opponent to the fracking industry, asserted, “when you have roots buried deep here there’s something intangible that really connects you to the earth...this is our land, this is what we’ve got left and we’ve got to fight for it.”<sup>49</sup> Bird Bear often visits Bismarck, the state’s capital, promoting her issues before state regulators and committee hearings. Bird Bear also advocates for a flaring moratorium, after flaring accidents caused two grass fires near her home. Other activists write letters to tribal leaders and protest the ways in which oil interests have invaded the land. These activists hope to preserve their land for their generation, and in line with environmental justice goals, for future generations. Bird Bear reflects on the importance of the cultural ties to the land, “our tribal culture and existence is based on the principle that the land equals the people: destroy one and you destroy the other.” She wonders, “yes, it’s true our tribe needs money, and it’s nice to get a royalty check every month, but what are we giving up to get it?”

Many members, however, are not taking an active role in fighting fracking. Unsure of the long-term consequences on the landscape, they are allowing the boom to play out in the hopes of economic benefit. If members aren’t passive toward fracking, they strongly support industry and deregulation. Tribal allottees who hope to reap long-term economic benefits from leasing advocate for less stringent regulations. If stricter regulations are imposed, the process of gaining drilling permits will become even more complicated, deterring companies. As it is companies must go through four federal agencies and 49 steps before they can acquire drilling permits.<sup>50</sup>

## **Policy Recommendation**

Tribe activists and tribal government members are struggling to seek the best avenue for which they can protect their reservation. Federally recognized tribes are exempt from most state regulations, and federal regulation of fracking at the reservation level lacks the power and resources to adequately protect reservations.<sup>51</sup> Of importance to the stakeholders, both in the tribal Council

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<sup>49</sup> Curt Brown, “Life in the Boom: Taking a stand on their sacred land,” *Star Tribune*.

<sup>50</sup> Sierra Crane-Murdoch, “The Other Bakken Boom: A Tribe Atop the Nation’s Biggest Oil Play,” *PERC Case Studies*, November 28, 2012.

<sup>51</sup> Bureau of Indian Affairs, “Frequently Asked Questions,” <http://www.bia.gov/FAQs/>.

and individual members, is ensuring that the natural gas extraction will not create long-term damage to the environment or public health. Some are concerned more generally, that unmitigated spills, and lack of drilling oversight will cause environmental degradation. But other Natives are worried that the destruction of the environment will irreparably pollute and damage their historical and spiritual and homelands.

The current and most overarching policy that could affect the Three Affiliated Tribes is the Bureau of Land Management's proposed rule "Oil and Gas: Hydraulic Fracturing on Federal and Indian Lands." The rule was originally proposed in 2012 and applies to public and Indian land, including allotted trustee lands. The rule has gone through several public comment periods, which have since closed, and is on track to be finalized and implemented before the next Congress begins. The rule will mandate disclosure of chemicals used in fracking, tighten regulations of well safety and integrity, and addresses issues related to wastewater.<sup>52</sup> It is currently voluntary for companies to disclose the chemicals used in fracking, but the new BLM rule requires disclosure of all chemicals used to the BLM or posted to FracFocus.org. The new rule emphasizes that the BLM respects and will abide by tribal self-determination and control of resources. For example, the rule recognizes the authority tribes have to implement the Safe Drinking Water Act, and will defer to tribal designations of aquifers or other sacred sites that require protection. The rule also allows tribes to work with the BLM to implement the best standards of technology and fracking processes such that industry operations can remain efficient and cost-effective.<sup>53</sup> After meeting with tribes, who were concerned about the lack of tribal consultation and sovereignty in the proposed rule, including criticism from the Three Affiliated Tribes, the BLM agreed to require industry's compliance with tribal laws.<sup>54</sup>

While there is no language in the proposed rule that references environmental justice, the new regulations comply with environmental justice standards. These standards include the right for the tribe to know what chemicals are being released; stricter standards protecting water and soil, and empowerment to implement tribal rules and decide what water needs protection. While these

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<sup>52</sup> Charlie Passut, "Agenda Shows BLM Frack Rule on Track, But Others Delayed," *Natural Gas Intel*, November 24, 2014.

<sup>53</sup> Bureau of Land Management, Department of the Interior, "Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands," [http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications\\_Directorate/public\\_affairs/hydraulicfracturing.Par.91723.File.tmp/HydFrac\\_SupProposal.pdf](http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs/hydraulicfracturing.Par.91723.File.tmp/HydFrac_SupProposal.pdf).

<sup>54</sup> Mandan, Hidatsa & Arikara Nation Tribal Business Council, "Re: Comments on Revised Proposed Rule for Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands," August 23, 2013.

provisions don't explicitly mention protecting public health, they will create more security against potential negative human health effects. These provisions also cover environmental justice issues specific to Native peoples. Tribal opponents are concerned that the chemicals used during the fracking process could cause pollution and irreversible damage to their culturally important land. The ability for tribe's to regulate their land and choose what land is most important empowers the tribe to protect their culture and sovereignty, while protecting the environment.

The tribe already has tools in place to regulate fracking. This include a tribal energy office that gathers data on fracking functions and serves as a liason between developers, allottees, the federal government, and the tribe. The tribe also implemented a Hazardous Waste Disposal ordinance to regulate the ways in which fracking wastewater is stored and disposed. If the tribe can improve its capacity to implement and regulate existing rules, and the proposed BLM rule, then the tribe's lands and people will be much better protected from the risks of fracking. Moving forward, the tribal council should ensure that all tribal people's voices are heard. Tribal activists, such as Theodora Bird Bear represent a sector of the tribe who care deeply about the land and have done extensive research and outreach in order to protect it. Members like her could provide important insight and information into the ways in which the tribal government can gain profit from fracking, without compromising the land's cultural significance and human health. An important aspect of environmental justice that should be kept in mind moving forward is the ways in which the tribal treasury is spent on the reservation. Many tribal members have not received a huge gain from royalties, nor do they privately have mineral rights. In order to ensure they are benefiting from the mineral extraction, their needs should be heard and represented. Tribal royalty spending should promote economic justice and help all members.

## Section 2

# Renewable Energy

**David Pudlo**, *Not Metering in the U.S.: A State-Level Regulation of the Energy Industry*

**Kathy Long**, *Renewable Portfolio Standards: Should the United States Implement it as a Federal Policy?*

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## Executive Summary

Combating climate change is a major goal of President Obama, and he is currently staking out several actions to make it what he hopes will be his strongest legacy. In addition to Obama's efforts, individual states have implemented varying policies to try to reduce GHG emissions and encourage renewable energy production. Often states encourage federal policies for energy to be put in place. However federal policies are difficult to enact and the process is very slow especially with a divided congress and executive branch. In order to bypass this gridlock it is important to consider alternative pathways such as passing a rule or focusing on state action.

Earlier this year, the EPA issued a the Clean Power Plan (CPP) to solidify the administration's commitment to reducing carbon emissions. The CPP aims to regulate and reduce carbon dioxide pollution from power plants. The rule acknowledges the success of many states' efforts such as the Renewable Portfolio Standards (RPS) and Net Metering Policies (NMP) to cut emissions and encourage renewable energies by introducing a level of flexibility for the states. The plan sets standards for each state, but leaves it up to legislators to decide on the route most appropriate. Within the CPP, there are 4 building blocks to combat greenhouse gas emissions, the first block focuses on making fossil fuel power plants more efficient, the second focuses on switching from coal fired power plants to low emitting natural gas plants, the third block encourages switching to renewable energy resources as well as nuclear power and finally, the last block increases encourages using electricity more efficiently. RPS and NMP intersect with the CPP because their goals fall under the third building block

One approach for climate change policy is to regulate from the bottom up by ensuring an incentive structure for energy forms, such as distributed solar photovoltaics. Net metering is a way of regulating a certain standard for consumer side generation, requiring that electric utilities effectively buy back the excess energy that somebody with solar panels produces. This policy has been implemented in various forms in 43 states (DSIRE, 2014), and has had success in increasing demand for solar energy as well as increasing the clean energy economy. Electric utilities stand to lose up to 41% of their revenues with even low market penetrations of solar (Satchwell et al, 2014), and have been pushing back against net metering: claiming that it unfairly places the burden of the fixed costs of the grid on lower-income communities. Net metering is about requiring that all producers of energy be compensated, and is an equitable way of regulating renewable generation, especially when aggregate options for net metering are implemented. Net metering is an approach

that should be used in tandem with other regulations, and it it lines up with the third building block of the CPP.

Another approach to address climate change is a top down, or generation-side, approach via the RPS since utility companies are required to produce a certain percentage of electricity from renewables such as wind and solar. Often times these standards can be met through Renewable Energy Credits (REC). Despite facing technical challenges like transmissions lines and production caps and political challenges from legislators and organizations trying to repeal RPSs, 30 states have implemented the policy in the past 30 years which in total accounts for around 42% of electricity sales. Furthermore, RPSs are fundamentally changing the behavior of actors supplying and overseeing state's electricity. In the end, both of these approaches work on their own, and fit in with the CPP, but could really stand to use the federal oversight of a national policy. The following papers will dive more deeply into the details of both RPS and net metering, conveying the current policy landscape, options, and developing recommendations for furthering and/or renovating the policy structures already in place.

# Section 2.1

## Renewable Energy

***Not Metering in the U.S.: A State-Level Regulation of the Energy Industry,***

**by David Pudlo**

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U.S. Environmental Politics  
Environmental Studies Program

# Net Metering in the U.S.:

## A State-Level Regulation of the Energy Industry

### Summary

Distributed solar has the potential to radically disrupt the current electric utility system, with 41% revenue losses projected with only 10% market penetration of solar photovoltaic systems (Satchwell et al., 2014). Net metering policies require the utilities to essentially back rooftop solar electricity at retail rates by providing use credits to energy consumers who generates their own electricity, either at a residential or commercial location. Electric utilities, citing these revenue losses, say that the fixed costs of the grid will be unfairly born by economically disadvantaged people, which some point out will disproportionately affect Black people. The solar industry, citing system-wide economic, human health, and environmental benefits, argue that the potential rate increases are a fault of the way electric utilities are currently incentivized, and that the utilities are hypocritical in using economic equality arguments as they've historically benefitted from continually raising rates (and are only expressing concern because distributed solar will affect their profits).

Many policy options are available for setting up a net metering policy, including capacity and energy generation limits on an individual or aggregate basis, specifying the technology used, choosing the reimbursement rate for the power generated, and specifying the size of power provider regulated (EIA, 2012). There are also ways to expand net metering's impact into communities of lower-income through aggregated and community net metering. These change the way that distributed solar energy is incentivized exist, but tend more towards adjusting rates than towards the comprehensive system incentive structure overhaul that is needed.

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# Mercury Emissions from Electric Power Plants: An Analysis of EPA's Cap-and-Trade Regulations

## **Background**

The electric utility industry is scared of rooftop solar. Recent studies have shown that the growing trend of residential and commercial scale solar installations, with net metering regulations in place, could be disruptive to the current profits of the electric utility companies. Net metering regulations state that electric utilities must buy back at retail rates the excess energy produced by those with solar panels. These companies have been pushing back on net metering regulations, arguing that they will place a burden on those who cannot afford solar on their roofs. They argue that those without solar are forced to pay for the fixed costs of the electric grid for which those using solar don't pay, making the issue of net metering one of economic justice. However in advocating for reduced rooftop solar incentives, the utilities ignore ways in which the system could be set up and used without disproportionately affecting those who are less economically advantaged. They also fail to take into account the environmental justice issues of the current electric system setup.

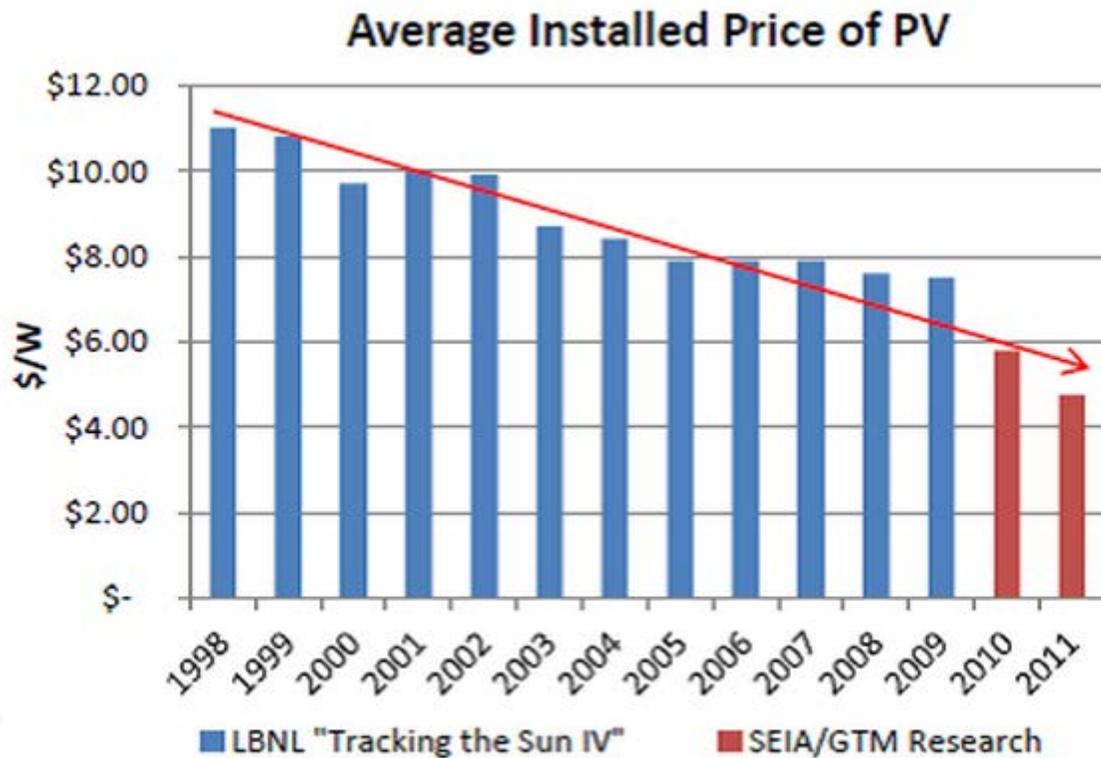
## **Why Solar?**

Solar electricity is beneficial for the nation and the people in it for both economic and environmental reasons. Getting our energy from this renewable source instead of fossil fuels reduces air pollution and greenhouse gas emissions; encourages economic development and job creation; increases the security and reliability of the electric grid; and increases energy independence (FTG, 2014). This emission-free generation also empowers local communities and discourages the use of polluting fossil fuel plants which are disproportionately located near low-income neighborhoods. Rooftop or distributed solar electricity (typically from photovoltaic panels) in particular is appealing as a renewable energy approach as it doesn't require significant dedicated land and has the potential to achieve a significant contribution to future energy needs.

In order to encourage distributed solar systems, various levels of government have set up incentives, often financial, to encourage the development of solar energy. Incentives involve financial incentives, such as tax incentives or loan programs, or regulatory incentives, such as solar access laws, renewable portfolio standards, or net metering. As examples, there currently exists a 30% federal tax credit for installing residential solar called the Solar Investment Tax Credit (SEIA). Many states also offer similar tax credits, such as North Carolina, which has a 35% personal tax

credit for commercial or residential renewable technologies including solar photovoltaics (DSIRE, 2014). Many states also have Renewable Portfolio Standards (RPS), which require a certain portion of a state’s electricity generation to come from Renewable Energy, in place, often with carve-outs for solar energy. The focus of this paper is on the implementation of net metering policies as a policy method of regulating a direct-to-consumer financial incentive.

At least partially as a result of these incentives, the amount of solar energy produced has just about tripled since 2010 (Kind,2013), and prices on solar have been plummeting in recent years, as shown in Figure 1.



Source: SEIA, 2012.

Figure 1: Falling costs of installed solar modules in the US (Clemmer, 2012).

### What is Net Metering?

Net metering is a way of having those generating their own electricity, usually from solar photovoltaic panels on their roof, in essence be paid for the energy they produce. This works because buildings with solar are still connected to the electrical grid, and with net metering in place these buildings can both draw energy from the grid and send it back. As an example, if a home is

net metered the electricity meter will run backwards, giving that house credits for electricity used when the solar panels aren't producing electricity. The excess electricity goes towards those homes on the grid nearby.

The details of implementation vary state by state, but the pay back usually happens with the form of kilowatt-hour (kWh) credits, and often a cap on the amount of payback a unit can receive is set. For context, a typical American household uses 10,837 kWh (EIA, 2012), and houses with solar only output 20-40% of the solar energy produced back to the grid (SEIA "Net Metering", 2014). Depending on the state, either the customer or the utility will be able to claim ownership of the renewable energy credits (RECs), which credits given for renewable energy generation and can be used to fulfill RPS requirements, for the solar generation. Net metering is a popular incentive structure for solar, as it proves to be relatively simple from a policy perspective, over 40 states have implemented some version of net metering regulation (see Figure 2). It prevents the excess electricity from not being used or being used by the utility without them paying for it, which would have meant free revenue for the utility company.

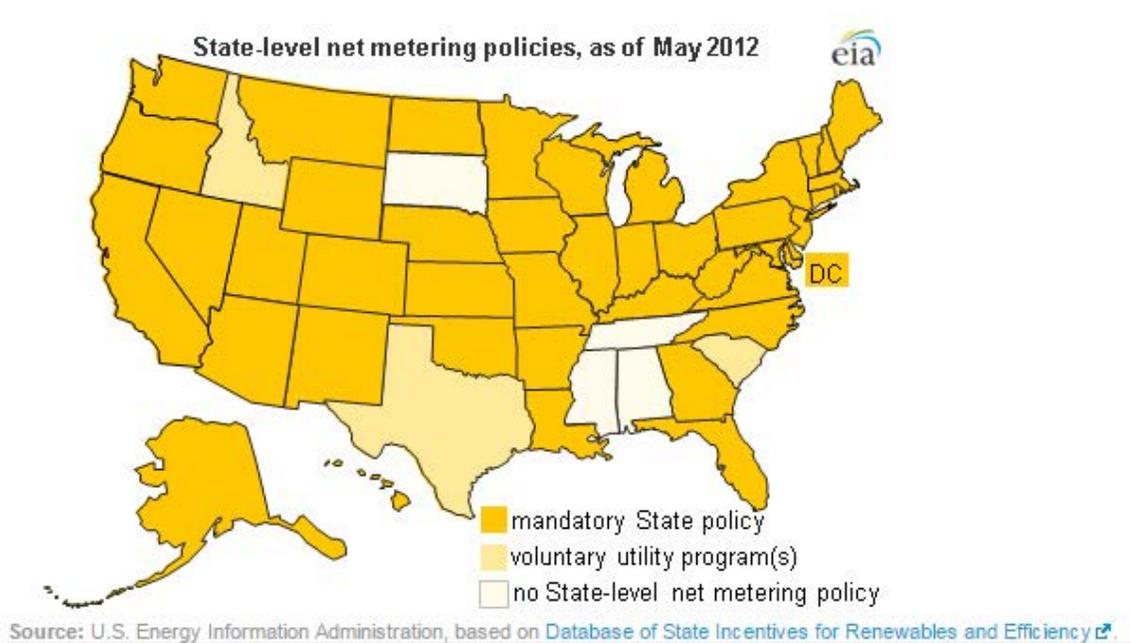


Figure 2: Status of state net metering policies in the US, including whether programs are voluntary or mandated (EIA 2012).

## Electric Utility Structure and Regulation

There are currently over 3000 public, private and cooperative utilities in the U.S., connecting 1,000 independent power generators to consumers (RAP, 2011). The way that these electric utilities

are currently structured incentivizes more expensive means of electricity generation. Most electric utilities are Investor-Owned Utilities (IOUs), as opposed to Publically-Owned or cooperative utilities, and they serve around 70% of America’s customers (Roberts, 2013). The electricity being distributed is 67% fossil fuel based, with 39% coming from coal (EIA, 2013), predictable sources of generation. However this industry is undergoing a structural evolution to try and accommodate growing trends of unpredictable sources, notably renewable energy generation and distributed solar generation (Black & Veatch, 2012).

Most aspects of the utility industry are regulated by the states, as the federal government only intrudes into private economic activity when interstate commerce is involved as mandated in the U.S. Constitution (RAP, 2011). This means that the federal government, mostly through the Federal Energy Regulatory Commission (FERC), will regulate interstate transmission and wholesale power sales. Retail rates and distribution service are state regulated, and facility siting and environmental impacts can be regulated locally (RAP, 2011).

The way that IOUs are regulated varies by state, but ultimately they have to have proposed electricity price rates approved by a Public Utility Commission (PUC). This process uses the basic revenue requirement formula shown in Figure 2 to determine how much money they will need to collect. This revenue is then split amongst the consumers to determine the electricity rates. First, the utilities, in a proposal to the PUC, estimate what the coming customer demand will look like and what infrastructure they will need to invest in to meet said demand; this is the rate base investment. This gets multiplied by a rate of return that is determined appropriate and summed with the operating expenses of the utility company to get what is known as a Revenue Requirement. The revenue requirement is the total amount of revenue that the utility would need to collect to obtain a “reasonable opportunity to earn a fair rate of return on its investment” (RAP, 2011), as determined by the utility company and the PUC.

$$\text{Rate Base Investment} \times \text{Rate of Return} + \text{Operating Expenses} = \text{Revenue Requirement}$$

**Figure 3: The Basic Revenue Requirement Formula, used in determining an electric utilities price rates (RAP, 2011).**

This regulatory infrastructure is inherently biased towards maximizing the rate base investment, as it is the main tool by which a utility company grows its revenue requirement. This incentivizes making more investments, which are primarily in infrastructure, including power plants, fuel sources and distribution, and transmission lines. This structure does not encourage

utilities to push for cheaper options of meeting need, such as energy efficiency efforts or renewable energies, as they do not provide for as large of a profit. As Craig Lewis, the executive director of the Clean Coalition explains, this structure “*encourages utilities to favor expensive investments even if new, affordable solutions - such as energy efficiency, demand response and local renewable generation - offer a cheaper alternative. This has led to an inefficient and overly expensive electricity system*” (Lewis, 2014). He goes on to illustrate this point with the fact that New York only uses 60% of the total capacity of its electrical distribution system, and that “*New Yorkers pick up the tab, through their utility bills, for this oversized system*” (Lewis, 2014). Ultimately, the important takeaway is that the way utilities rates are regulated currently encourages expensive infrastructure investment and increasing electricity consumption.

## **Net Metering Policy**

Prices on solar have been plummeting in recent years, as shown in Figure 1. This is largely due to governmental incentives, including the 30% federal tax credit for residential systems (6) and state net metering regulations. Net metering regulations were put into place to incentivize solar electricity production, and have been shown at the state level to save grid-level costs, increase jobs in renewable sectors, and even decrease the cost of energy (Coalition for Solar Rights, 2014). Instituted at the state level, they require electricity utilities to buy back excess energy from solar panels at retail prices. They are currently in place in 43 states (Figure 1) and are a key part of encouraging solar energy. If an electricity customer produces as much energy as they consume, ultimately they pay nothing to the utilities. The concern is that these net-zero customers would not pay towards any of the utility’s fixed costs for maintaining the grid. The utilities argue that as more people move to rooftop solar, it would force the fixed rates onto a smaller and smaller group of people who would have to pay increasing rates.

## **Stakeholder Opinions**

### **Electric Utilities**

Electric utility companies stand to lose 41% of their revenues from a 10% market penetration of rooftop solar, a relatively low penetration (Satchwell et al., 2014). Not surprisingly, these companies are strongly against net metering regulations. Electric utility arguments are based mostly on three arguments, that under the current scheme

- 1) connecting all of the new sources will be more costly,

- 2) distributed solar leads to a feedback cycle of revenue loss for the utilities, and
- 3) those costs and revenue losses will be forced upon those still paying electricity rates.

Utilities are only just now beginning to deal with the rise in distributed solar energy. As John Chevette, the president of utility consulting company Black & Veatch, put it: “Perhaps the biggest challenge to electric utilities today is the fundamental threat to their business model posed by distributed generation” (Black & Veatch, 2012). This is because of the “revenue erosion” that results when people send electricity back to the grid. Not only are these people not paying for an amount of electricity that they might have otherwise, but they also decrease the total amount of electricity that needs to be distributed as their excess energy flow to neighbors, a shorter trip than if the energy was coming from a power plant through the distribution system.

The utility companies that net metering policies are unfair because the policies would force the fixed costs of the grid onto those without the ability to install their own solar. They argue that those without solar would in effect be getting a free ride for the benefits of being connected to the grid, such as off peak-hour energy supply and the reliability associated with the grid, while those without solar would be left to pay for those costs.

However the paper which most utilities cite also downplays the significance of revenue erosion on increasing rates, stating that “*Compared to the impacts on ratepayers, the impacts of customer-sited PV on utility shareholders are potentially much more pronounced*” (Satchwell et al., 2014). This is an interesting tension between this statement and the much more public arguments made earlier.

## **Solar Industry**

The solar industry is fiercely defendant of net metering policies, as well as distributed electricity generation in general. It argues that the current electric utility system is not set up to act in the general public’s best interest, both in terms of economic and environmental justice. It also argues that when looking at the electricity distribution system as a whole, distributed solar ultimately lowers costs.

The price of solar energy has also fallen dramatically (see Figure 1 again), and the solar industry points to this as a way of avoiding the problem of having those who cannot afford solar pay for the fixed costs of the grid. Solar leasing, for example, has become a popular model of making solar affordable. In solar leasing the customer doesn’t have to pay money upfront for solar panels,

they simply have the solar company install the panels and pay the solar company a fraction of what the electricity costs on the grid. The solar company picks up the difference to pay off the capital investment and eventually collect profit. Often however these programs can require a strong credit score, which can act as a barrier to entry for many of the low-income groups of people which this is proposed to help.

The Solar industry also argues that distributed solar energy actually decreases grid costs when looking at a system perspective. According to a study of California's net metering policy by Crossborder Energy (Beach et al., 2013) they found a number of costs that are avoided for everyone on the grid. These benefits included avoided energy costs, avoided capacity costs for generation, reduced costs for ancillary services, lower line losses on the transmission and distribution system (T&D), reduced investments in T&D facilities, and lower costs for the utility's purchase of other renewable generation (Beach et al., 2013). They found that in California, those benefits were \$92.2 million larger per year than the costs to manage a net metering program and the lowered revenue to cover utility infrastructure costs (Beach et al. 2013). A similar study run in Mississippi found, through the benefits laid out in Table 1, that from "a Total Resource Cost perspective, solar net metered projects have the potential to provide a net benefit to Mississippi in nearly every scenario and sensitivity analyzed" (Stanton et al, 2014). Another important consideration is that rooftop solar, under some policy considerations, could count towards a utility's Renewable Portfolio Standard requirements.

Table 1: List of potential costs avoided by using distributed generation (Stanton et al., 2014).

Avoided Costs	Description
Avoided Energy	All fuel, variable operation and maintenance emission allowance costs and any wheeling charges associated with the marginal unit
Avoided Capacity	Contribution of distributed generation to deferring the addition of capacity resources, including those resources needed to maintain capacity reserve requirements
Avoided Transmission and Distribution Capacity	Contribution to deferring the addition of transmission and distribution resources needed to serve load pockets, far reaching resources, or elsewhere
Avoided System Losses	Preventing energy lost over the transmission and distribution lines to get from centralized generation resources to load
Avoided RPS Compliance	Reduced payments to comply with state renewable energy portfolio standards
Avoided Environmental Compliance Costs	Avoided costs associated with marginal unit complying with various existing and commonly expected environmental regulations, including pending CO <sub>2</sub> regulations
Market Price Suppression Effects	Price effect caused by the introduction of new supply on energy and capacity markets
Avoided Risk (e.g., reduced price volatility)	Reduction in risk associated with price volatility and/or project development risk
Avoided Grid Support Services	Contribution to reduced or deferred costs associated with grid support (aka ancillary) services including voltage control and reactive supply
Avoided Outages Costs	Estimated cost of power interruptions that may be avoided by distributed generation systems that are still able to operate during outages
Non-Energy Benefits	Includes a wide range of benefits not associated with energy delivery, may include increased customer satisfaction and fewer service complaints

Distributed Solar reduces the overall cost of the system, making for a more resource and money efficient system. However this does not help the utility companies as they directly profit from those extra costs. The solar industry argues that, because of the demonstrated financial benefits, any electricity rate raises are due to the poor setup and planning of the electric utilities (Roberts, 2013).

## Environmental Justice Opponents

In response to the concern over the possible rate increases for low-income people, some groups representing black legislators have come down hard on net metering. The National Policy Alliance (NPA), a coalition of African-American politicians which counts the Congressional Black Caucus, the National Conference of Black Mayors, and black local legislators as members, recently put out a proposal with strong wording against net metering. Their proposal includes *“net metering policies allow customers with rooftop solar or other DG systems to unfairly profit from exporting excess energy back to the grid while penalizing customers with basic energy needs who cannot afford rooftop solar or other DG systems”* and asked for state policymakers and regulators to create a fixed grid charge. Ultimately, as the NPA’s executive director Linda Haithcox puts it *“The main issue is that those who have the funds to put up solar energy panels feel they do not need to pay for the costs of the grid... The fact they feel they should not have to pay for the grid puts the burden of the*

*remaining costs on those who need the most assistance*” (Mock, 2014). The NPA’s resolution was submitted by the Edison Electric Institute (EEI), an association which represents IOUs (Mock, 2014). Also, most of the language was drafted by the American Legislative Exchange Council (ALEC). Both the EEI and ALEC are well known for having a conservative bias and funding from the fossil fuel industry (SourceWatch, 2014 and Graves, 2011).

## **Environmental Justice Proponents**

However not all groups that advocate for traditionally oppressed groups are opposed, as the National Association for the Advancement of Colored People (NAACP) is an outspoken advocate for net metering and clean energy in general. They support “energy democracy” projects, arguing that distributed solar gives individuals more control over their energy system and more of an economic voice (Mock, 2014). The NAACP also supports community-based solar projects as ways of delivering the benefits of solar to those in lower income areas by pooling resources (Mock, 2014). Jeanette Williams, president of the NAACP’s Tri-State Conference of Idaho, Nevada, and Utah supported keeping the net metering laws, saying that *“The costs of continuing on the fossil fuel-dependent paths are disproportionately borne by low-income communities and communities of color”* while *“the development of clean energy sources, such as solar, provides an opportunity to improve the health and well-being of everyone while creating economic enterprise opportunities”* (Williams, 2014). More than two-thirds of black Americans live within 30 miles of a coal-fired power plant (Williams, 2014), and are exposed to pollutants such as smog, lead, asbestos, mercury, and arsenic as a result. These can lead to a number of respiratory illnesses, birth defects, learning problems and more (Williams, 2014). For these reasons the NAACP has often come out in support of net metering as a way of moving away from the health consequences of prolonged exposure to power plant pollutants.

The public opinion of disadvantaged groups holds similarly positive views towards taking action on climate change and incentivizing clean and renewable energy efforts. It has been shown that increasing solar electricity generation decreases negative health and environmental effects of fossil fuel pollutants, can be made as an effective public facility, and fits at the core of community development (Sanders and Milford, 2014). The Joint Center for Politics and Economic Studies 2010 report of black voters in South Carolina, Arkansas, Indiana, and Missouri found that a majority would be willing to pay an extra \$10 on their electric bills to fight global warming (Bositis 2010). A Green For All report found that 75% agree that “new carbon emission standards will spur research

and innovations that will not only keep costs down but, more importantly, create new industries with good-paying jobs”(Green For All, 2014).

## **Policy Alternatives**

Opponents seem to imply that there is only one type of net metering [why?], but really there are a number of options a regulatory agency can use when setting up a net metering policy. The options include specifying technology and fuel, setting capacity limits, setting aggregate capacity limits, specifying the size or type of power provider regulated, and the compensation provided (EIA, 2012). Specifying the technology or fuel means setting what types of generation are eligible for net metering. For example, Florida’s program allows for solar panels to be counted but does not count landfill gas generators. Capacity limits means limiting the total compensated power output of a generation system. These can vary from 25 kW in Nebraska to 100 kW in Washington to 125% of a residence’s demand in Arizona (DSIRE, 2014). Aggregate capacity limits, where the total power of distributed energy for a neighborhood or region can also be set. Customers can either receive what is effectively retail rates for their power (as they get energy credits towards their bill), or in some states receive wholesale prices, which are lower than retail prices.

In addition to convention net metering policies which deal with individual residential or commercial sites, there are other types of net metering policies which allow for multiple meters or properties to take advantage of a single generator. These included aggregated net metering, virtual net metering, and community net metering (a detail of which states have these types is found in figure 3). These policies allow for a community to pool its resources to receive the benefits of solar generation and the net metering incentives, and are an effective tool for providing solar power incentives to those of lower income.

To understand how all of these options can come together to form successful policy, we turn to the states. Colorado is an example of a state with a strong and successful net metering policy. Colorado allows for net metering with a limit of 10 kilowatts (kW) for residential systems and 25 kW for non-residential systems (DSIRE ‘Net Metering’, 2014). The excess electricity generated by a solar system is carried forward as a credit on the customer’s next power bill as a kWh credit at the utility’s retail rate. At the end of a year-long billing period, customers can opt to have their credits roll-over to the next billing period or be bought back by the utility company at a rate lower than the retail rate. Customers own the RECs for the electricity generated with their system. This system has driven demand for solar in the state, a plurality of state voters without solar (46%) saying that they



the issue of increased rates on consumers. Most worth noting is the option of having customer-sited photovoltaics count towards RPS, as it would potentially deal with the potential for increased rates on customers. It also has its drawbacks, as it means that utility companies would be getting the credit for decision to switch to renewables when the decision was really made by the customer. The electric utility industry has also considered instituting a “*monthly customer service charge to all tariffs in all states in order to recover fixed costs*” (Kind, 2013). Tariffs here refer to the conditions, terms, and prices of utility services (RAP, 2011). However this is a crude alternative, not taking into account any way of shaping or incentivizing continual improvement of the grid, as all extra costs are simply passed along to customers.

**Table 2: Strategies to mitigate revenue erosion examined in (Satchwell et al, 2014) and their effects.**

Mitigation Measure	Revenue Erosion	Lost Earnings Opportunities	Increased Rates
Revenue-per-Customer (RPC) Decoupling	●		○
Lost Revenue Adjustment Mechanism (LRAM)	●		○
More Frequent Rate Cases	●		○
No Regulatory Lag	●		○
Current & Future Test Years	●		○
Increased Demand Charge & Fixed Charge	●		○
Shareholder Incentive		●	○
Utility Ownership of Customer-Sited PV		●	○
Customer-Sited PV Counted toward RPS			●

- Primary intended target of mitigation measure
- May exacerbate impacts of customer-sited PV

Another option for U.S. utilities involves overhauling the entire incentive structure of electric utilities in a way that encourages renewable energy and is more flexible in dealing with the distributed energy infrastructure. This idea stems from both utility industry groups and renewable advocates, and involves developing “*a tariff structure to reflect the cost of service and value provided to [distributed energy] customers*” where value is defined as “*off-peak service, back-up interruptible service, and the pathway to sell [distributed] resources to the utility or other energy supply providers*” (Kind, 2013). Though Kind represents an industry funded group, the core of the idea could bridge the gap between those in the utility industry and those in the solar industry. One could see a system where this new fee and revenue structure applied to all customers (not just those who own distributed solar as Kind implies) and served as the basis for a new pricing regime.

One business-led solution comes from overseas: E.ON, Germany’s largest electric utility, has decided to abandon the fossil fuel-heavy conventional energy market in favor of a new business model (Hockenos, 2014) in response to similar pressures to utility companies here in the U.S. This new model will be based on renewables, intelligent grid systems, energy management, and other

services, and serves as an example of charging for the actual services provided to consumers instead of using electricity rates as a proxy. It stands as a more flexible business model that can accommodate multiple energy sources.

## **Recommendations**

The first category of policy changes involves adjusting the rates and terms at which customers are paid for the energy from their distributed energy systems. The Interstate Renewable Energy Council, Inc. (IREC) has established a set of best practices for net metering, recommending having no aggregate system capacity limit for energy sold back to the grid, that utilities should not be permitted to impose an application fee for net metering, and that utilities should not impose any charges or fees for net metering that would not apply if the customer were not engaged in net metering (DSIR, 2014). These recommendations serve to create an appropriate incentive for solar energy. However, if one is to really deal with the issue of economic equality for access to these renewable resources, one must deal with the current utility incentive structure which is inherently set up to encourage and enable constant price rate hikes at the expense of customers.

The creation of a new regulatory structure for electric utilities proves to be a difficult one, as the current regime is so large. It seems unlikely for any major overhauls, especially at the federal level, in the near future, but policymakers should be aware of the changes currently happening and some of the criteria for a comprehensive overhaul. This will allow for policymakers and regulators to adapt to changes such as the shifting electric market structure in Germany, with electric utilities switching to renewable-based models instead of traditional fossil fuel-based models. Such a comprehensive overhaul should take into account the externalities of fuel use, ways to involve lower income areas in the benefits, and ways to more aptly quantify and distribute the costs of a smarter grid. Such systems could involve a membership based revenue model for grid connection, or perhaps a flat distributed fee with another regulatory framework, such as an aggressive RPS, incentivizing progress towards a cleaner energy economy.

Ultimately, any net metering policy should be considered in the larger context of supporting and incentivizing solar energy and other renewables. This is a field of strong economic growth, the potential for a more democratic, distributed energy system, and strong environmental benefits. Net metering should be used in conjunction with other policies such as the RPS or tax credits. Financial incentives, especially tax credits, are also beneficial in alleviating concerns over the affordability of solar systems and thus the potential for increased rates on those who cannot afford it.

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## Section 2.2

### Renewable Energy

***Renewable Portfolio Standards: Should the United States Implement it as a Federal Policy?***

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U.S. Environmental Politics  
Environmental Studies Program

## **SUMMARY**

In the past 30 years, many states have passed Renewable Portfolio Standards (RPS) in the hopes of reducing carbon emissions while creating clean jobs and increasing more renewable energy (RE) resources. RPSs mandate that state utilities must generate and sell a certain percentage of their electricity from a RE resource by a specific target date. The target percentage usually ranges from 10% to 40%. Many states have been successful at meeting and surpassing their goals, but some others have lagged behind and are facing many difficulties.

RPSs have been popular at the state level; 30 states had adopted them as of December 2014. The first RPS was implemented in the mid 1980s, but they did not really start to ramp up until the mid 2000s. Since every state has different renewable development potential, different access to renewable resources and different infrastructure in place, regulators have allowed utilities to use a renewable energy certificate (REC) trading system so that states can buy credits from other states in order to meet their targets. The REC systems are not regulated but are seen as a currency for RE and green power markets in the states that have RPSs. Increasingly state and local governments are also using RECs as a credible way to meet environmental goals for RE generation. RECs will be able to account for some of the differences between each state's renewable generation capabilities.

Economically, RPSs encourage RE production, create clean jobs, and reduce energy costs in the future as renewable resources become more affordable. However, there are mixed reactions to the RPSs and conflicting data about the effectiveness of the policy at the state level. Since every state is so different, RPSs have a lot of flexibility and states are able to set their own targets, caps and etc., but this means that there is no federal policy to regulate utilities and ensure that they will meet the targets and receive penalties for failing to comply with the standards. The public opinion of RPSs is positive, but legislators and utilities are hesitant to adopt a federal policy. In my paper I will outline the RPS policy landscape and history and establish the political and technical challenges that RPS policies are facing. In addition, I will bring to light the opinions of various stakeholders like the general public, legislators and utility companies before I propose my recommendations for how the U.S should approach implementing a federal RPS.

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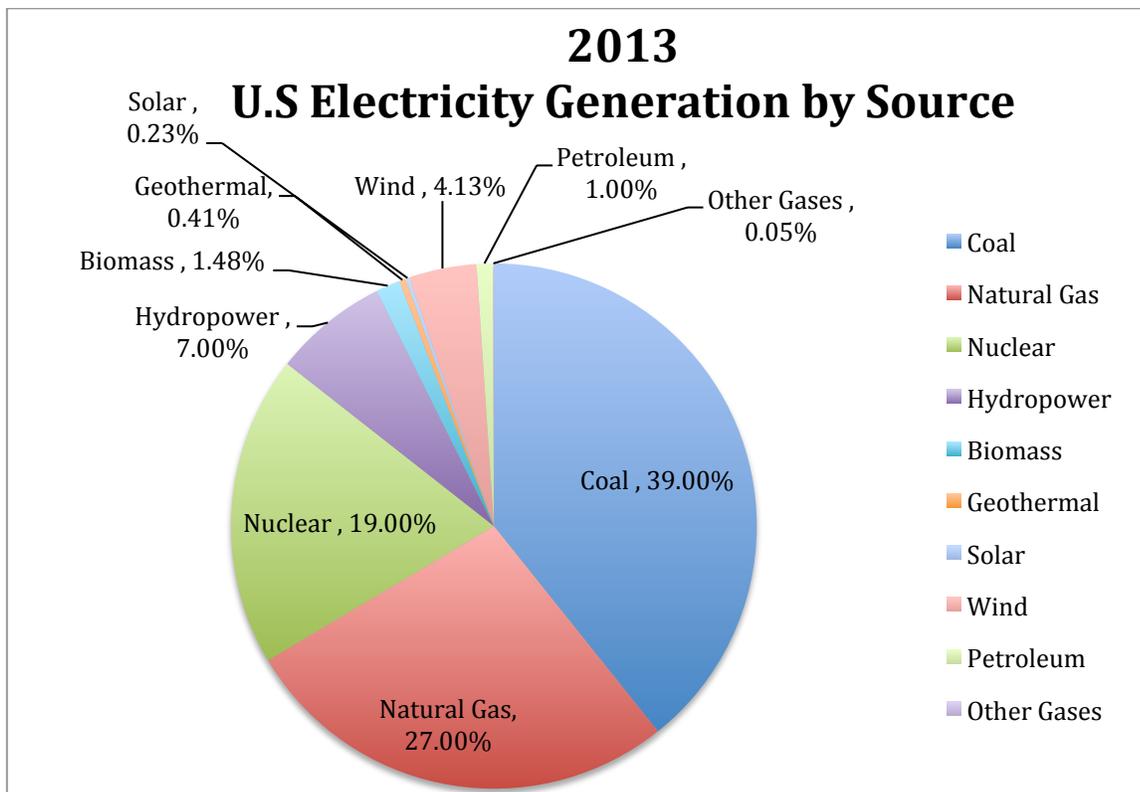
## RENEWABLE PORTFOLIO STANDARD TIMELINE

State	Start Year	Goal	End Year	Cost Cap	On target?	2009 production level
Iowa	1983	105 MW	1999	No	Yes	14.50%
Nevada	1997	25%	2025	None	No	11.20%
Massachusetts	1997	22%	2020	8%	No	3%
Wisconsin	1998	10%	2015	None	No	2.10%
Connecticut	1998	27%	2020	7.10%	No	4.70%
Texas	1999	10,000 MW	2025	3.10%	Yes	5880MW
New Jersey	1999	24.50%	2020	12.60%	No	1.53%
Maine	1999	40%	2017	6.10%	No	0.50%
Hawaii	2001	40%	2030	None	Yes	18.80%
New Mexico	2002	20%	2020	3.50%	No	4.70%
California	2002	33%	2020	N/A	No	13%
Rhode Island	2004	16%	2020	9.50%	No	2.10%
Pennsylvania	2004	18%	2020	None	No	2.40%
New York	2004	29%	2015	1.70%	Yes	23.00%
Maryland	2004	20%	2020	6.50%	No	4.19%
Colorado	2004	30%	2020	2.00%	Yes	5.70%
Montana	2005	15%	2015	0.10%	Yes	8.50%
Delaware	2005	25%	2025	3%	Yes	12%
Washington, D.C.	2005	20%	2020%	7.60%	N/A	N/A
Washington	2006	15%	2020	4%	Yes	5%
Arizona	2006	15%	2025	None	No	0.30%
Oregon	2007	25%	2025	4%	Yes	10%
North Dakota	2007	10%	2015	N/A	Yes	8.10%
New Hampshire	2007	24.80%	2025	7.30%	No	2.54%
Missouri	2007	15%	2021	1%	N/A	1%
Minnesota	2007	25%	2025	None	Yes	13%
Illinois	2007	25%	2015	1.30%	No	1.50%
North Carolina	2007	12.50%	2021	1.40%	N/A	1.50%
Ohio	2008	25%	2024	1.80%	Yes	0.36%
Michigan	2008	10%	2015	3.10%	Yes	3.20%
Kansas	2009	20%	2020	N/A	No	5.10%
Oklahoma	2010	15%	2015	N/A	N/A	3.10%
Indiana	2011	10%	2025	N/A	N/A	N/A

Source: Compiled information in graph from Durkay and Institute for Energy Research. This chart is for reference to understand the vast differences in targets, caps, end years and production levels of each state that has enacted a RPS.

## INTRODUCTION

State governments have always been sources of innovation for environmental policies. State leaders have adopted programs to reduce carbon emissions and encourage the growth of renewable energy (RE) resources. The Renewable Energy Portfolio Standard (RPS) is a state level regulation requiring a state's retail electricity suppliers to produce and sell a certain percentage of their electricity from wind, solar and other renewable resources utilities (EIA). Existing hydropower and municipal solid-waste generation resources are not considered under most RPSs, but are deducted when utilities calculate their RE obligations (Logan). RPSs are created to diversify electricity production, increase RE use, reduce reliance on fossil fuels, ensure renewable resources become costs competitive, and reduce carbon emissions (Carley). Typically, these policies are enforced with penalties and are accompanied by a tradable renewable energy certificates (REC) program to make compliance easier (Barbose). The breakdown of electricity in the U.S in 2013 shown in figure 1 shows that total RE production in the U.S currently makes up less than 6% of the total.



**Figure 1.** The U.S. electricity breakdown in 2013. RE accounts for less than 6% excluding nuclear and hydropower ("What Is U.S. Electricity Generation by Energy Source?").

## **TECHNICAL BACKGROUND**

States have control over how they will meet the RPS and often the renewable resources that are chosen are tailored to fit each state's resource base (EIA). Specific RE technologies are incentivized to meet economic development goals, diversify the energy supply, and expand energy production and environmental objectives. RPS and REC regulations vary from state to state with regards to the minimum amount of RE production, time of implementation, available technologies and resources, and the overall policy design (EPA). Furthermore, most RPS requirements only apply to investor-owned utilities (IOUs) and electric service providers. Other utilities like municipal utilities and cooperatives are mainly self-regulated, but some states have included provisions so they can voluntarily join the RPS program (Environmental Protection Agency). RPS policies have a lot of flexibility and reflect each state's different policy objectives. States can decide how ambitious to be by varying the RPS targets and compliance dates (Leon 10). As of December 2014, 30 states in the U.S have adopted a RPS mechanism, which account for more than 42% of electricity sales in the U.S ("Understanding U.S. Renewable Portfolio Standards"). Most states have policies that will set the final goal anywhere from 10% to 40% by 2025 (Wiser, 2007).

Under a RPS, utility companies can meet targets by owning a RE facility, purchasing RECs, or purchasing electricity from another renewable facility (Environmental Protection Agency). RECs provide a mechanism to track the amount of renewable power being sold and a means to financially reward eligible power producers (Wiser, 2007). One REC is equivalent to one MWh of RE production, so RECs can be traded in place of generating one MWh of RE (Carley). For each unit of power that an eligible producer generates, a certificate or credit is issued. A market exists for RECs because energy supply companies are required to redeem certificates to meet RPS goals. Increasingly, individuals and organizations are also buying RECs to satisfy environmental and non-environmental goals such as avoiding the CO<sub>2</sub> emissions associated with conventional electricity use, reducing air pollution, as well as creating positive publicity and enhance public image (Renewable Energy Credits).

## **POLICY**

There is a long history of efforts to reduce the U.S carbon intensity and implement a federal policy that encourages RE. Before state RPSs, the Public Utility Regulatory Policies Act (PURPA) of 1978 was created as a response to the energy crisis in the 1970s. PURPA was meant to conserve electric energy, increase utility facility resource efficiency, establish equitable retail rates for

electric consumers, develop hydroelectric dams, and conserve natural gas (FERC). Before PURPA, only utilities could own and operate electricity power plants, but the law ensured that there would be competition in the utilities industry. PURPA encouraged RE production because it established over 12,000 MWh of RE ("Public Utility Regulatory Policy Act").

After PURPA there had not been any federal law to promote renewables until 2009 when the Congress tried to pass the American Clean Energy and Security Act (ACES). The law eventually failed when it stalled in the Senate and was not voted on. The purpose of the bill was to create clean energy jobs, achieve energy independence, reduce GHG emissions, and transition to a clean energy economy. It also included a section about RPSs. According to the bill, retail electricity sellers from 2012 to 2039 would submit to the Federal Energy Regulatory Commission an amount of federal renewable electricity credits and demonstrated totally annual electricity savings that equal to the retail supplier's annual combined target. In addition, any electricity provider that supplies over 4 million MWh would have to produce 20% of its electricity from renewable sources by 2020 (H.R. 2454). The bill also proposed a cap and trade system where the government would set a cap on the amount of greenhouse gases (GHG) emitted nationally. Companies could buy and sell these permits based on the amount of CO<sub>2</sub> they released annually.

Even though the ACES failed in Congress, the EPA was able to push for carbon emission reductions through rulemaking. In June 2014, the EPA proposed the Clean Power Plan (CPP) which allows the EPA to "limit carbon pollution from existing power plants under Section 111(d) of the Clean Air Act" (Georgetown Climate Center). The goal of the CPP is to reduce CO<sub>2</sub> emissions by 30% by 2030 from 2005 levels (Pacyniak). States will have until June 2016 to submit plans for compliance to achieve minimum emissions goals (Georgetown Climate Center). The language of section 111(d) is flexible and "allows states to develop plans that include a broad range of strategies to reduce carbon pollution" (Georgetown Climate Center). The CPP uses different strategies to help states achieve their carbon reductions. The first strategy focuses on improving the efficiency of coal-fired power plants, the second encourages shifting from coal fired power plants to natural gas power plants, the third encourages the use of new renewable and nuclear energy generation, and the last increases overall energy efficiency (Lynch). In addition, the CPP requires states to meet an interim goal from 2020-2029 before the final emissions goal in 2030 (Georgetown Climate Center).

The CPP is in many ways similar to the RPS because both have flexible policies that are trying to reduce carbon emissions in the U.S. However, the CPP focuses more on switching from coal to natural gas and improving energy efficiency while the RPS would be a specific mandate that

requires utilities to produce more energy from renewable sources. Both of these policies represent different strategies to achieve the same goal. In order for the RPS to be a federal law it has to be passed through the House and the Senate while the CPP is a rule passed by the EPA and does not have to go through a voting procedure. Both laws and rules have the power to enforce policies but rules are easier to enact whereas laws require a majority vote which is a slow process especially with a Republican House and Senate and a Democratic president. However, rules can also be overturned in courts, changed and appealed while laws are more permanent.

## **STATUS OF RPSs**

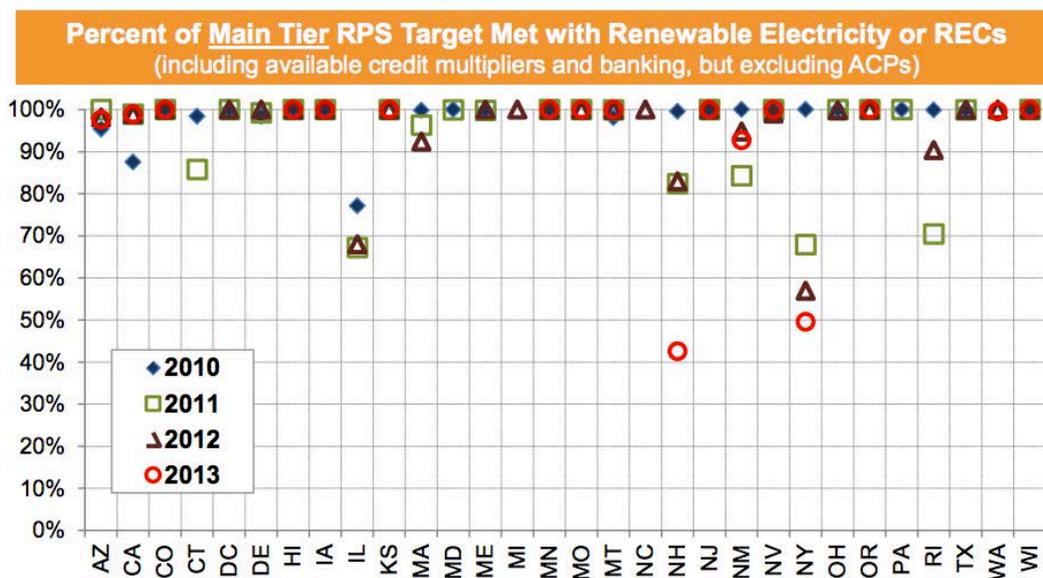
Even though a majority of states have enacted RPSs, they still face continued political challenges. Since 2009, no new RPS programs have been enacted. However, many states have reformed their RPSs. California, Colorado, Delaware, Hawaii, Kansas, Nevada, New Jersey, and New York have increased their standards, while Indiana, Oklahoma and West Virginia have established voluntary goals. Six other states including Colorado, Maine, New Mexico, North Carolina, Ohio, and Washington State have fought off attempts to repeal or weaken their RPSs (Kasper). None of the efforts succeeded, but Ohio passed SB 310, which froze the RPS for 2 years (Barbose 6). In general, these challenges are based on concerns about the cost and rate impacts in these proposals. Some of the legislation includes expanding the eligibility of RE to include large existing hydropower dams and nuclear facilities.

RPSs previously had strong bipartisan support because of their ability to attract new industries, create jobs, and keep state businesses competitive, while encouraging RE development (NRDC). Yet, RPSs are under attack in numerous states, often by fossil fuel interest groups. In Kansas, Koch Industries lobbied heavily to repeal a 2009 law mandating that 20% of the state's electricity come from RE by 2020 (CleanTechnica). Kansas's RPS helped create thousands of jobs, generated \$7 billion of economic activity, and has strong bi-partisan and business support (Lubber). Ultimately their efforts failed, but Kansas is one of many states where organizations like the Heartland Institute and the American Legislative Exchange Council (ALEC) have been lobbying against RPSs (CleanTechnica).

Aside from political challenges, there are conflicting interpretations about whether RPSs are effective at achieving state RE goals. According to a 2011 study on the status of RPSs in the U.S, the Institute for Energy Research contacted public utility commissions in the states with RPSs and found that only 14 of 36 states are meeting or are on track to meet their renewable electricity

mandates or goals, 18 states are not on track to meet their mandates or goals, 4 states have not implemented their mandate or do not yet have data (Institute for Energy Research 3). However the EIA’s annual energy outlook report states that most RPS states are on track or have already met their RPSs as shown in figure 2. The EIA believe states have been able to comply with RPSs because of decreasing costs of wind, solar, and other renewable technologies as well as complementary state policies that reduce the cost of RPS technologies like equipment rebates or increase the revenue streams through net metering (EIA). These differing results show that mixed policy affect the effectiveness of RPS policies

Some factors that may hinder RPSs are a lack of consistency, poor policy structure and design, and weak penalty enforcement. RPSs also fail to meet their targets because growing electricity demand overtakes the growth of renewable resources resulting in fossil fuel generation making up for the deficit. In the long term, with a flexible RPS, states can learn how to adjust programs, address these issues, and meet their targets (Carley).



**Figure 2** RPS targets met by state (Barbose 19)

In addition to the political challenges, RPS policies also face technical challenges. Two of the biggest issues are renewable resource availability and transmission capacity (Hurlbut). Resource availability has long been a concern of opponents to RPSs. Renewable resources are intermittent and are not evenly distributed throughout the country. Thus, having a federal RPS puts a greater burden on states that do not have available renewable resources. In order for RPSs to be successful, transmission lines needs to be capable of accommodating energy generated from renewable

resources. Under a well-designed RPS, all ratepayers share costs. RPSs can also include provisions to prevent costs from escalating (“Renewable Portfolio Standards”).

RPSs have sparked a diverse range of changes by changing the behavior of actors supplying and overseeing the state’s electricity. These actors start to consider the changes in order to achieve these goals like how utilities and other electricity suppliers supply electricity, how public utility commissions plan for transmission capacity, and how project developers decide which projects to adopt. RPSs also change electricity planning, regulation and tracking. A new system has to be created to monitor the production and distribution of RE and modification of existing systems (Leon 6).

Some states have found ways around transmission capacity and recouping losses from rising energy costs. The New York State Energy Research and Development Authority (NYSERDA) offers ten-year REC contracts to some RE projects. In 2013, Connecticut enacted a law that allows the commissioner of the Department of Energy and Environmental Protection to accept proposals and strike up long-term agreements with certain RE source providers. Massachusetts has required its IOUs to enter into long-term contracts with RE generators and has developed effective strategy for ensuring relative price stability for the solar RECs. Other states have taken steps to encourage long-term contracting with an RPS (Leon 14).

The research shows that there are conflicting interpretations, but by examining two RPS policies in Texas and in Pennsylvania we can examine the actual organization and performance of state programs that can inform a federal RPS. Positive results would be used as examples and we can learn from the states that have not been successful.

### **Case Study 1: Texas**

Texas has historically favored fossil fuel development, but it still passed an RPS that has massively increased the state’s RE supply and made RE competitive with coal and natural gas. Texas has long been concerned with how to meet its growing energy demand. The state also faces many environmental problems such as its immense CO<sub>2</sub> emissions and Texas realized that it has a huge potential for renewable resources, especially wind. The RPS has met its targets and in 2005 Governor Rick Perry endorsed a major extension and expansion of the legislation (Rabe).

Between 2003 and 2009, the state expanded its RE generation from 1,280MW to 2,880MW. For reference, a 1MW turbine on land can power 225 to 300 households and a 1MW offshore wind turbine can power more than 400 households (“Wind Energy: Facts”). So 2,800MW can power

between 648,000 to 1,152,000 households. Texas's RPS did not focus on a specific energy source, but most of it was focused in wind. Even by 2005, the state construction of RE facilities had progressed much faster than expected and met their 2009 targets. The success of the RPS encouraged proposals to expand the RPS, but there was some conflict over how high to set the new target. The new legislation amended Section 39.905 of the Texas Utilities Code and increased the RE target to 5,880MW by January 1, 2015 and a non-binding target of 10,000MW by January 1, 2025 (Rabe).

Texas's RPS is particularly successful because the supply-demand balance ensures new renewables development and there is a reasonably broad application of the policy with publicly owned utilities getting exemptions. The legislation also had well defined and stable RE resource and eligibility rules. Furthermore, the targets are steadily ramped up over time so that there is adequate time for verification and compliance and the enforcement is strong (Wiser 2004). From Texas's RPS we learn that a flexible policy that has clearly established rules and standards are conducive to the growth of renewable resources as well as achieving RPSs in a timely manner.

## **Case Study 2: Pennsylvania**

Pennsylvania's RPS faced many challenges because unlike Texas where public utilities were exempt from the RPS very few electric service providers in Pennsylvania are exempt from the RPS. The RPS duration and enforcement is unclear and the compliance mechanism are not flexible (Wiser, 2004). All of these factors coupled together have made the RPS difficult to enforce and achieve. Like Texas, Pennsylvania has also been reliant of coal mining for electricity, which poses a problem for any policies that promote RE production. However, unlike Texas, which has a clear definition of RE resources, Pennsylvania has unusual definitions for qualifying RE sources. Pennsylvania's RPS is divided into two tiers. Tier I sources including wind, geothermal, solar photovoltaic, low-impact hydropower, methane gas, biomass, and fuel cells are required to reach 8% by 2020. Tier II sources including waste coal, integrated coal gasification combined cycle, and incineration of municipal trash and poultry farm wastes are required to reach 10% by 2020. This broad definition of RE generations raised a lot of controversy with some state environmental groups that call the proposal "the dirtiest RPS" in the nation. But, the Pennsylvania RPS does designate a percentage of Tier I energy that must be derived from solar sources which shows its commitment to expanding RE (Rabe).

Another challenge is the boundaries where RE is counted toward the RPS. Pennsylvania has a lot of regional energy exchange. Pennsylvania's regional transmission organization integrates the state energy providers with ones in Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Tennessee, Virginia, West Virginia, and the District of Columbia. But, the RPS policy mandates that eligible RE have to come from within Pennsylvania or within any regional transmission organization that manages Pennsylvania's transmission system (Rabe). Pennsylvania's program has not been successful because it also incorporates a lot of non-renewables in its RPS that do not actually reduce carbon emissions as much as switching to renewable resources. In addition, this case study shows policymakers that if a federal RPS is applied then we need to ensure that compliance and enforcement is clear, but also flexible.

## **ECONOMIC BACKGROUND**

The RPS is largely a market-based approach to encourage RE production and reduce GHG emissions. The government sets the general requirements, but doesn't stipulate what has to be built and what the price of electricity will be. Instead, public, private and investor-owned utilities and project developers make all of the decisions. Since the market is driving the RPS, electricity producers are incentivized to choose projects that are most effective in terms of cost, location, timeliness of development, and reliability. The rapid development of RE under RPSs has generated large economic activity including job creation, lease payments and royalties from wind farms. States also incentivize their customers to install solar photovoltaic systems which have made solar more affordable. (NRDC). However, according to the Heritage Foundation, a conservative think tank that denies climate change, electricity prices are lowest in states that generate a majority of their electricity from coal or hydropower while electricity prices are nearly 40% higher in states with RPSs. RE mandates require generation from more intermittent and expensive sources that requires backup generation placing stress on transmission-grid operations (Institute for Energy Research).

Inevitably, electricity prices will increase depending on renewable energy technology costs trends, natural gas prices, federal tax incentives, and environmental regulations. However, the increases will not be nearly as drastic as what the Heritage Foundation claims. Many State RPS programs have escape clauses if the extra cost of renewable generation exceeds a specified level (EIA). These escape clauses usually involve RE production caps where a regulatory authority can suspend the program or exempt utilities from meeting its requirements. Caps were established to

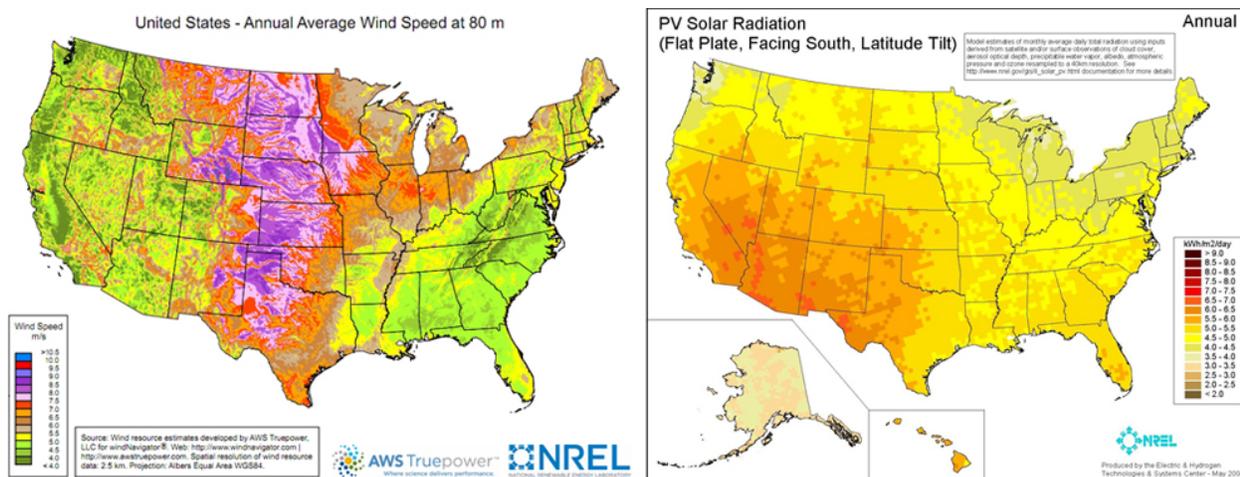
avoid the difficulties of rising costs of the RPS program since the actual costs to the utility and the ratepayer is unknown until the supply and cost base of renewable power is established (M.J. Beck Consulting). So far, compliance costs have ranged from 1-3% of average retail rates in most states, averaging 1.6% in the most recent available years. As RPS targets increase compliance costs will continue to rise, but other factors such as decreasing technology costs, rising gas prices, increased federal tax incentives and increased government oversight can mitigate or exacerbate pressure on states (Barbose 19). Though there are initial high costs to an RPS overall is beneficial to society. Additional benefits from an RPS include reduced emissions, water savings, fuel diversity, electricity price stability, and economic development. (Heeter).

## STAKEHOLDERS

### Public Opinion

Within the past 20 years RPSs have been passed in a majority of states, and 77% of Americans support funding more research into RE resources such as solar and wind. 62% of Americans support requiring electric utilities to produce at least 20% of their electricity from wind, solar or other RE sources, even if it costs the average household an extra \$100 a year (Leiserowitz 18). Furthermore, it is interesting to note that most state RPSs were established through legislation or a ballot initiative, reflecting broad political support (Institute for Energy Research).

### Legislators



**Figure 3** Maps of the Wind (Left) and Solar (Right) Energy Potential in the United States.

(Compiled from NREL)

RE always raises geographical and party debates because RE sources are intermittent and are developed in areas that are abundant in wind or solar. In figure 3, we can see that the states with the most solar production are in the Southwest. Most of the wind energy is concentrated in the Midwest. We can see that the areas with the least intense wind or solar power are the states in the Southeast where many states have not enacted any RPSs. In addition, the states that have tried to repeal their RPS programs including Washington, North Carolina, Colorado, New Mexico, and Maine are also some of the states that do not have prominent wind or solar potential. Furthermore, the South has the least percentage of people supporting alternative energy sources.

In addition to geographical difference, there is a clear partisan rift between Republicans and Democrats. Across the board, clean energy has more support than fossil fuels except among conservative Republican males. Only 26% of conservative Republicans polled placed alternative energy as a priority for the nation's energy supply. In addition, Democrats favor developing RE resources 34% more than Republicans. This rift affects all aspects of RPS policy and whether it will be passed in the House and the Senate. Going forward it would be very unlikely for a federal RPS to pass now that the Republicans have gained the House and the Senate.

### **Energy Advocates**

Energy advocates like the Natural Resources Defense Council (NRDC) and Environmental Defense Fund (EDF) have advocated for federal RPSs since before ACES was first introduced. In addition, these non-profits have been working hard to fight off large utility coalitions from repealing state RPSs. The NRDC, a non-profit international environmental advocacy group, has released multiple reports and RPS state fact sheets for Ohio, Kansas and Missouri touting the beneficial impacts of a RPS. They believe that "The [RPS] is the smart way to encourage [RE] projects, create jobs, and keep Ohio's businesses competitive" (Natural Resources Defense Council). Furthermore, they have encouraged a number of voters to vote against the bill to Repeal Ohio's RPS. Furthermore, the Environmental Defense Fund (EDF) is a nonprofit environmental advocacy group that works to preserve natural systems. The EDF has fought hard to keep RPSs and have fended off organizations like ALEC. The EDF believes that "[RPSs] are not only an appropriate response to climate change; they are also good for our state's energy prices, jobs and economic development" (Environmental Defense Fund).

## **Utilities**

Overall utilities companies have been fairly compliant with their state RPS. American Electric Power (AEP), NRG Energy, and Pacific Gas and Electric (PG&E) have all expanded their RE capabilities in order to meet RPSs in the states they operate. NRG is challenging the U.S. energy industry by becoming the largest developer of solar power, and providing customers with advanced energy solutions to manage their energy use (NRG Energy). According to Michael G. Morris, AEP's chairman, president and chief executive officer, "our growing renewable portfolio has significantly diversified our fuel mix, helping us to meet our customers' energy needs while reducing our environmental impact" (American Electric Power). PG&E reached 20% renewables in California in 2012 and will meet 33% target by 2020. The utility company already gets more than half of its electricity from carbon-free sources, making it one of the cleanest utilities in the nation (Marshall, 2012). A report by Ceres and Clean Edge ranked PG&E among the top utilities nationwide in both RE sales and energy efficiency savings (Marshall, 2014).

Despite compliance by many utilities, there is still opposition. Edison Electric Institute (EEI), a trade association for America's IOUs, opposes a nationwide RPS because the policy will conflict with many states' existing RPSs. In addition EEI does not believe that the RPSs adequately consider the uneven distribution of renewable resources across the country, and the program creates inequities among utility customers by exempting all rural electric cooperatives and government-owned utilities from the RPS (Kind). Also, Duke Energy, the largest utilities holding company in the United States, argues that a federal "one-size-fits-all" approach "might fail to recognize that what works in California or Texas might not work well in Ohio or North Carolina" (Duke Energy). Duke has proposed implementing new RPSs by starting with reasonable initial energy goals that ramp up over time. The company would like the goals to be based on a region-specific resource assessment. Furthermore, Duke believes that diverse stakeholders such as utilities, clean energy developers, consumer advocates and environmental experts need to participate in the goal-setting process. Finally, Duke Energy wants to require all electricity suppliers regardless of size participate in the RPS (Duke Energy).

## **RECOMMENDATION**

One pathway to encourage RE production and CO<sub>2</sub> emissions reduction is to enact a federal RPS. The policy should be flexible and acknowledge that each state has a variety of RE technologies and infrastructure in place. The RPS also needs to apply to all suppliers including IOU,

municipal and electricity cooperatives. In order to ensure clarity, renewable technologies and generator eligibility should be clearly defined, and all RECs should be carefully tracked so there is uniform regulation. To ensure that the RPS is sustainable, the costs should be allocated across all utility customers (“Renewable Portfolio Standards”). There should be tiered targets that are stable and increase steadily overtime a general timeframe allowing for sufficient time for long-term construction and financing. By setting a floor for the percent a state’s RE production, the RPS would not conflict with the ones states currently in place, but would help the states that have no programs or voluntary programs to catch up to the states that are currently on track.

We need a federal RPS because increasing the amount of RE resources can solve the problems that critics raise about RE resources intermittency and high transmission costs. Overtime, the price of solar and wind will keep falling until it is competitive with coal and natural gas. In the interim, RECs will help alleviate RE generation because in the states where RE can be produced inexpensively, they will sell credits to the states that can’t generate as many which will encourage more RE development. Major challenges that state RPSs face are future rate impacts and infrastructure to support RE development. Factors like lack of diversity in the renewable technologies supported by the RPS and potential future shortage of RE to meet the RPS are less of an issue (Leon 16).

However, a federal RPS is challenging especially in our current political landscape, so an alternative pathway is integrating a RPS into the third strategy of the CPP, which encourages RE and nuclear generation. The EPA expects every state to have a specific percent of its electricity from RE by 2030, which is already very similar to an RPS. The EPA calculates the target RE generation for each state by examining state RPSs. One complication of the third strategy is that a state gets credit for the RE sold to that state, not what is produced within that state. If a solar or wind project is built and the energy is sold out of state then no credits are received for the RE. The third strategy does not control where power gets sold so there is no guarantee how much RE will be available in the future (Baugues). If the RPS is integrated into the third building block then all RE electricity produced within a state regardless of where it is sold would count towards meeting the RE target. States still have the flexibility to determine which technologies to use. In fact, incorporating an RPS into the CPP would help states meet their goals much faster. Whether the RPS is a passed as a federal law or incorporated as part of the CPP, the purpose of an RPS should be to increase RE resources, reduce pollution, increase local economic development, and reduced dependence on foreign energy sources.

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## Section 3

### Water Allocation

**Kate Corcoran**, *Management Strategies for Water Allocation on the Colorado River*

**Hannah Fleisch**, *Farmers vs. Fish: An Analysis of Water Rights and Species Protection in the Sacramento-San Joaquin River Delta*

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## Executive Summary

As one of the most abundant, yet important resources, water has been instrumental in promoting economic growth and development in the western United States. Since the 19th century, the construction of complex water management systems to serve a burgeoning population has resulted in competing and sometimes overlapping allocations of water for a variety of agricultural, municipal and industrial needs. While the construction of these management systems can be thought of as examples of human achievement, poorly conceived laws and policies have resulted in conflicts of economic, cultural and political significance for the region. In many cases, over-allocation initiated by increasing demand has resulted in water shortages, placing significant stress on the regions existing water systems and reservoirs. In addition, the diverse services of these water management systems have all required manipulation of the hydrology and landscape of the region. These already existing problems have produced unintended consequences that pose threats to the region's infrastructure along with human and animal/plant populations. For both the Colorado River and the Sacramento-San Joaquin River Delta, these effects have been exacerbated by a prolonged drought, and as a result, what was once an abundant resource has become a severely contested one in both of these systems.

Dubbed the lifeblood of the southwest, the enormous, yet still finite, volume of the Colorado River has been allocated to meet human demand down to the last drop. When allocation laws from the early 1900s meet 21st century climate change and extended drought, with a projection of increased water shortage and variability, the outcome is unworkable and entirely unsustainable. While the threat of climate change has challenged historical and largely inefficient allocations of water in the Colorado River, declining abundances of living species in the Sacramento-San Joaquin River Delta has also prompted calls for better management practices. The Endangered Species Act is an important source of federal protections for species such as the delta smelt, whose population is in severe decline as a result of water management systems. Together, both of these case studies help demonstrate that there has been a noticeable shift in public attitudes towards protecting the environment and its natural resources since the 1960s when a number of environmental laws were passed to regulate water quality and species protection.

The complicated process of managing natural resources amidst growing demand and consumption has illustrated that long-standing laws and policies that once governed these resources rather easily need to be reformed or replaced. Recent attention to these issues suggest that we are

now just starting to realize how these existing laws and methods of water allocation for human consumption are unsustainable and have enormous ecological consequences. Management strategies are complex and will therefore rely on an interdisciplinary approach that can balance many values, such as agricultural production and biodiversity, or economic growth and environmental justice.

# Section 3.1

## Water Allocation

### ***Management Strategies for Water Allocation on the Colorado River***

**by Kate Corcoran**

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## Summary

The Colorado River is the lifeblood of the American Southwest, as it provides a limited supply of water to a vast arid and semiarid region. The Colorado River system has an extraordinary storage capacity and provides water for over 30 million people and irrigates 3.5 million acres of farmland in the seven states and Mexico encompassed in its basin. The policies that govern the Colorado River, collectively known as the “Law of the River”, allocate 16.5 MaF/yr of water to the seven basin states and Mexico. However, these laws from the early 1900s were based on data that could not with reasonable accuracy determine the long-term annual flow of the Colorado River, and in reality on average there is only 14.9 MaF/yr of water available to stakeholders, and this average is highly variable. The over-allocation of water is projected to get worse in coming years as climate change reduces annual streamflow by 10-20% in the next 50 years and amplifies year to year variability, at the same time that demand in the southwest continues to grow. Demands on the river have already exceeded the river’s supply in recent years, largely driven by irrigated agriculture which currently consumes 78% of the water supply within the Colorado River basin.

While no one solution to the over-allocation of the Colorado River exists, strategies must be pursued to ensure that the Colorado continues to reliably provide water to meet demand in the face of climate change. To begin with, the Law of the River must be corrected to effectively allocate water in the event of water shortages and streamflow variability. To do this, water allotments must all be done by percentages so that they can change proportionally with streamflow, as it averages below the 16.5 MaF that is currently allotted in the law. Second, the agriculture industry must reduce its demand on the Colorado River system by employing more efficient irrigation strategies and shifting to less water intensive crops. Colorado River flow is notoriously variable and this variability will accelerate with climate change, continuing to stress resources in the basin. Management strategies of Colorado River water are complex and require a portfolio of solutions that fundamentally rethink the Law of the River while also being based largely in our modern day scientific understanding of the hydrology of the river system.

### Timeline: Law of the River

**The Colorado River Compact of 1922** – The cornerstone of the Law of the River, the CRC was negotiated by the seven Colorado River Basin states and the federal government. It divided the states into the upper and lower basin, with each basin having a right to develop and use 7.5 MaF of water annually.

**The Boulder Canyon Project Act of 1928** - This act: (1) ratified the 1922 Compact; (2) authorized the construction of Hoover Dam and related irrigation facilities in the lower Basin; (3) apportioned the lower basin's 7.5 MaF among the states of Arizona (2.8 MaF), California (4.4 MaF) and Nevada (0.3 MaF); and (4) authorized and directed the Secretary of the Interior to function as the sole contracting authority for Colorado River water use in the lower basin.

**The Mexican Water Treaty of 1944** - Committed 1.5 MaF of the river's annual flow to Mexico.

**Upper Colorado River Basin Compact of 1948** – Apportioned the Upper Basin's 7.5 MaF among Colorado (51.75%), New Mexico (11.25%), Utah (23%), and Wyoming (14%); the portion of Arizona that lies within the Upper Basin was also apportioned 0.05 MaF annually.

**The Colorado River Basin Project Act of 1968** - Authorized construction of a number of water development projects in both the upper and lower basins, including the Central Arizona Project (CAP) in Arizona. It also made the priority of the CAP water supply subordinate to California's apportionment in times of shortage, and directed the Secretary to prepare, in consultation with the Colorado River Basin states, long-range operating criteria for the Colorado River reservoir system.

**2007 Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead** – Determined new Colorado River water allocations for the lower basin states depending on three levels of shortage conditions, specified by the level of Lake Mead. The guidelines extend through 2026.

## The Colorado River



Figure 1. Map of the Colorado River Basin

### Introduction

The Colorado River supplies water to 30 million people and 3.5 million acres of farmland, and is one of the most contested and carefully controlled rivers on Earth. The Colorado River, 1450 miles long, flows through seven US states: Wyoming, Utah, Colorado, and New Mexico comprising the “upper basin”, and Arizona, Nevada, and California comprising the “lower basin”. The Colorado River then flows through Baja California, Mexico, and then, historically, into the Gulf of California – although since 1998 the Colorado River has not reached the sea, save once in 2014 (Figure 1). Snowmelt from the Rocky Mountains provides 90% of stream flow, and thus more precipitation equates to more robust flows.<sup>55</sup> Outgoing diversions such as aqueducts, tunnels,

<sup>55</sup> National Geographic. "Colorado River Map." National Geographic Society, n.d. Web. 29 Nov. 2014. <<http://environment.nationalgeographic.com/environment/freshwater/change-the-course/colorado-river-map/>>.

pipelines, and canals channel water away for agricultural use (78%) and industrial use (22%).<sup>56</sup> Furthermore, the Army Corps of Engineers and Bureau of Reclamation have built 100+ dams for flood control, hydroelectric generation, and water storage.<sup>57</sup> The construction of dams and depletion of the Colorado River has often had negative impacts on indigenous peoples, who have historical legacies of hunting, fishing, and unique cultural identities based upon the Colorado River.<sup>58</sup>

Over-allocation and drought have placed significant stress on the river system's reservoirs. Anthropogenic climate change is expected to further dry the region in the long term and increase year to year precipitation variability.<sup>59</sup> Under the strains of flow variability, climate change, and increased demand, management strategies of Colorado River water are complex and require an interdisciplinary understanding of the river that come from science as much as they do from law, politics, and environmental justice. That the laws currently governing the river allocation were based on years of abnormally high streamflow further confound management strategies.<sup>60</sup>

### **Colorado River Science Background**

The Colorado River system's exceptionally high storage capacity gives the Colorado River the ability to reliably provide water as demand rises, and to weather extended dry periods, such as the ongoing drought beginning in 2000. The mean annual flow of the Colorado River is 16.3 million acre feet (MaF), as measured from 1930-2006.<sup>61</sup> An acre-foot is the metric commonly used to measure large-scale water resources, and one acre-foot is the volume of one acre of surface area filled to a depth of one foot. The Colorado River system has phenomenal reservoir storage capacity, capable of storing roughly four times the mean annual flow rate. Over 80% of that storage is found in the Colorado River's two largest reservoirs, Lakes Powell and Mead. Just north of the Upper/Lower Basin divide that divides the basin states for governing purposes, at Lee Ferry near Page, Arizona, sits the Glen Canyon Dam that creates Lake Powell, with 24.4 MaF of storage capacity. Further south, downstream from the Grand Canyon and outside of Las Vegas, the Hoover

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<sup>56</sup> *ibid*, "Diversions"

<sup>57</sup> *ibid*, "Dams, Reservoirs, Canals, and Pipelines"

<sup>58</sup> *ibid*, "Native Americans"

<sup>59</sup> Nowak, Kenneth C. (April 2, 2012). "Stochastic Streamflow Simulation at Interdecadal Time Scales and Implications to Water Resources Management in the Colorado River Basin" (PDF). Center for Advanced Decision Support for Water and Environmental Systems. University of Colorado. p. iii. Retrieved Nov. 30, 2014.

<sup>60</sup> See p. 8 below, section "Intercurrence"

<sup>61</sup> *ibid*, p. 136

Dam creates Lake Mead, with 26.2 MaF of storage capacity. Lake Mead stores deliveries from the Upper Basin and reregulates flow of the Colorado River downstream throughout the year.<sup>62</sup>

The year-to-year flow of the Colorado River varies wildly mainly due to differences in precipitation and temperature, and climate change is expected to amplify this variability. The standard deviation of flow of the Colorado River is 4.89 MaF/yr, or 30% of the average, and 70% of the inter-annual flow variance of the river is driven by variation of precipitation and temperature (Figure 2).<sup>63</sup> Large scale climate features like the El Nino Southern Oscillation (ENSO) drive year-to-year variations in the Southwestern (SW) US rainfall patterns, with El Nino years resulting in an above average precipitation in the SW US and thus above average flow of the Colorado River, and La Nina years having the opposite effect.<sup>64</sup> The hot and arid climate of the river results in approximately 1.4 MaF/yr of water loss due to evaporation.<sup>65</sup>

### Water Allocation under the Law of the River

#### U.S. States & Mexico

The Colorado River is managed and operated under numerous compacts, federal laws, and court decisions collectively known as the "Law of the River." This collection of policies apportions the water and regulates the use and management of the Colorado River among the seven basin states and Mexico.<sup>66</sup> The 1922 Colorado River Compact is the cornerstone of regulation, dividing the US portion into the Upper and Lower Basin, allotting 7.5 MaF of Colorado River waters annually to each basin. The current specific annual allotments in the Lower Basin were established

Upper Basin, 7.5 MaF/yr total		
Colorado	51.75%*	3.86 MaF/yr
Utah	23.00%*	1.71 MaF/yr
Wyoming	14.00%*	1.04 MaF/yr
New Mexico	11.25%*	0.84 MaF/yr
Arizona	0.70%	0.05 MaF/yr
*Percentages of the total after Arizona's 0.05 million are deducted. Arizona's percentage is of the total.		
Lower Basin, 7.5 MaF/yr total		
California	58.70%	4.40 MaF/yr
Arizona	37.30%	2.80 MaF/yr
Nevada	4.00%	0.30 MaF/yr

Figure 3.

in 1928 as part of the Boulder Canyon Project, while the current specific annual allotments in the Upper Basin were established by the Upper Colorado River Basin Compact of 1948 (Figure 3).<sup>67,68,69</sup>

<sup>62</sup> *ibid* p.57, p.115-116

<sup>63</sup> *ibid* p.77 (since 1975)

<sup>64</sup> *ibid* p.3, p.58

<sup>65</sup> *ibid* p. 113-114

<sup>66</sup> "The Law of the River." Bureau of Reclamation, Lower Colorado Region.

<http://www.usbr.gov/lc/region/g1000/lawofrvr.html>.

<sup>67</sup> The Boulder Canyon Project Act of 1928, U.S. Bureau of Reclamation, 1928. p.2-3.

<http://www.usbr.gov/lc/region/g1000/pdffiles/bcpact.pdf>

The Boulder Canyon Project allots water to the lower basin states by dictating the exact quantities of acre-feet each state will receive, while the Upper Colorado River Basin Compact allots water to the upper basin on a percentage basis. The Mexican Water Treaty of 1944 committed 1.5 MaF, or 9.1%, of the Colorado River's average annual flow, to Mexico – and like the Boulder Canyon Project, 1.5 MaF is the exact quantity Mexico is to receive.<sup>70</sup> In total, this allocation of 16.5 MaF is more than the Colorado River's annual streamflow of 16.3 MaF, of which only 14.9 MaF remains useable after evaporation, and thus the Colorado River is inherently over-allocated in the Law of the River. Thus far, meeting these obligations has been made possible by the great storage capacity of Lake Powell, which allows the Upper Basin to capture and regulate high run-off season flows to meet downstream demand. While the Lower Basin fully utilizes its allotment, the Upper Basin has been slower to grow. At present, Upper Basin demand is estimated to be approximately 4.5 MaF/yr, 60% of its allotment.<sup>71</sup> Native American water rights were not formally established until the 1963 Supreme Court decision *Arizona v. California*, when the court granted reservations enough water to irrigate all “practicably” irrigable acreage within their boundaries. The water was to come from the basin states' Colorado River apportionments.<sup>72</sup> Under this standard, five Indian reservations in the lower basin were granted approximately 0.90 MaF/yr of water, and upper basin tribes have defined their water rights to about 1 MaF/yr, thus receiving about 13% of each basin's total annual allotment.<sup>73</sup> The reservations presently are using about 80 to 90% of their allotment.<sup>74</sup>

### Addressing Drought in Law of the River

The Law of River offers little guidance on what reductions are to be made in the event of a year of streamflow under 16.5 MaF, much less a prolonged drought where streamflow is consistently below average and declining. The Colorado River Compact simply gives priority to the river for domestic, agricultural and power generation in the event of a water shortage, stating that if

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<sup>68</sup> Upper Colorado River Basin Compact of 1948, U.S. Bureau of Reclamation, 1948. p.2, Article III, (2).  
<http://www.usbr.gov/lc/region/pao/pdfiles/ucbsnact.pdf>

<sup>69</sup> Note: Arizona is included in both the Upper and Lower Basin. This is because the Colorado River runs through the Northwest corner of Arizona, then through Nevada, then Arizona again to create the California-Arizona border. See Figure 1.

<sup>70</sup> The Mexican Water Treaty of 1944, U.S. Bureau of Reclamation, 1944.  
<http://www.usbr.gov/lc/region/g1000/pdfiles/mextrety.pdf>

<sup>71</sup> Nowak, p. 114.

<sup>72</sup> Gelt, J. "Sharing Colorado River Water: History, Public Policy and the Colorado River Compact." University of Arizona. Indian Water Rights. <https://wrrc.arizona.edu/publications/arroyo-newsletter/sharing-colorado-river-water-history-public-policy-and-colorado-river>. 1 Aug 1997. Web. 30 Nov 2014.

<sup>73</sup> *ibid*, Indian Water Rights

<sup>74</sup> *ibid*, Indian Water Rights.

the Colorado River has “ceased to be navigable”, then its use for navigation shall be “subservient to the uses of such waters for domestic, agricultural, and power purposes”.<sup>75</sup> It does not offer any insight into how the 7.5 MaF allocations to each basin may be reduced when streamflow declines. Unlike the Colorado River Compact, the Mexican Water Treaty specifically acknowledges drought, stating that in the event of “extraordinary” drought water allotment to Mexico “will be reduced in the same proportion as consumptive uses in the United States are reduced”.<sup>76</sup> This provides some flexibility in the water allotment guaranteed to Mexico in the future.

States in the upper basin know how their water allotments will be reduced in times of shortage because their water is appointed to them on a percentage basis. For the lower basin states, clarifying water allotment reductions in times of shortage has been more contentious. The Colorado River Basin Project Act of 1968 (CRBPA) authorized the construction of a diversion canal for 1.6 MaF of Colorado River water to Arizona in the lower basin, called the Central Arizona Project (CAP). In authorizing the construction of CAP, however, the Act also stipulated that during times of drought or shortages, CAP’s priority will be junior to that of California’s Colorado River allocations. If this law is fully implemented, it would force Arizona to forego all CAP deliveries, 1.6 MaF, before California faces any reduction, leaving Arizona with a total of only 1.2 MaF and California receiving a full 4.4 MaF.<sup>77</sup>

However, in December 2007 a set of interim guidelines that extend through 2026 on how to allocate Colorado River water in the lower basin in the event of shortages was signed by the Secretary of the Interior, and the California’s seniority granted in the CRBPA was not fully enforced. The agreement, titled the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, specifies three levels of shortage conditions, depending on the level of Lake Mead (Figure 4):<sup>78</sup>

	<b>California</b>	<b>Arizona</b>	<b>Nevada</b>	<b>Total</b>	<b>Condition</b>
<b>Light:</b>	4.40 MaF	2.48 MaF	0.287 MaF	7.167 MaF	Lake Mead surface elevation from 1,075-1,050ft
<b>Heavy:</b>	4.40 MaF	2.40 MaF	0.283 MaF	7.083 MaF	Lake Mead surface elevation from 1,050-1,025ft
<b>Extreme:</b>	4.00 MaF	2.32 MaF	0.280 MaF	7.000 MaF	Lake Mead surface elevation below 1,025ft

**Figure 4.**

<sup>75</sup> The Colorado River Compact of 1922, Article IV (a).

<sup>76</sup> The Mexican Water Treaty of 1944, Section III, Article 10, (b)

<sup>77</sup> The Colorado River Basin Project Act of 1968, U.S. Bureau of Reclamation, 1968.

<http://www.usbr.gov/lc/region/g1000/pdfiles/crbproj.pdf>

<sup>78</sup>Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, U.S. Bureau of Reclamation, 2007. p.37.

<http://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf>

The surface elevation of Lake Mead at full capacity is 1,229ft, and as of October 2014 the lake is at 1,082.79ft above sea level, just 7.79ft above the first “drought trigger”, the light shortage condition upper limit.<sup>79</sup> Arizona will bear the brunt of reductions, and California will only reduce in the most extreme drought conditions.

### Stakeholders: Overview of Major Uses

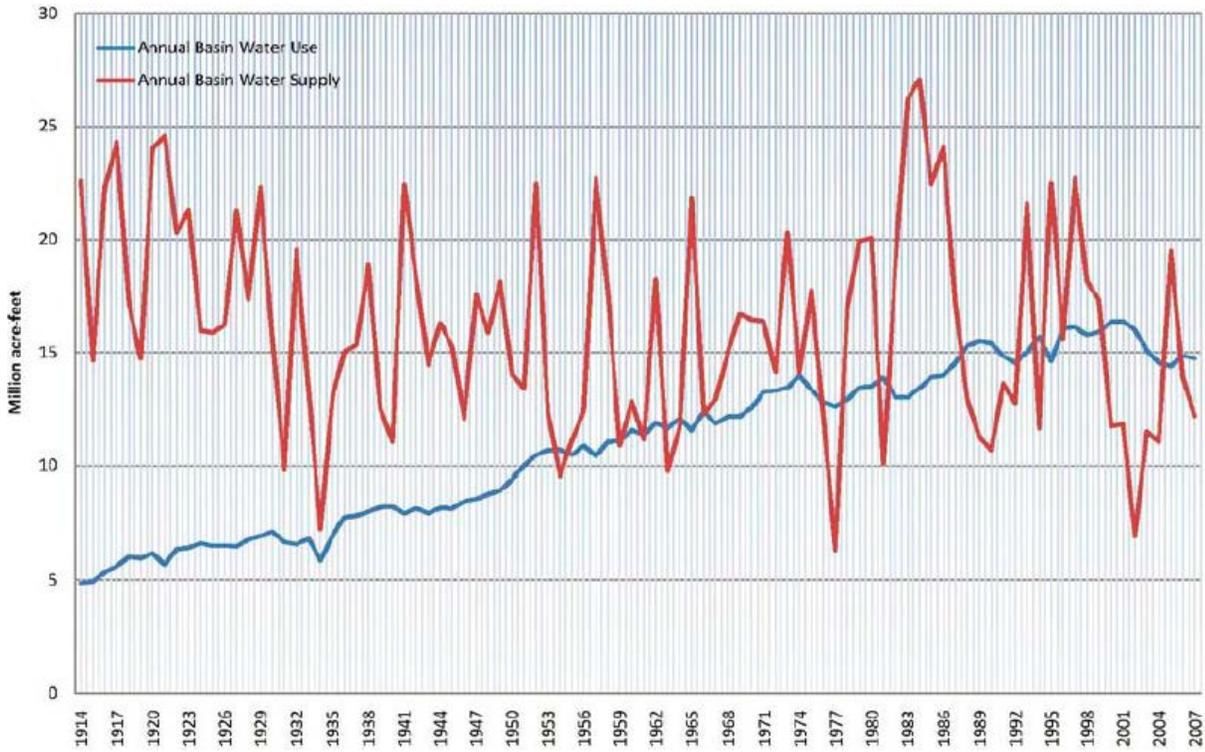


Figure 5 Nowak, 2012. Historical data of MaF (vertical axis) per year from 1914 - 2007 (horizontal axis) of annual basin water use (blue line) and annual basin water supply (red line).

The stakeholders that divert the largest amounts of water use their outgoing diversions for agriculture (78%) and industry/municipalities (22%).<sup>80</sup> Without diverting any water, but still requiring base Colorado River water levels to operate, the recreation industry and hydroelectric power industry are also prominent stakeholders of Colorado River water. Stakeholders operate within the water allotments of the state in which they reside, as they are not granted allotments directly themselves under the Law of the River.

<sup>79</sup> Bureau of Reclamation. "Lake Mead at Hoover Dam: Elevation." *Bureau of Reclamation: Lower Colorado Region*. US Department of the Interior, Oct. 2014. Web. 30 Nov. 2014. <<http://www.usbr.gov/lc/region/g4000/hourly/mead-elv.html>>.

<sup>80</sup> *ibid*, “Diversions”

## Agriculture

More than 1.4 million acres of irrigated land throughout the Colorado River basin produce about 15% of the US's crops, 13% of its livestock, and agricultural benefits of more than \$1.5 billion a year. Of the seven basin states, California has the largest amount of acres under irrigation with roughly 688,000 acres relying on diverted Colorado River water.<sup>81</sup> In Arizona, about 25% of the state's water is provided by the Colorado River, and of that 25%, about 80% is used for agriculture. In Colorado and Nevada, 90% of the overall water consumed in each state goes to agriculture.<sup>82</sup> California has been noted as having particularly wasteful Colorado River water usage, with thirsty forage crops such as alfalfa and pasture land accounting for as much as half of its irrigated acreage. Studies have found that stingier but still effective irrigation practices could perhaps save roughly 1.0 MaF/yr throughout the Colorado River basin, and replacing alfalfa with cotton and wheat could save 0.25 MaF/yr.<sup>83</sup>

## Industry/Municipal

Water allocated from the Colorado River going towards industry and municipal uses contributes to the water supply of many large southwestern US cities. Through the Central Arizona Project, Colorado River water contributes in serving 2,292,000 people in Phoenix and 712,000 people in Tuscon-metro. Colorado River water moves through a 242-mile Colorado River Aqueduct and serves millions in California: those in Los Angeles, San Diego, Long Beach, and Riverside to name a few. The Colorado River aids in serving Colorado's city populations in Denver, Colorado Springs, and Pueblo, Nevada's Las Vegas, New Mexico's Santa Fe and Albuquerque, and Utah's Salt Lake City.<sup>84</sup> Of the water needs of these cities strained under water shortage, Mike King, the Colorado Department of Natural Resources Director, recently said, "I don't care what you think about the Law of the River, we are not going to dry up a city of 2 million people [Las Vegas]".<sup>85</sup>

Without requiring any water allocation, but still requiring a certain level of streamflow, recreation is also a prominent industry on the river. The Colorado River basin includes eleven

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<sup>81</sup> CRWUA. "Colorado River Uses." *River Uses*. Colorado River Water Users Association, 2014. Web. 30 Nov. 2014. <<http://www.crwua.org/colorado-river/uses>>.

<sup>82</sup> Ibid, "Agriculture"

<sup>83</sup> Hiltzik, 2014

<sup>84</sup> ibid, "Urban Uses"

<sup>85</sup> Fleck, John. "Brad Udall on the Colorado River and "the Reality of the Public"" Inkstain, 18 Aug. 2013. Web. 09 Dec. 2014. <<http://www.inkstain.net/fleck/2013/08/brad-udall-on-the-colorado-river-and-the-reality-of-the-public/>>.

national parks, in addition to many national forests, state parks and recreation areas.<sup>86</sup> Famed for its dramatic rapids and canyons, Colorado River recreation supports 250,000 jobs and contributes billions in revenue each year to the Southwest economy.<sup>87</sup>

## Power

On the Colorado River, there is a total hydropower generating capacity of 4,178 MW, with 1 MW enough to power 750-1,000 average American homes.<sup>88</sup> However, many plants are already operating below their measured capacities because low Colorado River water levels caused by the drought.<sup>89</sup> For example, the Hoover Dam, the main source of hydroelectricity on the Colorado River, is currently generating 1,735MW annually, down from full generation capacity of 2,074MW that can fully serve 1.3 million people annually. Of Hoover Dam hydroelectricity, Arizona receives 18%, Nevada receives 25%, and California receives 57%, roughly.<sup>90</sup> Second to the Hoover Dam is the Glen Canyon Dam, which has a full generation capacity of 1,320MW annually.<sup>91</sup> Power generation has declined in tandem with lower mean annual flow and depletion of Lakes Powell and Mead. The dropping water levels have prompted federal managers to reduce the Hoover Dam's hydroelectric generating capacity by 23%. Every foot of elevation loss on Lake Mead reduces Hoover Dam's power potential by 5.7MW.<sup>92</sup>

## Challenges

### Intercurrence

Between the 7.5 MaF/yr allocated to each basin and the 1.5 MaF/yr allocated to Mexico, the total basin allocation is 16.5 MaF/yr. However, the annual average basin yield is roughly 16.3 MaF. This allocation disconnect is because the Colorado River water allocation is still dictated by the

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<sup>86</sup> "National Parks of the Colorado River Basin: Water Resources, Threats and Economics" (PDF). National Parks Conservation Association. April 2011. Web. 30 Nov. 2014. <[http://www.npca.org/about-us/center-for-park-research/colorado\\_river\\_basin/Colorado-River-Report.pdf](http://www.npca.org/about-us/center-for-park-research/colorado_river_basin/Colorado-River-Report.pdf)>

<sup>87</sup> O'Donoghue, Amy Joi (August 16, 2013). "Worst Colorado River drought in century prompts feds to cut releases from Lake Powell". *Deseret News*. Web. 30 Nov. 2014. <<http://www.deseretnews.com/article/865584776/Worst-Colorado-River-drought-in-century-prompts-feds-to-cut-releases-from-Lake-Powell.html?pg=all>>

<sup>88</sup> National Hydropower Association. "Frequently Asked Questions." *National Hydropower Association*. 2014. Web. 01 Dec. 2014. <<http://www.hydro.org/tech-and-policy/faq/>>.

<sup>89</sup> Tweed, Katherine. "Colorado River Hydropower Faces a Dry Future." *IEEE Spectrum*. 19 Sept. 2013. Web. 30 Nov. 2014. <<http://spectrum.ieee.org/energy/renewables/colorado-river-hydropower-faces-a-dry-future>>

<sup>90</sup> "Frequently Asked Questions: Hydropower on the Hoover Dam". Bureau of Reclamation. Web. 30 Nov. 2014. <<http://www.usbr.gov/lc/hooverdam/faqs/powerfaq.html>>

<sup>91</sup> "Frequently Asked Questions: Hydropower on the Glen Canyon Dam". Bureau of Reclamation. Web. 30 Nov. 2014. <<http://www.gcdamp.gov/faq.html>>

<sup>92</sup> Walton, Brett. "Low Water May Halt Hoover Dam's Power". Circle of Blue. September 22, 2010. Web. 30 Nov. 2014. <<http://www.circleofblue.org/waternews/2010/world/low-water-may-still-hoover-dam%E2%80%99s-power/>>

1922 Colorado River Compact, which is based on data from ~1900 to 1922 that suggested an abnormal, much wetter climate and overall greater water availability than currently exists, of perhaps 17.5MaF annual streamflow.<sup>93</sup> Furthermore, large system losses of 1.4 MaF/yr due to evaporation exacerbate the supply/allocation disjoint, meaning 14.9 MaF is the actual usable annual average basin yield, well below 16.5 MaF.<sup>94</sup> Although the 2007 Interim Guidelines for Lower Basin Shortages reduce the Lower basin allotment by up to 0.5MaF/yr in an attempt to address the sustained dry period the region is experiencing, the above described discrepancies are never worked into the calculations accordingly, and thus additional management strategies which take these discrepancies into account need to be devised and implemented.

### Climate Change & Variability

Accounting for the effects of climate change is another confounding factor that must be considered in future management strategies. Warmer temperatures will increase evaporation at the same time precipitation is predicted to decrease. A number of scientific studies have investigated the impact of temperature on stream flow in the SW US and while the results range somewhat from study to study, a consistent finding is that a sustained 1 degree Celcius increase in temperature is expected to decrease annual stream flow by roughly 13.8%, or approximately 2 MaF/yr.<sup>95</sup> For the SW US, climate change is expected to induce a stream flow decrease of 10-20% over the next 50 years, to 13.41 – 11.92 MaF/yr including evaporation losses, and dropping further beyond 50 years as climate change worsens.<sup>96</sup> Yet, in the relatively short term of 10 years, the window of stream flow means vary from 82% (12.2 MaF) to 125% (18.6 MaF) of the full record mean minus evaporation. These variations are likely to strain the reservoir system even more than a slow flow reduction trend associated with anthropogenic climate change over a decadal horizon, as the low end of the variation comes more frequently than the high.<sup>97</sup>

### Increased Demand & Population

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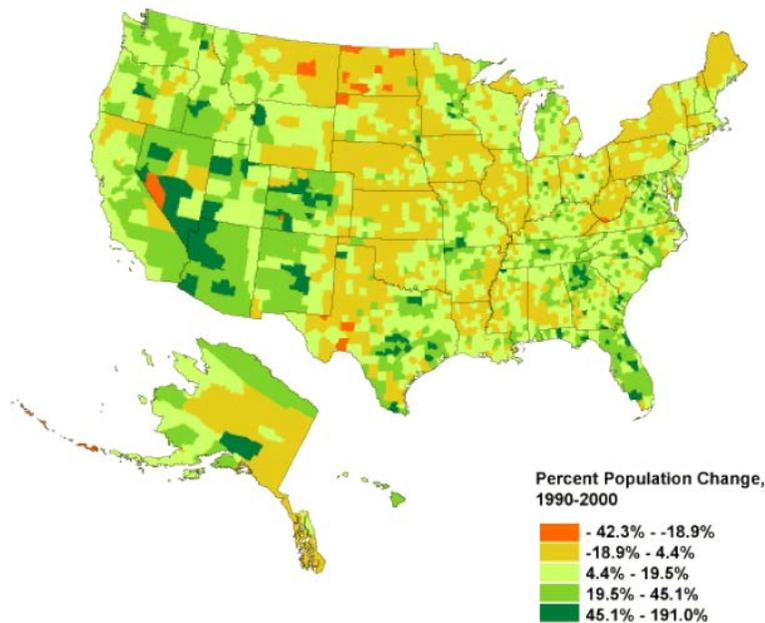
<sup>93</sup> Reisner, Marc (1993). *Cadillac Desert*. p.126. Penguin.

<sup>94</sup> Nowak, p. 113-114

<sup>95</sup> Nowak, p. 71-72

<sup>96</sup> Ray, A. J., J. J. Barsugli, and K. B. Averyt (2008), *Climate Change in Colorado; A Synthesis to Support Water Resources Management and Adaptation*, CU-NOAA Western Water Assesment, Boulder, CO.

<sup>97</sup> Nowak, p. 88



**Figure 6 US Population change map (source: [www.CensusScope.org](http://www.CensusScope.org)).**

Since the 1900s, the population of the Southwest US has grown by over 1500%, compared to the US national average of 225%, and the population served by the river has grown from 12 million to 30 million.<sup>98</sup> The projection of the SW US is that it continues to grow. The phenomenal reservoir storage capacity of the Colorado River system has allowed for all demand to consistently be met, despite the rapid growth of the SW US. Considerable concerns about reliability of water resources, due to increased demand in addition to the myriad of aforementioned confounding factors, directly threaten water availability and electricity availability for 30 million people in the SW US. Reduced flow rates threaten to destabilize energy markets in the Southwest and send retail customers that serve millions of residents to the spot market to buy power at up to five times the cost.<sup>99</sup>

### **Course of Action Recommendation**

“The Colorado is a 'deficit' river, as if the river were somehow at fault for its overuse.”

—Marc Reisner, in *Cadillac Desert*<sup>100</sup>

A fundamental reconsideration of 100 years of water-appropriation practices and patterns is necessary to manage the Colorado River going forward. No one solution to the challenges facing

<sup>98</sup> Hiltzik, Michael. "Water War Bubbling Up Between California and Arizona." *Los Angeles Times*. 20 June 2014. Web. 09 Dec. 2014. <<http://www.latimes.com/business/hiltzik/la-fi-hiltzik-20140620-column.html>>.

<sup>99</sup> Walton, 2010

<sup>100</sup> Reisner, p.121

the Colorado River exists, but rather a portfolio of different alternatives is necessary to a complete management strategy of the river. In light of the intercurrency and climate change threats that exist, the most basic strategy for managing the Colorado River must begin with its first priority being to fix the broken water allocation system for the basin states and Mexico by ensuring they are all bound to allotments that are proportional, because the Colorado River annual stream flow is variable in the long and short term. The second priority within a Colorado River management plan portfolio should focus on reducing water demand at the state level where proven possible: from the agriculture industry, by far the biggest consumer of Colorado River water.

#### Priority 1: Percentage Based Water Allocations to Lower Basin States

There is better data on the Colorado River today than there has ever been, and this data shows that a dominant reality the Colorado River faces is flow variability, which occurs naturally, is amplified by climate change, and is further confounded in the lower basin by changes in upstream demand. The best way to allocate Colorado River water in the face of this variability is on a percentage basis, as is already the standard in the upper basin, because percentages allow for proportional changes when the available quantity fluctuates. If water allocation in the lower basin is not shifted from hard fixed allocations into percentages, lower basin states will be indefinitely setting new smaller quantities for shortage conditions, as was done in 1922, 1928, and 2007, forever kicking the can down the road. When the quantities allotted to each of the lower basin states were originally set in 1928, they assumed 7.5MaF/yr of water was available annually, which was based on a streamflow of 16.5 MaF/yr, which we know today is actually on average 14.9 MaF/yr including evaporation losses. The original set quantities have worked in the past only because the upper basin has used on average only 60% of its allotment. If action is not taken now, action will be forced later when shortage worsens; the effects of climate change are widely predicted to increase the variability of the mean annual river flow in addition to reducing streamflow to between 13.41 – 11.92 MaF/yr over the next 50 years.<sup>101</sup>

This change can be achieved through the administrative rule-making authority that the Secretary of the Interior was given in the Colorado River Basin Project Act of 1968, which directed the Secretary to propose and adopt criteria “in order to comply with and carry out the provisions of the Colorado River Compact, the Upper Colorado River Basin Compact, and the Mexican Water

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<sup>101</sup> Ray, 2008

Treaty, [...] for the coordinated long-range operation of the reservoir.”<sup>102</sup> It was under this authority that the Secretary passed the recent 2007 Interim Guidelines for the Lower Basin, along with authority from the Boulder Canyon Project Act of 1928, which states the Secretary of the Interior is responsible for “formulating a comprehensive scheme of control and the improvement and utilization of the water of the Colorado River and its tributaries”.<sup>103</sup> Negotiations over the actual percentage each lower basin state will receive is likely to be contentious, but it is not being devised from scratch – allotments can and should be grounded in the precedent set in the 1928, which translates into 58.7% for California, 37.3% for Arizona, and 4.0% for Nevada, or in the 2007 laws.

#### Priority 2: Agricultural Practice Reform at the State Level

Another strategy to ensure that the Colorado River can reliably meet demand, in the face of climate change’s projected impact of high variability of inter-annual supply and long term water shortages on the Colorado River, is to conserve water before severe shortage conditions force reductions. The agriculture industry consumes 78% of Colorado River water, but new research on the extent of irrigated agriculture throughout the seven Colorado River basin states shows that considerable water savings are possible without removing any agricultural land from production.<sup>104</sup> Irrigation demand in the Colorado Basin could be reduced by employing innovative irrigation techniques more strategically and in more places – techniques that many farmers are already using. For example, almost 1 MaF of water may be conserved through implementing “regulated deficit irrigation”, the practice of irrigating alfalfa less often, throughout the Colorado River basin (in the U.S.).<sup>105</sup> Another strategy capable of yielding impressive water reductions at low costs and without removing any agricultural land from production is shifting to less water-intensive crops. For example, substituting about 10% of the basin’s thirsty alfalfa acreage with less thirsty cotton and wheat could save about 0.25 MaF of water use each year.<sup>106</sup>

These would be best implemented at the state level for many reasons: states are historically more pragmatic, states can develop more tailored programs because they are working closer to the problem, and states have more land management jurisdiction, to name a few. Indeed, many states are already pursuing such programs. When the Colorado River allotments dictated by the Law of

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<sup>102</sup> Colorado River Interim Guidelines, p. 61

<sup>103</sup> The Boulder Canyon Project Act of 1928, p. 8 Sec. 15

<sup>104</sup> Cohen, Michael, Juliet Christian-Smith, and John Berggren. "Water to Supply the Land: Irrigated Agriculture in the Colorado River Basin." (n.d.): n. pag. Pacific Institute, 2013. Web. 12 Dec. 2014.

<sup>105</sup> Ibid, p.61

<sup>106</sup> Ibid, p.64

the River are fully enforced, states have a finite water quantity available to them. There are many possible strategies that states can adopt to cut-back on their agricultural water demand; listed above are only two focal points. This variety of strategies should provide flexibility in policy among states and should provide an opportunity for all states to cut back, and cut back sooner rather than later with water use increasingly surpassing water supply.

### **Concluding Remarks**

How much we know about the Colorado River today compared to how little we knew in 1922, and even 1968, is humbling. Despite these limitations, the Colorado River has been able to reliably provide water to over 30 million people and 3.5 million acres of farmland through times of drought and ever increasing demand because of the phenomenal storage capacity of the system. Today scientists warn of imminent impacts from climate change on this system that could destabilize this system. The Law of the River much be amended to address these challenges. Currently, it over-allocates Colorado River water, and basin states are unprepared to meet the challenges of climate change that are at its doorstep. Colorado River water management is too big a problem for one solution, but it can, and must, be addressed with a portfolio of solutions. At the forefront of these is converting all of the lower basin state's water allotments from set quantities to percentages, ensuring they can effectively allocate water when supply is variable and decreased. Also at the forefront of a portfolio of solutions is to take advantage of the potential to reduce water demand in the agriculture industry at the state level. This has been a long-term problem from the beginning, and climate change will greatly increase the deficit and variability the Colorado System already faces. The consequences of the Law of the River remain with us, but the sooner we act to change it the better prepared we will be for the worst of the strains on the Colorado River yet.

## Section 3.2

### Water Allocation

***Farmers vs. Fish: An Analysis of Water Rights and  
Species Protection in the Sacramento-San Joaquin  
River Delta***

**By Hannah Flesch**

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## **Farmers vs. Fish: An Analysis of Water Rights and Species Protection in the Sacramento-San Joaquin River Delta**

### **Summary**

Delta Smelt (*Hypomesus transpacificus*) is a tiny striped bass that is only found in the Sacramento-San Joaquin River Delta located in Northern California. Although it was once relatively abundant to the Delta, the smelt's population has declined dramatically since the 1980s, warranting a listing as "threatened" under the Endangered Species Act (ESA) by the U.S Fish and Wildlife Service (FWS) in 1993. In 1994, the FWS designated a majority of the Delta as critical habitat for the smelt, however since then its population has continued to decline. In 2005, its numbers were measured at a record low and extinction risk analyses estimated that the species could become extinct within 20 years. While the fish faces a multitude of threats from invasive species, pesticide use, and toxic chemical waste, its primary threats are water diversions and entrainment from state and federal pumping stations from within the Delta. Consequently, several state and federal actions and programs have sought to regulate the massive water supply in order to protect the species, which includes federally mandated water restrictions that limit the amount of water that industry can divert away from the Delta. While farmers, local residents and industry immediately opposed these restrictions as it limits water availability for their crops, the recent drought that has hit the state has exacerbated the effects of these water restrictions. As a result, opposition against the federally imposed water restrictions has increased, especially since the smelt has continued to decline despite these restrictions and other efforts to restore their population.

The conflict between the continued existence of the smelt and residents/industry over the allocation of water has been fought primarily through the courts over provisions of the ESA. While environmental groups have sought for greater protections of the smelt, farmers and agribusiness have asserted that the protections prioritize fish over humans and are especially damaging during times of prolonged drought. The back and forth legal battle has exemplified that using the courts for direct policy action can be unstable and thus, a broader overhaul of both the ESA and historic water diversions from both the state and federal legislatures are needed. Although the state has developed its own conservation plans for the smelt, a greater base of support from the federal government will give these plans more of an opportunity to succeed within the existing framework of the ESA.

## Introduction

Since the early 20<sup>th</sup> century, the Sacramento-San Joaquin River Delta has been significantly altered due to the development and operations of water projects that have increased siltation and altered circulation patterns governing the normal flow of freshwater in and around the Delta. Since this period, featuring high rates of economic growth and development without much consideration of environmental impacts, nearly 95% of the Delta's wetlands have been reclaimed as people have sought to make the area's dynamic hydrology more regular and predictable.<sup>107</sup> As a result of these changes, more than 90 of animal and plant species in the Delta are listed as threatened or endangered under the ESA.<sup>108</sup>

Delta smelt is a particularly vulnerable species due to its high susceptibility to changes in environmental conditions. The species also normally lives for just one year and often dies after its first spawning and therefore does not have a high life expectancy and faces quick turnover. Although the species faces a number of environmental and anthropogenic threats to its survival, it has been well documented that increasing water exports are positively correlated with declines in their abundances, especially among their larvae and juvenile populations. While this population will likely face extinction without federal and state regulations and programs to protect them, a regional conflict over the rights to California's water resources has emerged among farmers, industry, local residents and environmental groups.

This paper examines the current status of the Delta Smelt in the context of the Sacramento-San Joaquin River Delta's development through time while also investigating how the smelt's main threats are a direct result of state and federal water projects that have changed the natural hydrology of the delta since the mid-20<sup>th</sup> century. After explaining how protections under the ESA are intended to save the species from extinction, it examines how the ESA and its regulatory requirements have been the direct source of conflict. Finally, it moves on to explain how the issue has developed specifically along the court policy pathway and ultimately provides a recommendation about the best possible mechanism to balance increasing demands for water while also providing effective protection for larger ecosystem in the Delta.

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<sup>107</sup> Alagona, Peter. S, *After the Grizzly: Endangered Species and the Politics of Place in California*. Berkeley and Los Angeles: University of California Press, 2013, 209)

<sup>108</sup> San Francisco Bay Area and Delta Protection, Center for Biological Diversity, accessed December 12, 2014, [http://www.biologicaldiversity.org/campaigns/san\\_francisco\\_bay\\_area\\_and\\_delta\\_protection/](http://www.biologicaldiversity.org/campaigns/san_francisco_bay_area_and_delta_protection/)

## Timeline

### Significant Federal Regulatory and Judicial Activity of the Delta Smelt

**1993:** FWS listed the fish as threatened under the ESA, California also lists the species as threatened under their own ESA.

**1994:** FWS establishes critical habitat designation for the smelt, comprised of the entire delta.

**1996:** FWS publishes its 1996 Recovery Plan for the smelt.

**2004:** Bureau of Reclamation seeks a formal consultation with the FWS for CVP and SWP water project operations.

**2005:** FWS issues a “No Jeopardy” decision in its biological opinion.

**2005:** Lowest abundance level ever recorded in 2005 at 26, or fewer than 25,000 adult fish.

**March 2006:** Environmental groups sue the FWS against its 2005 biological opinion, challenging that its information was arbitrary and capricious.

**Dec. 2007:** *NRDC et al v. Kempthorne et al:* Federal district court judge ruled to close the delta’s pumping plans temporarily to protect the delta smelt.

**Dec. 2008:** FWS issues new biological opinion, placing new water restrictions to protect the smelt.

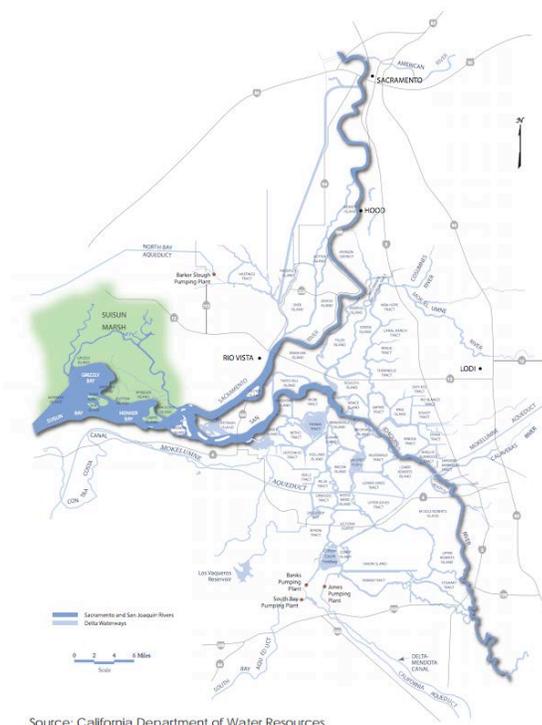
**2009:** *Stewart and Jasper Orchards v. Jewell et al:* Agricultural company sues FWS for failing to provide reasonable and prudent alternatives in its 2008 biological opinion.

**January 2014:** Governor Edmund G. Brown Jr. declares a state of emergency for prolonged drought conditions since 2011.

**March 2014:** Ninth Circuit Court of Appeals upholds 2008 water restrictions to protect the smelt.

## The Sacramento-San Joaquin River Delta: “One of the world’s most intensely engineered landscapes”

The Sacramento-San Joaquin River Delta, comprised of nearly 700 square miles of wetlands and waterways, is the largest watershed in California, naturally draining 42% of the state’s land area and capturing 50% of its annual runoff.<sup>109</sup> The Sacramento and San Joaquin Rivers carry sediment and freshwater through the delta into the San Francisco Bay and eventually to the Pacific Ocean (Figure 1). The delta is characterized by significant seasonal variations in flow and salinity, as well as large interannual variations caused by floods and droughts, making it one of the most dynamic and unique landscapes in the world.<sup>110</sup> Since the mid-19<sup>th</sup> century however, miners, explorers and other western settlers have reclaimed the delta lands in order to commercialize, develop and support the growing population of the state. Since this period, the delta’s natural freshwater flows to the ocean have been diverted upstream for urban and agricultural use through a number of federal and state flood and reclamation projects constructed during the mid-20<sup>th</sup> century, namely by the Central Valley Project (CVP) and the State Water Project (SWP).



**Figure 1. Map of the Sacramento-San Joaquin Delta and Suisun Bay.** <sup>111</sup>

<sup>109</sup> Alagona, *After the Grizzly*, 198.

<sup>110</sup> Jay Lund et al., *Envisioning Futures for the Sacramento-San Joaquin Delta*. (San Francisco: Public Policy Institute of California, 2007), 41.

<sup>111</sup> Governor’s Delta Vision Blue Ribbon Task Force, *Our Vision for the California Delta*, January 29, 2008, 23. [http://deltavision.ca.gov/BlueRibbonTaskForce/FinalVision/Delta\\_Vision\\_Final.pdf](http://deltavision.ca.gov/BlueRibbonTaskForce/FinalVision/Delta_Vision_Final.pdf)

To the dismay of farmers and residents of the region, the newly reclaimed lands in the Delta became increasingly susceptible to flooding as a result of poorly constructed levees. In 1933, the California state legislature sought to address flooding and early water shortage problems within the Delta by creating the CVP under the Central Valley Project Act. Due to limited funding brought on by poor economic conditions, the state sought federal assistance for its construction and the federal government soon adopted the project as a New Deal relief effort under the Rivers and Harbors Act of 1937. In order to promote economic growth in the region, the Rivers and Harbors Act appropriated \$12 million for the CVP for “the purposes of improving navigation, regulating the flow of the San Joaquin River and the Sacramento River, controlling floods and providing for storage and for the delivery of the stored waters thereof.”<sup>112</sup> Since then, the CVP has operated under the jurisdiction of the Bureau of Reclamation (a federal agency that oversees water resource management within the Department of the Interior), successfully supplying fresh water to irrigators and urban to users in the San Joaquin Valley and areas west of the Delta. providing for storage and for the delivery of the stored waters thereof.”<sup>113</sup> Following the construction of extensive canals, pumping plants, aqueducts, dams and reservoirs on several major rivers, the CVP soon became the Bureau’s biggest project. However, Californian’s began to recognize in the coming decades of the need to manage water supplies under state control. Thus, in 1960, the state introduced and passed the SWP, adding 34 storage facilities, 20 pumping plants, 5 power plants and nearly 700 miles of canals and pipelines to the already existing infrastructure of the Delta.<sup>114</sup> Together, the CWP and SWP have become an integral part of the Delta’s landscape, working in tandem to distribute and manage the Delta’s water supply by providing water to 25 million people across the state (over 65% of California’s population) (Figure 2).<sup>115</sup> While the CVP and SWP represent two of the largest and most intricate water projects in the country, significantly developing and contributing to California’s \$26 billion agricultural industry, a new era of environmental policymaking beginning in the 1960s began to usher in concerns surrounding the growing ecological and environmental damage from these massive development projects.<sup>116</sup>

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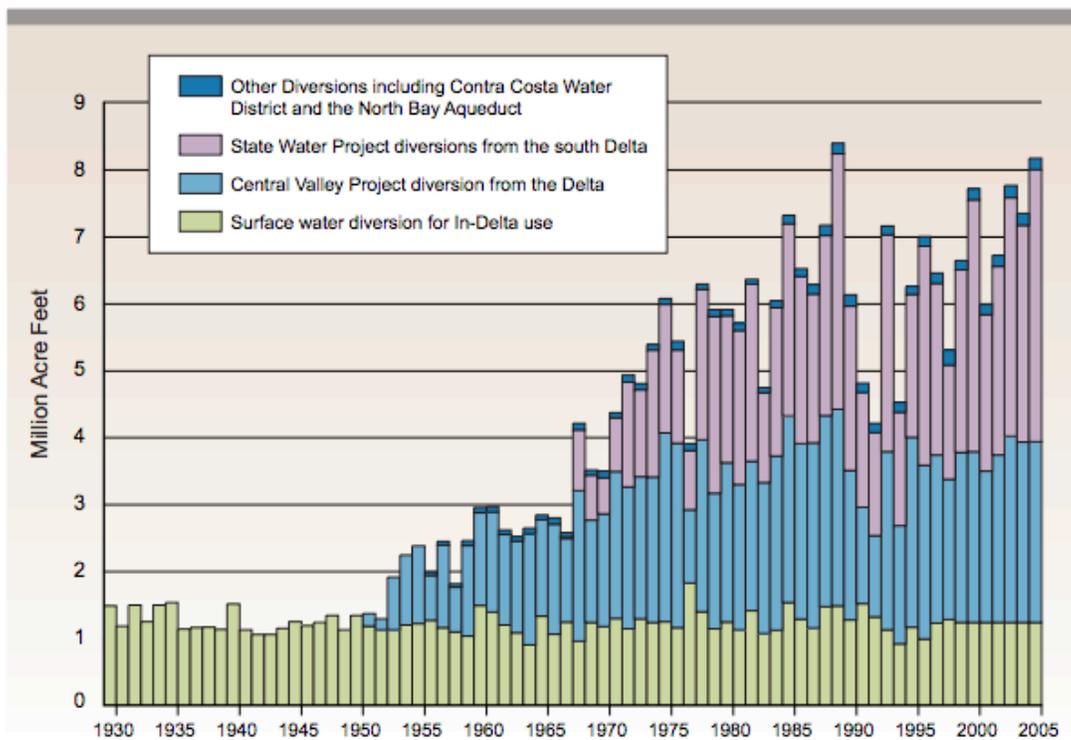
<sup>112</sup> Edson Abel, *The Central Valley Project and the Farmers*, 38 *California Law Review* 653 (October 1950) <http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=3467&context=californialawreview>

<sup>113</sup> *Ibid.*,

<sup>114</sup> Angora, *After the Grizzly*, 206.

<sup>115</sup> California Department of Water Resources, *Where Rivers Meet-The Sacramento-San Joaquin Delta*, July 18, 2008 last modified, <http://www.water.ca.gov/swp/delta.cfm>

<sup>116</sup> *Ibid.*,



Source: Measured, calculated and modeled from an array of data sources as compiled by Tully & Young, Inc.

**Figure 2. Historic Diversions from within the Delta<sup>117</sup>**

### Impacts to the Delta Smelt

In addition to providing critical infrastructure and economic resources for California’s agricultural economy, the Delta is also one of the largest estuaries on the West Coast, supporting habitats for over 700 plant, fish and wildlife species.<sup>118</sup> Within the last 30 years however, biologists and ecologists have observed severe declines of several native populations of fish, including the delta smelt. A tiny (50-80mm) pelagic fish, the smelt’s survival is heavily dependent and influenced by the dynamic and variable conditions of the Delta (Figure 3).

<sup>117</sup> Governor’s Delta Vision Blue Ribbon Task Force, 36.

<sup>118</sup> Pietron, Rachel. “Undermining the Endangered Species Act in the Bay-Delta Estuary,” Wildlife Promise Blog, <http://blog.nwf.org/2012/02/undermining-the-endangered-species-act-in-the-bay-delta-estuary/>



**Figure 3. An Adult Delta Smelt<sup>119</sup>**

Although the delta smelt does not support a commercial or recreational fishery, many ecologists consider its population an indicator of the delta's ecological health.<sup>120</sup> Beginning in the late 1950s, California's Department of Fish and Wildlife's Interagency Ecological Program began to conduct surveys on the species, finding evidence of this population's (and therefore species) decline. The Fall Midwater Trawl (FMWT) survey, a widely accepted long-term index of the relative abundance of delta smelt, estimated that since the early 1980s, the smelt's population has declined by more than 80% (Figure 4).<sup>121</sup> In 2005, the FMWT recorded the smelt's lowest abundance level ever at 26, or fewer than 25,000 adult fish. A 2005 population viability analysis found that the species could go extinct within the next 20 years and although its abundance has increased slightly since then, the smelt is still in substantial decline since the first recorded surveys and will likely go extinct without adequate and far-reaching protections.<sup>122</sup>

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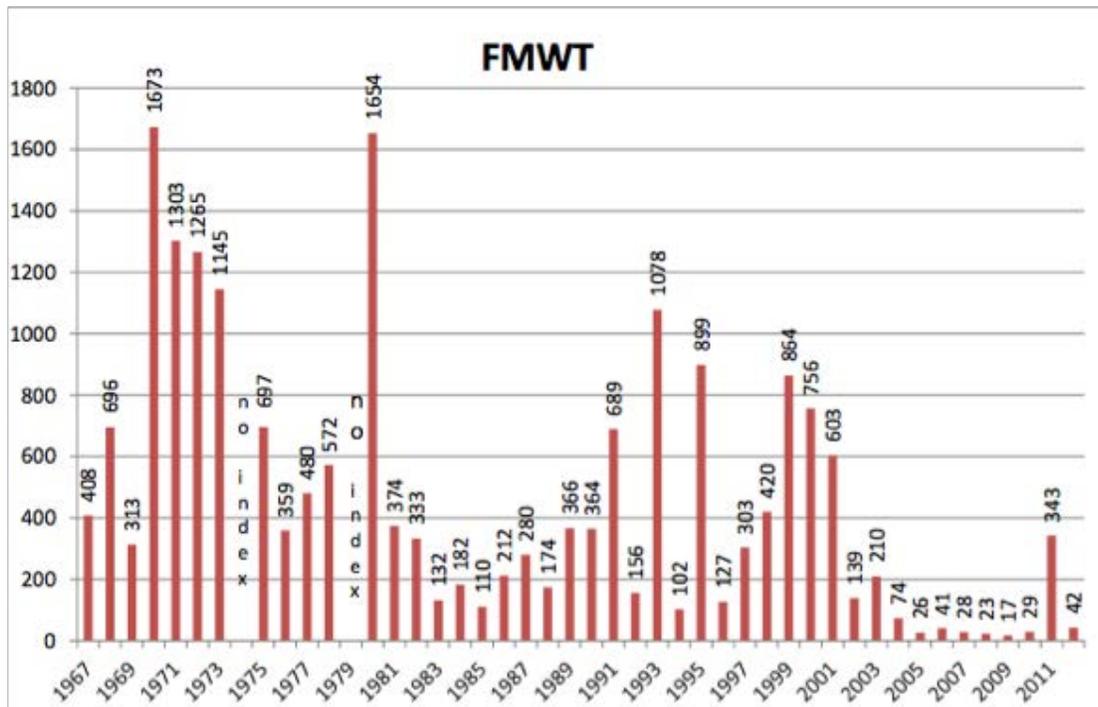
<sup>119</sup> Johnson, Peter, *Delta Smelt*, photograph, 2008 USFWS.

[http://www.fws.gov/sfbaydelta/GlobalImages/delta\\_smelt\\_in\\_hand2\\_USFWS\\_Peter\\_Johnsen\\_2008.JPG](http://www.fws.gov/sfbaydelta/GlobalImages/delta_smelt_in_hand2_USFWS_Peter_Johnsen_2008.JPG)

<sup>120</sup> California Natural Resources Agency, *Questions and Answers about Water Diversions and Delta Smelt Protections* [http://resources.ca.gov/docs/Smelt\\_QandA.pdf](http://resources.ca.gov/docs/Smelt_QandA.pdf), last modified February 12, 2013

<sup>121</sup> *Ibid.*

<sup>122</sup> Bennett, William A, "Critical Assessment of the Delta Smelt Population in the San Francisco Estuary," *San Francisco Estuary and Watershed Science, California* no. 2 (2005). <https://escholarship.org/uc/item/0725n5vk#page-24>



**Figure 4. Delta Smelt Abundance (total across year-classes) as indexed by the Fall Mid-Water Trawl of the Bay-Delta, 1967-2012.<sup>123</sup>**

### Reasons for the Smelt's Decline

Anthropogenic activity in and around the Delta is a significant source of the smelt's decline. Like many other plant and animal species in the Delta, the smelt faces a number of threats to its continued existence from invasive species, pesticides and toxic compounds entering and contaminating the water. In particular, invasive species of fish such as the Mississippi Silverside (first introduced to the region in the mid-1970s) have been found to prey on smelt larvae. Additionally, the presence of multiple pesticides and herbicides has also proven to be harmful to the smelt, causing direct mortality and physiological and/or developmental impairments.<sup>124</sup> While these factors have proven to threaten the smelt's existence over time, the activities of the CVP and the SWP have been the principle sources of its decline. These water projects impact the smelt most directly by diverting and exporting water that reduces freshwater outflows and by capturing them

<sup>123</sup> U.S. Fish and Wildlife Service, Species Assessment and Listing Priority Assignment Form, last modified May 15, 2008, <https://ecos.fws.gov/docs/species/uplisting/doc4320.pdf>

<sup>124</sup> Center for Biological Diversity et. al., *Emergency Petition to List the Delta Smelt as an Endangered Species under the Endangered Species Act*, March 8, 2006, [http://www.biologicaldiversity.org/species/fish/Delta\\_smelt/pdfs/ds-endangered-petition-3-8-06.pdf](http://www.biologicaldiversity.org/species/fish/Delta_smelt/pdfs/ds-endangered-petition-3-8-06.pdf)

into water delivery channels and diversion pumps that store and deliver water to municipal and agricultural users (known as entrainment).

### **Reduction of Outflows**

While the delta smelt is generally found in shallow (<3m) and brackish (low salinity) waters, its actual location varies seasonally depending on its different life history stages. For example, adult fish seek deep, narrow rivers and channels (found upstream in the Delta) for productive spawning habitat. Once their eggs hatch, the larvae and juveniles rely on the natural outflow patterns, particularly in the spring for transport downstream to Suisan Bay. Suisan Bay, located on the eastern side of the Delta, is a particularly conducive habitat for the larvae and it provides an open, yet shallow area rich in nutrients, algae and zooplankton, the main source of food for the smelt.<sup>125</sup> High outflows (water moving downstream out of the Delta) are therefore particularly important processes for successful rearing of larval smelt. The CVP and SWP divert substantial amounts of water (4.7 million acre-feet per year) from the delta, particularly in dry years, which reverses this process.<sup>126</sup> Larvae and juveniles are thus confined upstream in deeper channels that are often limited in ecological productivity and supply of phytoplankton and zooplankton. Consequently, greater water exports and flows as a result of CVP and SWP operations decrease juvenile and overall smelt abundance.

### **Entrainment**

Water that is to be diverted from the Delta is mainly pumped out from several large pumping plants located at its southern end.<sup>127</sup> These massive pumps, in addition to power generation facilities, trap and kill large numbers of fish, including the smelt, in a process known as entrainment. Some facilities, such as the John E. Skinner Delta Fish Protective Facility (near the city of Stockton in the southern delta) operate to catch fish that get caught in the pumps and release them back to the delta. Although 15 million fish are “salvaged” each year through these efforts, many, especially larval fish, do not survive the handling.<sup>128</sup> As a result of both reduced outflows and entrainment of fish from CVP and SWP operations, the number of delta smelt has largely

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<sup>125</sup> U.S. Fish and Wildlife Service, *Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes*, November 26, 1996 [http://ecos.fws.gov/docs/recovery\\_plan/961126.pdf](http://ecos.fws.gov/docs/recovery_plan/961126.pdf)

<sup>126</sup> California Department of Water Resources, *Where Rivers Meet-The Sacramento-San Joaquin Delta*

<sup>127</sup> U.S. Fish and Wildlife Service, *Delta Smelt Recovery Plan*

<sup>128</sup> Tuagher, Mike. “Delta Fish Crash Remains a Mystery,” *Contra Costa Times*, December 28, 2005 article [http://www.biologicaldiversity.org/species/fish/Delta\\_smelt/pdfs/cc-times-delta-in-decline4-12-28-05.pdf](http://www.biologicaldiversity.org/species/fish/Delta_smelt/pdfs/cc-times-delta-in-decline4-12-28-05.pdf)

disappeared from increases in amounts and frequency of water exports from these continued operations.

### **Protections of the Delta Smelt: The Endangered Species Act**

Passed by a nearly unanimous congressional vote in 1973, the ESA is a landmark piece of environmental legislation that reflected a growing and urgent shift in public attitudes towards environmental protection after the 1960s. The law, administered by the FWS for terrestrial and freshwater species and the National Marine Fisheries Service (NMFS) (the Services) for oceanic wildlife, affirms a deep commitment to “protect and recover imperiled species and the ecosystems upon which they depend.”<sup>129</sup> Since 1967, the federal government has identified nearly 1500 species as threatened or endangered; including the delta smelt which the FWS listed as threatened in 1993 as a result of its diminishing population.<sup>130</sup> Since then, the FWS has administered a number of federal protections under the ESA, one of several mechanisms for federal and state protection of the smelt and other threatened and endangered species in the delta watershed. Although the ESA has awarded significant protections for listed species, it has been a continuing source of conflict among various stakeholders including environmental groups, corporate and agricultural interests and the federal government.

### **Threatened vs. Endangered Listing**

The ESA defines an “endangered” species as any species, which is “in danger of extinction throughout all or a significant portion of its range,” and a “threatened” species as any species “which is likely to become an endangered species within the foreseeable future.”<sup>131</sup> If a species is listed as either threatened or endangered, it receives federal protections through the designation of critical habitat and prohibition of “take”-defined as any federal action that is intended to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”<sup>132</sup> Furthermore, should the FWS find that a federal action is likely to adversely affect a listed species or its critical habitat, it will undergo a formal consultation with the agency, known as a biological opinion, to determine the nature of the impact and provide reasonable and prudent

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<sup>129</sup> Endangered Species Act, U.S. Fish and Wildlife Service, last modified July 15, 2013, <http://www.fws.gov/endangered/laws-policies/>

<sup>130</sup> Angora, *After the Grizzly*, 230

<sup>131</sup> U.S. Fish and Wildlife Service, *ESA Basics: 40 Years of Conserving Endangered Species*, January 2013, [http://www.fws.gov/endangered/esa-library/pdf/ESA\\_basics.pdf](http://www.fws.gov/endangered/esa-library/pdf/ESA_basics.pdf)

<sup>132</sup> *Ibid.*,

alternatives for the proposed action. Although both threatened and endangered species can receive these protections, endangered species have few exceptions to regulations of “take” while regulations of this nature for threatened species are separately evaluated under Section 4(d) of the ESA. Under this statute, the FWS is allowed to reduce or expand protections for threatened species on a case by case basis and these are often used to clarify or simplify what forms of “take” of a threatened species are allowed.<sup>133</sup>

### **The Smelt’s Critical Habitat**

Listed or endangered species are protected under the ESA through several provisions including the designation of critical habitat. Critical habitat for a listed species is identified by the Services as a specific geographic area as “containing the physical or biological features essential to the species’ conservation.”<sup>134</sup> In 1994, the FWS designated a majority of the delta as critical habitat for the smelt, thereby restricting federal agencies from permitting, funding or carrying out actions that “adversely modify” the species’ critical habitat (Figure 6).<sup>135</sup> As one of the most controversial components of the ESA, critical habitat is often criticized as existing at the expense of state and federal economic growth and development while also infringing upon private property rights.<sup>136</sup> The FWS is thus required to consider potential economic impacts of its critical habitat designation and determines that if the costs of the designating the area outweigh the potential benefits to the protected species, the area will be excluded from the designation as long as it will not result in extinction of the species.<sup>137</sup>

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<sup>133</sup> U.S. Fish and Wildlife Service, Endangered Species Act Special Rules, February 2014, [http://www.fws.gov/mountain-prairie/endspp/ESA%20SpecialRules%20Factsheet\\_020714.pdf](http://www.fws.gov/mountain-prairie/endspp/ESA%20SpecialRules%20Factsheet_020714.pdf)

<sup>134</sup> Department of the Interior, *Endangered and Threatened Wildlife and Plants; Critical Habitat for the Delta Smelt*. Federal Register, 1994, U.S. Fish and Wildlife Service.

<sup>135</sup> *Ibid.*,

<sup>136</sup> The Endangered Species Act - Opposition To The Endangered Species Act, Library Index, last accessed Dec. 18, 2014, <http://www.libraryindex.com/pages/3034/Endangered-Species-Act-OPPOSITION-ENDANGERED-SPECIES-ACT.html>

<sup>137</sup> U.S. Fish and Wildlife Service, *Critical Habitat: What is it?*, September 2011, [http://www.fws.gov/endangered/esa-library/pdf/critical\\_habitat.pdf](http://www.fws.gov/endangered/esa-library/pdf/critical_habitat.pdf)



**Figure 6. FWS Critical Habitat Designation for the Delta Smelt.**<sup>138</sup>

### **Section 7 Consultation and Biological Opinions**

Formal consultations are another regulatory provision of the ESA that can protect a threatened or endangered species. Section 7 of the ESA requires that if a federal agency such as the Bureau of Reclamation determines, through a biological assessment or other review, that a proposed action is *likely* to adversely affect a listed species, then it must consult with the Services to determine whether its planned actions will in fact affect the continued existence of the listed species. After information between the Services is shared for up to 90 days, the Services will issue its conclusions in a biological opinion (BiOp). For proposed actions that will likely jeopardize a listed species or its critical habitat, the Services issue a “jeopardy” BiOp which must provide the federal agency with reasonable and prudent alternatives to its proposed action. These alternatives must be consistent with the purpose of the proposed project and within the federal agency’s legal authority and jurisdiction, be economically and technically feasible and in the Service’s opinion,

<sup>138</sup> Department of Fish and Game, Critical Habitat for the Delta Smelt, map, 2010, [http://en.wikipedia.org/wiki/File:Critical\\_Habitat\\_Delta\\_Smelt.png](http://en.wikipedia.org/wiki/File:Critical_Habitat_Delta_Smelt.png)

avoid jeopardy.<sup>139</sup> For proposed actions that will not likely jeopardize a listed species, the Services may issue a “no-jeopardy” BiOp, as was the case in the 2005 FWS BiOp of CVP water operations towards the delta smelt.

## **2005 Biological Opinion**

In 2004, the Bureau of Reclamation requested for formal consultation with the FWS on the coordinated and continued operations of CVP and SWP water projects after completing a biological assessment in which it found the potential for adverse effects on the delta smelt and its critical habitat. The FWS responded a year later with its first biological opinion on the smelt, finding that the operations of the CVP and SWP would not have an adverse effect on the continued existence and recovery of the delta smelt and its critical habitat.<sup>140</sup> The FWS therefore kept the species’ status as unchanged despite dwindling population numbers, prompting petitions by a number of environmental groups such as the Center for Biological Diversity (CBD) and Bay Institute to the FWS for reclassification of the delta smelt from threatened to endangered. By reclassifying the smelt as endangered, the species would have likely received immediate and urgent protections rather than flexible ones provided by Section 4(d). While the Natural Resources Defense Council (NRDC) also signed off on this petition, it went further to challenge the FWS’s conclusion in a U.S. District Court (*NRDC v. Kempthorne*), claiming that the information presented in the opinion was arbitrary and capricious and therefore its conclusion should be falsified after judicial review.

## **Environmental Groups: The Delta Smelt’s biggest advocate**

Environmental groups such as the NRDC and CBD were quick to challenge the 2004 BiOp, recognizing the continued threat of water export and pumping operations to the existence of the smelt. Calling the tiny smelt “one of the best indicators of environmental conditions” in the Delta, the CBD has pushed for further state and federal protections that would preserve and prioritize ecological integrity over historical and harmful water management practices.<sup>141</sup> In addition to supporting greater water restrictions, the CBD has also challenged the Environmental Protection

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<sup>139</sup> Endangered Species, U.S. Fish and Wildlife Service, last modified June 30, 2014, <http://www.fws.gov/midwest/endangered/section7/section7.html>

<sup>140</sup> Department of the Interior, *Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP)* (Sacramento, CA) [http://www.fws.gov/sfbaydelta/documents/SWP-CVP\\_OPs\\_BO\\_12-15\\_final\\_OCR.pdf](http://www.fws.gov/sfbaydelta/documents/SWP-CVP_OPs_BO_12-15_final_OCR.pdf)

<sup>141</sup> Saving the Delta Smelt, Center for Biological Diversity, last accessed Dec. 18, 2014, [www.biologicaldiversity.org/species/fish/Delta\\_Smelt/](http://www.biologicaldiversity.org/species/fish/Delta_Smelt/)

Agency's registration and authorization-for-use of 46 toxic pesticides in and around the Delta. The CBD, along with other environmental groups, has been increasingly reliant on the judicial system as a meaningful tactic for achieving greater protections for listed species.

After hearing the case brought by environmental groups, a federal district court, representing the Eastern District of California, found that the 2005 BiOp was arbitrary and capricious. The court, led by Judge Oliver Wagner therefore invalidated the biological opinion, compelling the FWS to complete a new one in the following year. Recognizing that the delta smelt existed "undisputedly in jeopardy as to its survival and recovery" the court also mandated a 25 to 30 percent reduction in water exports that year, equivalent to 730,000 acre feet (over 200 million gallons) of water until the new biological opinion would be completed.<sup>142</sup> While the decision does not rule on how project operators should achieve these restrictions, its urgent restriction of water exports designed to protect the delta smelt was immediately met with hostility by several states rights and farmers groups.

### **Outrage by Farmers and Agribusiness**

Because the CVP and SWP water projects provide a substantial amount to the heavy agricultural economy in California, providing water to nearly three million acres of farmland (a size a little less than the area of Connecticut), farmers were outraged following the 2007 court-imposed water restrictions.<sup>143</sup> Those such as Victor Davis Hanson whose family owns a 135-acre property in Fresno County and rely on contractual water deliveries from the projects as their main source of irrigation water have been especially vocal towards what is now called "California's Water Wars," by accusing the FWS of putting "a fragile, short-lived fish" ahead of agribusiness.<sup>144</sup> Along with agricultural industries that export a multitude of crops that need irrigated water such as dairy, wine, row crops and rice, farmers such as Hanson have illustrated how water restrictions have resulted in economic damage of for the local and state economy. Studies performed by the University of California and the University of the Pacific both suggested figures of about 250,000 acres idled, 5,000-7,000 farm workers laid off, and \$350 million in annual agricultural revenue lost as a result of the 2007 court-mandated water restrictions.<sup>145</sup> In addition to these economic losses, the farmers and

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<sup>142</sup> Fimrite, Peter. "U.S. Issues Rules to Protect the Delta Smelt." *San Francisco Chronicle*, December 18, 2008, [www.sfgate.com/green/article/U-S-issues-rules-to-protect-Delta-smelt-3180044.php](http://www.sfgate.com/green/article/U-S-issues-rules-to-protect-Delta-smelt-3180044.php)

<sup>143</sup> California Natural Resources Agency, Questions and Answers about Water Diversions and Delta Smelt Protection

<sup>144</sup> Hanson, Victor Davis. "California's Water Wars," Summer 2011. [http://www.city-journal.org/2011/21\\_3\\_california-water.html](http://www.city-journal.org/2011/21_3_california-water.html)

<sup>145</sup> Ibid.,

agricultural groups have argued that despite the water cutoffs, the delta smelt has not rebounded, but rather has continued to decline.

### **FWS 2008 Biological Opinion and Challenges**

A year after the federal ruling on *NRDC v. Kempthorne*, the FWS issued a new biological opinion in December 2008. The new BiOp found that the CVP and SWP proposed water operations were “likely to jeopardize the continued existence of the delta smelt,” and “adversely modify delta smelt critical habitat.”<sup>146</sup> The FWS therefore required the water projects to decrease the amount of water that they would normally pump out of the Delta for storage and delivery in order to minimize entrainment and harm to the smelt. The 2008 BiOp was legally challenged in federal district court, this time by Stewart and Jasper Orchards, a family-owned almond company that claimed the FWS failed to give the Bureau of Reclamation reasonable and prudent alternatives in its decision. After the court ruled in the company’s favor, environmental groups immediately appealed this decision to the Ninth Circuit Court of Appeals which resulted in an overturn of the district court’s decision and a re-imposition of the FWS’ 2008 water restrictions. While the volatile battle between the delta smelt and farmers/agriculture has largely been fought in recent years through the courts, the source of this conflict through biological opinions is a direct result of the elusive regulatory structure of the ESA. Furthermore, opposition towards the FWS’ water restrictions has continued to grow among farmers and residents especially as a result of the state’s prolonged drought. Since 2011, falling rates of precipitation and reduced snowpack from the Sierra Nevada Mountains (the largest reservoir of freshwater for the state) which prompted Governor Edmund G. Brown Jr. to proclaim a state of emergency on January 17, 2014, citing that the “state’s water supplies have dipped to alarming levels.”<sup>147</sup> Despite these dry conditions, the FWS has not scaled back water restrictions, frustrating many desperate farmers and users of the Delta’s freshwater reservoirs.

### **Policy Recommendation:**

As an area featuring highly developed and engineered water systems in the middle of pristine ecosystems, the Delta’s history is one of complex economic, ecological and political problems. Water shortages and inefficient allocations are not new to the region; however concern

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<sup>146</sup> Department of the Interior, Formal Endangered Species Act Consultation

<sup>147</sup> Save Our Water, California Water Agencies, last accessed Dec. 18, 2014, <http://www.saveourh2o.org/content/governor-declares-official-drought>

for the ecological health has only recently emerged as a complication to already existing water resource management conflicts. In addition, changing climatic conditions and increasing demand for water resources from an expanding population will exacerbate the current conflicts between water and species protection within the delta well into the 21<sup>st</sup> century. The most effective and far-reaching solutions to the Delta's problems cannot be narrowed down to one legislative change or a single court decision. Rather, what is needed is greater reform of existing regulatory measures in the ESA in addition to smarter and more efficient ways to deliver water supplies to people throughout the delta without harming existing species.

The back and forth legal challenges against biological opinions and other regulatory provisions also suggests that the ESA has not been a particularly efficient solution on its own to protecting the delta smelt, whose population abundance has continued to decline despite 20 years existing as a threatened species. In fact, the ESA, while revolutionary at its inception, has hardly been effective at mitigating species decline in the United States. Although less than 1 percent of the total species listed under the ESA have gone extinct, only 2 percent have actually recovered.<sup>148</sup> However, despite a multitude of legal and legislative challenges, the law has remained relatively intact and it is therefore unlikely that the ESA will undergo any major changes. Consequently, stakeholders in a number of issues will have to work within its existing framework in order to push and enforce regulation for endangered and threatened species.

Furthermore, as demand for water has increased as a result of unseasonably dry conditions, water restrictions for protection of the smelt will be harder to justify. Rather than cutting off water for millions of municipal and agricultural users, the simplest way to curtail direct impacts to the smelt by CVP and SWP water operations is to reduce their entrainment by the water pumps, which may require new and innovative construction and operation methods that specifically prevent entrainment. Thus, the FWS, with greater research and monetary support from Congress, should support the state in developing alternative ways to pump water, perhaps by relocating the operating stations away from areas that are particularly important to delta smelt habitat. While these alternative measures could reduce the number of entrained smelt, localized protections and intensive recovery programs as required by the ESA must be more comprehensive and go beyond the current regulatory provisions in place.

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<sup>148</sup> Angora, *After the Grizzly*, 231

## Section 4

### Fracking and Wildlife Protection in the American West

**Alyssa Brody**, *On the Rise: Policy Recommendations For Regulating the Expanding Fracking Industry*

**Charlotte Benishek**, *Federal Policy and the Gunnison Sage-Grouse: An Analysis of the Endangered Species Act as a Conservation Tool*

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## Executive Summary

The oil and gas industry has a tight hold on the US economy, providing approximately 9.8 million jobs across the nation and generating billions of dollars in economic activity annually. A recent uptick in domestic oil and gas production, made possible by the expansion of industrial fracking, made natural gas one of the primary fuels for producing energy and heat in the U.S. Most fracking occurs in the American West, and many local economies in the West depend on the fossil fuel industry. Due to this dependence, Western politicians are generally reticent to regulate the industry.

This lack of regulation is especially troubling because while oil and gas extraction have fueled the American energy economy, these activities pose serious threats to both environmental and human health. Thus far fossil fuel companies that produce natural gas via fracking have been able to circumvent many major federal environmental regulations such as the Clean Air Act and Clean Water Act through loopholes that specifically exempt the industry's activities from oversight. While anti-fracking and pro-environment advocates have sought to regulate the industry via alternative policy pathways, their actions have generally been unsuccessful.

One regulatory pathway that has not been explored by environmental groups is the Endangered Species Act, a law which fracking is not exempt from. The Endangered Species Act protects organisms that are in danger of extinction or might be in danger of extinction in the future. The law prohibits harming a species that has been listed under the Act, as well as its habitat. Fracking is detrimental to the habitat of the Gunnison Sage Grouse, which was recently classified as threatened under the Endangered Species Act. This species covers a relatively small range, and its designation is not expected to result in a net decrease in fracking activity because equally suitable fracking sites exist outside of the Gunnison Sage Grouse's range. However, the state of Colorado and the oil and gas industry have vehemently protested the listing of the Gunnison Sage Grouse under the Endangered Species Act because they view the listing as an informal precedent for the upcoming listing decision for the Greater Sage Grouse, which has an extensive range that spans 11 western states. Protecting the Greater Sage Grouse under the Endangered Species Act could seriously inhibit fracking activity throughout the West and would effectively function as an alternative pathway to regulate fracking.

Both species' power in this regard was recently highlighted when a Republican Representative from Nevada added a rider to the annual federal appropriations bill eliminating

funding for the listing of both the Greater Sage Grouse and Gunnison Sage Grouse under the Endangered Species Act, eliminating the threat of limitations on fracking based on the Endangered Species Act. This action highlights how powerful political interests can utilize creative alternative policy pathways to achieve their interests, often at the expense of environmental protection. But the story of the Grouse also suggests that, when harnessed in the name of protecting the environment, alternative policy pathways such as the endangered species act can be effective tools for enacting green policies.

# Section 4.1

## Fracking and Wildlife Protection in the American West

### *On the Rise: Policy Recommendations For Regulating the Expanding Fracking Industry*

**by Alyssa Brody**

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

## Executive Summary

In the past decade, a combination of contemporary improvements in technology and an exemption from federal environmental regulations has helped the modern fracking industry boom. Fracking, the cracking open of shale rock in existing oil wells in search of previously unobtainable stores of natural gas, has yielded the United State's greatest reserve of oil and gas in thirty-eight years.<sup>149</sup> While fracking has led to positive gains for the nation's economy, energy security, and job growth, it does not come without consequences. The process of fracking poses environmental and health risks that if left unregulated could cause serious damage. Therefore it is necessary that, in the absence of federal oversight, a combination of alternative policy pathways be used to regulate the fracking industry.

In 2005 the Bush Administration passed the Energy Policy Act, effectively exempting fracking from EPA oversight in many of the major environmental laws including the Clean Water Act and Clean Air Act.<sup>150</sup> Without a cohesive law to govern its practices, issues concerning a lack of chemical disclosures by industries, potential for chemical leaks, water contamination, air pollution, and the stimulation of earthquakes have become major policy priorities for both communities that experience fracking in their backyards and those that watch from afar.

However not everyone wants to see fracking regulated. Stakeholders in support of fracking include the oil and gas industry, as well as primarily western communities that benefit from fracking's job production. Politically, proponents on both sides of the isle, including Republicans and pro-job growth pro-union Democrats support fracking and push back on proposed federal regulations that could potentially limit the industry's growth.<sup>151</sup>

Conversely, environmentalists insist that these benefits are only short term, and that because natural gas is still a fossil fuel, it like other fossil fuels drives climate change and should not be seen as a solution. These groups want to see more regulation of the industry so to make its practices safer and to hold it accountable for any environmental harm.

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<sup>149</sup> Alan Neuhauser, "Study Links Fracking to Infertility, Miscarriages, Birth Defects," US News, last modified December 5, 2014, <http://www.usnews.com/news/special-reports/energy-of-tomorrow/articles/2014/12/05/fracking-linked-to-infertility-miscarriages-birth-defects>.

<sup>150</sup> "Loopholes for Polluters- The Oil and Gas Industry's Exemptions to Major Environmental Laws," Natural Gas Subcommittee of the Secretary of Energy Advisory Board, [http://www.shalegas.energy.gov/resources/060211\\_earthworks\\_fs\\_oilgasexemptions.pdf](http://www.shalegas.energy.gov/resources/060211_earthworks_fs_oilgasexemptions.pdf).

<sup>151</sup> Alex Roarty, "Are Democrats About to Fracture Over Fracking?," National Journal, last modified August 17, 2013, <http://www.nationaljournal.com/politics/are-democrats-about-to-fracture-over-fracking-20130817>.

To regulate the growing fracking industry multiple policy pathways have been tried. At the federal level the FRAC Act and the BREATHE Act have been proposed, but both have only a 1% chance of becoming law because of how politically divided the issue is.<sup>152</sup> In the absence of federal law numerous states have passed their own legislation requiring chemical disclosures and regulating the industry, but these laws tend to lack bite and often do not exist in states that need regulation most. Through the process of rulemaking, the Bureau of Land Management (BLM) has proposed a rule that regulates fracking on public and Indian Lands.<sup>153</sup> This alternative pathway currently seems like the strongest step being taken to provide more fracking oversight.

Ultimately there is no one-size fit all policy. The solution to creating regulations for fracking lies in a multitude of pathways, each with their own strengths and weaknesses, but together they can slowly move the industry towards greener standards.

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<sup>152</sup> "S. 1135: Frac Act," GovTrac, <https://www.govtrack.us/congress/bills/113/s1135>.

<sup>153</sup> "BLM's Proposed Fracking Rule: Earthworks Factsheet," Earthworks, <http://www.earthworksaction.org/files/publications/blmrulefactsheet.pdf>.

## Fracking Timeline

- 1860:** Fracking is established as, “exploding torpedoes in artesian wells” by Colonial Edward A. L. Roberts. The process involved lowering an iron-cased torpedo filled with gunpowder into wells then exploding the torpedo to obtain more gas and oil from existing wells.
- 2003:** Improvements in fracking technology lead to an industrial uptick in use.
- 2004:** June, An EPA report concludes that fracking is safe for drinking water, but does not include a scientific summary of findings. This remains a major point of contention amongst anti-fracking advocates who see the rise in fracking as posing major environmental and health threats.
- 2005:** August, the Energy Policy Act of 2005 is passed, prohibiting the EPA from regulating fracking under the Safe Water Act and further helping the industry to expand.
- 2009:** June, Congress introduces the FRAC Act, a law that would allow the EPA to regulate fracking and require companies to disclose the chemicals they pump into the ground. This bill would have filled in the regulatory gaps that the Energy Policy Act created, but never came to a vote.
- 2010:** February, The House Committee on Energy and Commerce launches two investigations: one into the potential environmental and health impacts of fracking and the other on the impacts that fracking has on drinking water.
- 2011:** April, The FRAC Act is reintroduced into the House and Senate, demanding more oversight for fracking. Again, the bill is never brought to a vote.
- 2011:** May, Congress introduces the BREATHE Act, in follow up to the FRAC Act. The BREATHE ACT would give the EPA power to regulate air pollution from fracking; together both would create the regulations that the Energy Policy Act eliminated.
- 2011:** An EPA Report concludes that contaminants in the town of Pavillion, Wyoming most likely seeped up from gas wells, scientifically linking fracking to water contamination for the first time since the beginning of fracking.
- 2013:** August, the Bureau of Land Management (BLM) introduces a rule to regulate fracking on public and Indian lands.
- 2014:** The FRAC Act is introduced for a third time with a projected 1% chance of becoming law.

# On the Rise: Policy Recommendations for Regulating the Expanding Fracking Industry

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## Introduction

Over the past decade there has been a boom in domestic energy productions. This boom, which has yielded the United States' greatest reserve of oil and gas in thirty-eight years, is largely due to the expanding industrial use of fracking, brought about through a combination of contemporary technology improvements and relaxed industry regulations.<sup>154</sup> Fracking, the cracking open of shale rock in search of stores of natural gas, has opened huge reserves of oil and gas in the Northeast, Mid-Atlantic, Midwest and South that was otherwise thought unreachable, and has helped to push cheap natural gas to the top of the U.S.'s sources for electricity and heating.<sup>155</sup> This natural gas from shale has become widely promoted as clean when compared to oil and coal, and called a 'win-win' fuel as it can lessen emissions while still supplying abundant fossil energy.<sup>156</sup> Natural gas is projected to continue thriving, with demands expected to double from now through 2035. This growing industry is also projected to support 3.5 million jobs nationwide by 2035, and U.S. exports are projected to reach about 4.3 billion cubic feet a day by 2020.<sup>157</sup>

But this boom in the fracking industry has not come without costs. The rapid pace at which the fracking industry is growing is largely due to deregulations of the process brought about by exemptions made during the Bush administration in 2005.<sup>158</sup> These deregulations have heightened pre-existing concerns about the environmental consequences of drilling. The physical process of fracking has led to many environmental and health impacts on surrounding communities that experience issues of increased rates of cancer and asthma, and face disproportionate increases in localized earthquakes and air pollution. Confronted with these serious concerns, a lack of federal support, and a growing fracking industry, many states have felt the pressure to respond with a series of regulations on the industry to fill gaps, while others have not responded at all. This patchwork system of creating fracking regulation has led to widespread variation in dealing with the same process, with some states like Pennsylvania requiring full disclosure of chemicals used in drilling, and others like Kansas, leaving the chemical process completely unregulated.<sup>159</sup>

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<sup>154</sup> Alan Neuhauser, "Study Links Fracking to Infertility, Miscarriages, Birth Defects," US News, last modified December 5, 2014, <http://www.usnews.com/news/special-reports/energy-of-tomorrow/articles/2014/12/05/fracking-linked-to-infertility-miscarriages-birth-defects>.

<sup>155</sup> Brad Plumer, "How States Are Regulating Fracking," Washington Post, last modified July 16, 2012, <http://www.washingtonpost.com/blogs/wonkblog/wp/2012/07/16/how-states-are-regulating-fracking-in-maps/>.

<sup>156</sup> Robert Howarth, Anthony Ingraffea, and Terry Engelder, "Natural Gas: Should Fracking Stop?," *Nature* 477, no. 7364 (September 15, 2011).

<sup>157</sup> *Ibid.*

<sup>158</sup> "Improving the Safety and Environmental Performance of Hydraulic Fracturing," Natural Gas Subcommittee of the Secretary of Energy Advisory Board, last modified December 9, 2011, <http://Shalegas.energy.gov>.

<sup>159</sup> *Ibid.*

As fracking continues to grow so too do concerns about its unregulated externalities, or side effects of the industrial processes. In order to create an effective and far reaching regulation on the fracking practice a federal law, which provides consistent standards and equally protects all Americans, is necessary. However, due to the current political landscape all attempts at a federal law to regulate fracking continue to fail. The purpose of this policy brief is to provide suggestions on how to regulate the process of fracking for natural gas. Should it prove impossible to pass federal legislation to regulate fracking, it is necessary that states continue to hold fracking accountable or that alternative policy pathways are pursued.

### **The Science of Fracking**

Hydraulic fracturing, or fracking, is a well stimulation process used to extract natural gas, composed of primarily methane and in some cases oil, from deep reserves 5,000 to 8,000 feet deep.<sup>160</sup> This process debuted in the 1860s as a way to allow energy companies to access previously unreachable and unavailable energy sources in shale formations.

Fracking begins with the digging of a well vertically into the ground. When the well has reached the right depth, the “kick off point,” it becomes horizontal and spans for a continued 1,000 to 6,000 feet away from the well.<sup>161</sup> The well is then filled with a steel casing to protect groundwater and the surrounding area from potential leaks during the hydraulic fracking practice. At the horizontal section of the well, this casing is perforated so that water can escape. Next, a water solution made of chemical additives and sand slurry (proppant) are pumped at high pressure into the well, and when this pressure exceeds the rock strength a fracturing of the surrounding rock formation occurs, propping open a passage for natural shale gas to flow freely from rock fractures.<sup>162</sup> After the fracturing is complete the internal pressure of the geologic formation cause the injected fracturing fluid to rise to the surface where it can be stored in tanks or pits prior to disposal or recycling. However, in most cases only 20-40% of the carrying fluid returns to the surface as the rest remains deep in the ground.<sup>163</sup>

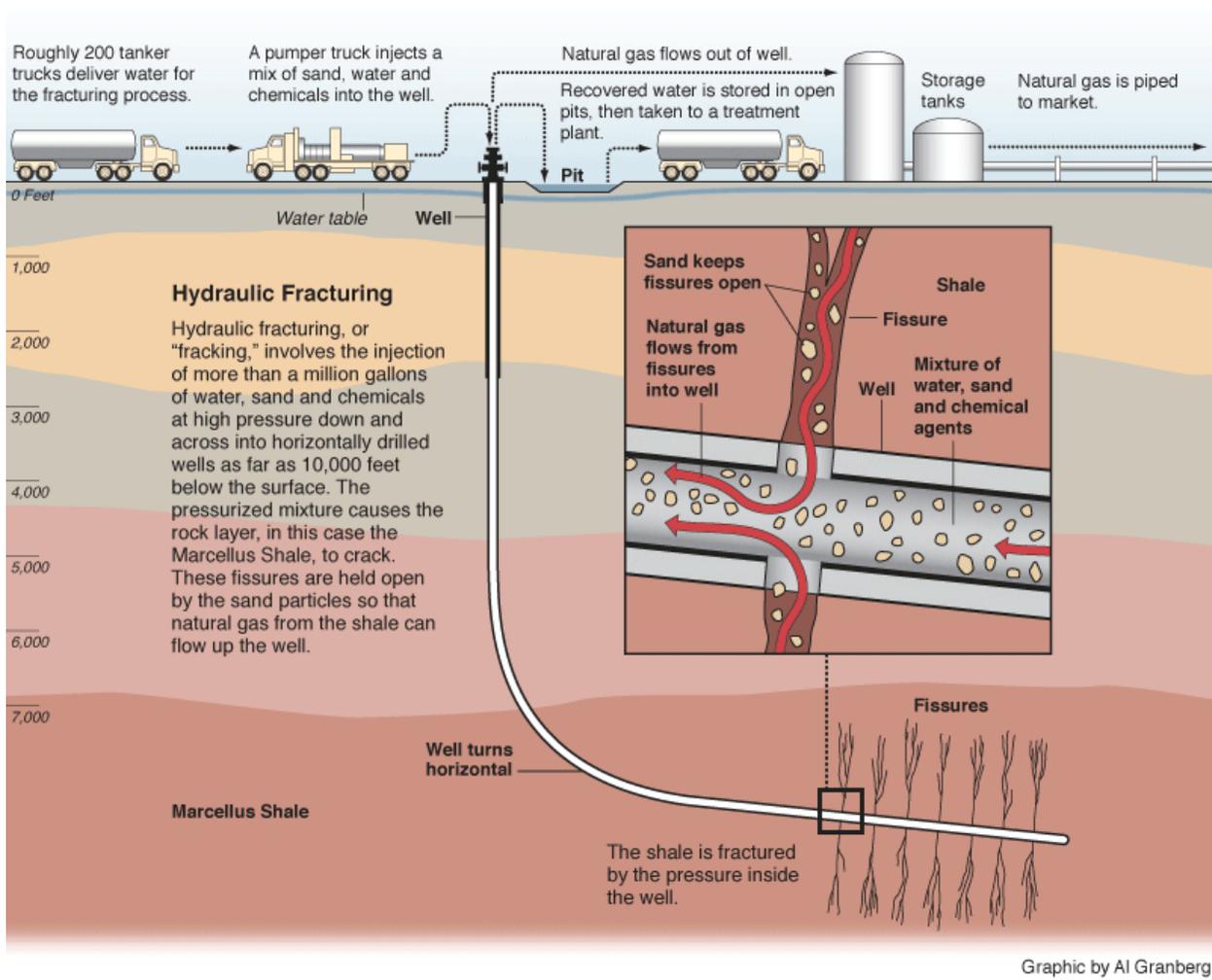
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<sup>160</sup> "A Brief History of Hydraulic Fracturing," EEC Environmental, <http://www.eecworld.com/services/258-a-brief-history-of-hydraulic-fracturing>.

<sup>161</sup>"Hydraulic Fracturing Background Information," United States Environmental Protection Agency, last modified May 9, 2012, [http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells\\_hydrowhat.cfm](http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydrowhat.cfm).

<sup>162</sup> Ibid.

<sup>163</sup> "A Brief History of Hydraulic," EEC Environmental.



Source: [http://www.propublica.org/images/articles/natural\\_gas/fracking\\_graphic\\_120418.gif](http://www.propublica.org/images/articles/natural_gas/fracking_graphic_120418.gif)

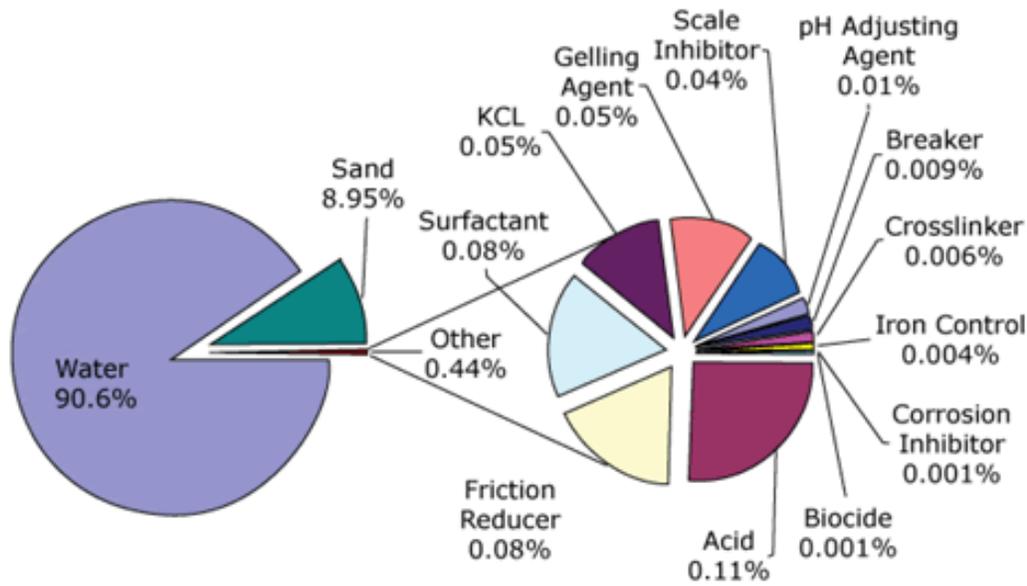
Figure 1. The Physical Fracking Process

The chemicals used in this process include but are not limited to: benzene, gelling agents, crosslinkers, friction reducers, corrosion inhibitors, scale inhibitors, biocides, and in some cases diesel fuel.<sup>164</sup> Xylene, formaldehyde and even heavy metals like cadmium and lead have also been identified as being used in the process.<sup>165</sup> However the exact chemical composition of these fluids are protected like trade secrets by the industry and are exempt from federal disclosure rules under the Energy Policy Act of 2005. As such, there currently exists some discrepancy in the publishing of exactly what is being pumped into the ground.<sup>166</sup>

<sup>164</sup> Ibid.

<sup>165</sup> Neuhauser, "Study Links Fracking to Infertility," US News.

<sup>166</sup> Plumer, "How States Are Regulating," Washington Post.



Source: <https://therivermanagementblog.files.wordpress.com/2014/07/frackingfluid.jpg>

Figure 2. One Representation of the Chemical Makeup of Fracking Fluids

What is clear about the process of fracking is the large amounts of water that it requires. Early fracking technology required 20,000 to 80,000 gallons of water per well, but today's advanced fracturing techniques can use up to 8 million gallons of water- the equivalence to twelve Olympic sized swimming pools- and up to 75,000 to 320,000 pounds of sand (proppant) per well, times the approximately 900,000 wells in the U.S. that are or have been fracked.<sup>167</sup> When fracking is complete and water rises back to the surface, some industries bring this wastewater to local waste disposal sites, while others are working on improving technology needed to recycle it for use in fracking once more.<sup>168</sup>

Although a process that has existed for well over a century, two recent technological improvements have allowed for advancements in fracking and made way for the resulting expansion of the industry circa 2003. These improvements include the use of high-pressure additives so to increase fissures in the rock and the adoption of precision drilling of wells that can follow the contour of a shale layer closely for 3km or more at depths of more than 2km.<sup>169</sup> With new

<sup>167</sup> Bobby Magill, "Fracking in the USA: New Map Shows 1 Million Oil, Gas Wells," Climate Central, last modified March 27, 2014, <http://www.climatecentral.org/news/fracking-the-usa-maps-show-americas-1.1-million-oil-and-gas-wells-17226>.

<sup>168</sup> Michael Halloway and Oliver Rudd, *Fracking: The Operations and Environmental Consequences of Hydraulic Fracuring* (Beverly, MA: Scrivener Publishing, 2013), 64.

<sup>169</sup> Howarth, Ingraffea, and Engelder, "Natural Gas: Should Fracking."

technology came a new emphasis by oil and gas companies on the exploration of shale formations, and fracking soon expanded on a massive industrial scale.<sup>170</sup> These companies targeted the shale formations in Texas, Pennsylvania, West Virginia, Wyoming, Utah, and Maryland, as well as general areas in the Midwest and northeast.<sup>171</sup> This boom was further aided by the Bush administration, which signed into law the Energy Policy Act of 2005, exempting hydraulic fracturing from the Safe Water Drinking Act.



Source: [http://www.eia.gov/oil\\_gas/rpd/northamer\\_gas.jpg](http://www.eia.gov/oil_gas/rpd/northamer_gas.jpg)

Figure 3. A Map of Shale Plays

Despite these improvements, environmental threats caused by the process remain just as great, if not greater, than when the practice first debuted. Today, about 90 percent of the estimated one million U.S. wells in operation have been fractured, a process that continues to be applied to

<sup>170</sup> "A Brief History of Hydraulic," EEC Environmental.

<sup>171</sup> Ibid.

boost production in unconventional formations such as tight gas sands and shale deposits.<sup>172</sup> As fracking continues to grow so too do questions about its long-term impacts on human health and the environment, creating a complicated policy landscape at both the state and federal level.

## **The Impacts of Fracking**

### **The Economics of Fracking**

Since 2005, fracking has come to be identified as playing a key role in the nation's clean energy future.<sup>173</sup> The EPA explains that fracking and America's shale gas resources offer important economic, energy security, and environmental benefits.<sup>174</sup>

The economic outlook for the use of natural gas, a product of fracking, is increasingly positive. The U.S. Energy Information Administration (EIA) projects the total U.S. natural gas consumption will grow from 25.6 trillion cubic feet (Tcf) in 2012 to 31.6 Tcf in 2040. This growth is due to an increase in supply made possible by shale gas, which fuels relatively low natural gas costs, and makes natural gas an attractive fuel.<sup>175</sup> Currently, natural gas is second only to coal in U.S. electricity production, comprising 27% of the nation's total energy use compared to coal's 39%.<sup>176</sup> The EPA also predicts that production of natural gas in the U.S. will outpace consumption, resulting in the U.S. growing as a major net exporter, with a rise of 88% in net exports by 2030.<sup>177</sup> By increasing domestic productions of energy, the U.S. is improving its energy security- an issue of international security, while also supporting domestic job growth.

### **The Environmental Impacts**

Natural gas poses many environmental impacts, and while some are severe negative externalities, some consequences of fracking for natural gas may be seen as a positive influence on the environment, as well. In the short-term, natural gas is expected to act as a substitute for aging coal-fired power plants. Praised by the Obama administration for being a "bridge-fuel," burning

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<sup>172</sup> "Shooters- A 'Fracking History,'" American Oil and Gas Historical Society, <http://aoghs.org/technology/hydraulic-fracturing/>.

<sup>173</sup> "Natural Gas Extraction- Hydraulic Fracturing," United States Environmental Protection Agency, last modified October 2, 2014, <http://www2.epa.gov/hydraulicfracturing>.

<sup>174</sup> Ibid.

<sup>175</sup> "Annual Energy Outlook 2014- Market Trends: Natural Gas," U.S. Energy Information Administration, last modified May 7, 2014, [http://www.eia.gov/forecasts/aeo/mt\\_naturalgas.cfm](http://www.eia.gov/forecasts/aeo/mt_naturalgas.cfm).

<sup>176</sup> "What Is U.S. Electricity Generation by Energy Source?," U.S. Energy Information Administration, last modified June 13, 2014, <http://www.eia.gov/tools/faqs/faq.cfm?id=427&t=3>.

<sup>177</sup> Ibid.

natural gas produces half the carbon dioxide released by coal, causing shale gas proponents argue that as such it can be used while renewable and nuclear energy are ramped up.<sup>178</sup> However, studies have warned that natural gas is a “cushion” rather than a complete answer. The reason for this is that despite being a “cleaner” energy, natural gas is still non-renewable. A study in the journal *Nature* also warns against over utilizing natural gas, as, while an unrestricted gas boom could increase the use of fuel by 170% by 2050, this could actually increase overall CO<sub>2</sub> emissions. A gas boom could turn the estimated 2% cut in emissions that a regulated switch to natural gas is projected to fuel, to an increase of as much as 11% in carbon emissions when left without any restrictions. The study concludes that while natural gas does promote economic growth, cuts air pollution caused by coal burning, and improves energy security, it ultimately does not slow climate change.<sup>179</sup> Additionally, the physical process of extracting gas poses many environmental risks that for most environmentalists outweigh the benefits.<sup>180</sup>

Due to the nature of fracking being a means for harnessing energy, it results in negative externalities and poses risks to the environment. Chemical spills, waste disposal, air quality, and earthquakes are amongst some of the greatest environmental impacts that are cause for concern. While all means of energy production, be it a renewable or non-renewable, have some form of an externality, environmental advocates fear that due to fracking’s threatening of both above ground and below ground stability, the risks are particularly high. One major point of concern is waste disposal and management. It is estimated that 84 gallons of drilling waste are produced for each vertical foot drilled during well development. This waste is composed of drilling fluids and rock fragments and often contains toxic contaminants including mercury, cadmium, arsenic, hydrogen sulfide, and natural gas. Were these waste products mishandled or leaked, they could contaminate groundwater, including drinking water sources.<sup>181</sup> Air pollution caused by fracking, is also a major environmental concern, as the process’s use of diesel engines and turbines to power drilling equipment and transport waste product has serious repercussions on air quality. Air pollutants from these devices include particulate matter and ozone, which contribute to poor air quality and are linked to a host of public health issues.<sup>182</sup> Additional concerns surround methane leaks, which are

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<sup>178</sup> Damian Carrington, "Fracking boom will not tackle global warming, analysis warns," *The Guardian*, last modified October 15, 2014, <http://www.theguardian.com/environment/2014/oct/15/gas-boom-from-unrestrained-fracking-linked-to-emissions-rise>.

<sup>179</sup> *Ibid.*

<sup>180</sup> *Ibid.*

<sup>181</sup> "What Goes Into Hydraulic Fracturing," *Dangers of Fracking*, <http://www.dangersoffracking.com/>.

<sup>182</sup> *Ibid.*

result of defects in the cement and steel linings of oil and gas bores. While exact amounts of methane leaked are unknown, a Princeton University study has demonstrated that both active and abandoned gas wells in Pennsylvania, representative of how most wells are constructed, leak at varying rates.<sup>183</sup> Finally, earthquakes have become a major cause of fracking opposition, as recent studies have shown increases in small quakes near fracking sites in the middle of the country where quakes were otherwise limited.<sup>184</sup>

## **The Health Impacts**

Risks to human health exist at every level of the fracking process, resulting from possible contamination of water sources, noise emissions, compressor stations, and intense truck traffic required over a well's life cycle. Studies have suggested a link between fracking and asthma, autism, thyroid disorders, and cancers.<sup>185</sup> Most recently, a 2014 study linked shale oil and gas development to a host of developmental and reproductive health risks including infertility, miscarriages, impaired fetal growth, and low birth weights within up to a ten-mile radius from wells.<sup>186</sup> These health impacts also present an issue of environmental justice, the idea that minority and low income populations are disproportionately impacted by environmental issues, as many of those who live near shale oil and gas sites lack the money needed to move away- leaving them few options to reduce their exposure to toxins.<sup>187</sup>

## **Stakeholders**

For some groups, there exists a deep distrust in the safety, reliability, and transparency of the fracking industry's practices.<sup>188</sup> For others, the hope of economic gain and faith in industry practice outweigh any concerns.

For many homeowners there is great distrust in fracking, and much pushback against the spread of the industry. An issue of Not In My Backyard (NIMBY), some homeowners are reluctant to allow for the environmental and health threats that come coupled with fracking to exist in

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<sup>183</sup> Bobby Magill, "Fracked Oil, Gas Well Defects Leading to Methane Leaks," Climate Central, last modified July 1, 2014, <http://www.climatecentral.org/news/shale-gas-well-defects-methane-leaks-17701>.

<sup>184</sup> Christopher Joyce, "Scientists Link Rise in Quakes to Wastewater Wells," npr, last modified April 12, 2012, <http://www.npr.org/2012/04/12/150460029/scientists-link-rise-in-quakes-to-waste-water-wells?ft=1&f=1007>.

<sup>185</sup> Ibid.

<sup>186</sup> Neuhauser, "Study Links Fracking to Infertility," US News.

<sup>187</sup> Ibid.

<sup>188</sup> Christopher Skroupa, "The Politics of Fracking," Forbes, <http://www.forbes.com/sites/christopherskroupa/2014/02/19/fracking-politics/>.

proximity to their homes. However, not all of these homeowners resent the practice of fracking and instead generally support the industry so long as they do not have to live near its consequences or industrial sites.<sup>189</sup> This opens up an issue of environmental justice, as wealthier states and homeowners have the political agency to advocate against the expansion of natural gas transport pipes or the building of wells, and low-income communities who lack this opportunity end up with the impacts of the fracking process.

Environmental Groups are the strongest voice against fracking, pressing that the potential for pollution outweighs the jobs created by the mushrooming of the shale-gas industry and expanding of fracking.<sup>190</sup> Visible groups in the anti-fracking campaign include Green Peace, Earthjustice, and Earth Works. These groups continue to insist that the long-term costs of fracking are not worth the short-term gains and that uncertainty and a lack of full investigation into the impacts of fracking are reason enough to not allow the practice to expand. Greenpeace, specifically, wants not just regulations on the practice, but for fracking to be banned all together. Instead, Green Peace advocates for investments in renewable fuels over the investment in a practice that they see to be threatening communities and diverting real solutions (through renewable technology) from being made.<sup>191</sup>

The fracking industry obviously presents the strongest voice for fracking, pushing back on environmentalist's concerns with lobbying attempts to prove the safe measures that the industry is taking and the economic benefits that they can bring to a region. The industry strongly opposes regulations; especially those that require the disclosing of chemicals used in fracking liquids, on the grounds that this would be detrimental to their industries, representing giving away trade secrets and making them vulnerable to competitors.<sup>192</sup> Not just owners and employees of companies back the fracking industry, but also local organizations that believe without fracking industries their local economies would perish. One such group is the Western Energy Alliance, a pro-industry pro-fracking group that looks to "save western jobs," from the threats of fracking regulation.<sup>193</sup>

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<sup>189</sup> Patrick Wintour, "Fracking Will Meet Resistance from Southern NMBYS, Minister Warns," The Gaurdian, last modified August 4, 2013, <http://www.theguardian.com/environment/2013/aug/04/fracking-resistance-southern-nimbys-minister>.

<sup>190</sup> Alex Roarty, "Are Democrats About to Fracture Over Fracking?," National Journal, last modified August 17, 2013, <http://www.nationaljournal.com/politics/are-democrats-about-to-fracture-over-fracking-20130817>.

<sup>191</sup> "Documentation of Hydraulic Fracturing," Greenpeace, <http://www.greenpeace.org/usa/en/campaigns/global-warming-and-energy/The-Problem/fracking/>.

<sup>192</sup> Halloway and Rudd, *Fracking: The Operations and Environmental*, 64.

<sup>193</sup> "Western Energy Alliance," last modified 2014, <http://www.westernenergyalliance.org/>.

## The Policy Landscape

### Federal Exemptions of Fracking

While the associated risks of fracking may suggest that heavy federal regulations are necessary to avoid serious negative consequences, fracking and other activities by the gas and oil industries have a history of being exempted from major environmental laws that are put in place to govern pollution and related externalities. For fracking, a major source of these exemptions came about on August 8, 2005 when the Energy Policy Act was signed into law by President George Bush. The Act, which intended to address a multitude of factors concerning energy production in the United States through bipartisan negotiations, also played a tremendous role in the further exemption of fracking from major federal environmental laws.<sup>194</sup> The Energy Policy Act created what is known as the “Halliburton Loophole,” which exempts shale oil and gas companies from federal regulations involving the monitoring and disclosure of fracking chemicals under the Safe Drinking Water Act (SDWA) of 1974 and the Clean Water Act (CWA) of 1972.<sup>195</sup> Specifically, the Policy Act states:

*The term ‘underground injection’—*

*(A) means the subsurface emplacement of fluids by well injection; and*

*(B) excludes—*

*(i) the underground injection of natural gas for purposes of storage; and*

*(ii) the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities.”*

Through the use of this language, the Act exempted natural gas and fracking fluid from the definition of “underground injection,” significantly reducing federal oversight of drilling and fracking operations.<sup>196</sup> While the Halliburton Loophole is a significant source of fracking’s freedom from regulation, it is not the only source of deregulation. In fact, fracking is exempt from seven major environmental laws including the Clean Water Act and Safe Drinking Water Act, as well as the Energy Policy Act, the Clean Air Act, the Resource Conservation and Recovery Act, the

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<sup>194</sup> “Energy Policy Act of 2005,” FedCenter, last modified June 20, 2007, <https://www.fedcenter.gov/Documents/index.cfm?id=2969>.

<sup>195</sup> Neuhauser, “Study Links Fracking to Infertility,” US News.

<sup>196</sup> Kendall Gurule, “Halliburton Loophole,” Frackwire, last modified June 5, 2013, <http://frackwire.com/halliburton-loophole/>.

Comprehensive Environmental Response, Compensation, and Liability Act, the National Environmental Policy Act. Further exemptions also exist in the Toxic Release Inventory. By pardoning many of its practices through federal loopholes and exemptions, fracking practices which otherwise would be deemed forbidden by the EPA are allowed to persist and prosper.<sup>197</sup>

As aforementioned, the two federal laws that were most impacted by the 2005 Energy Policy Act and whose loopholes are often recognized as the cause of a lack regulation are the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). The CWA of 1972 was introduced with the purposed of establishing permitting systems for industrial processes in order to curtail the introduction of pollutants into US waters from point sources.<sup>198</sup> A major source of EPA regulatory power, the CWA grants the agency the authority to set industry-wide standards for the quality and disposal of effluent water. However, the Energy Policy Act significantly reduced the EPA's regulatory authority over fracking and gas production. The Act did so by defining the chemical additives used in fracking fluid as "tools" rather than "pollutants," thus circumventing restrictions applied to pollutants.<sup>199</sup> Secondly, the oil and gas industry are exempt from the 1987 inclusion of rainwater runoff restrictions. The Energy Policy Act redefined sediment as a non-pollutant, broadening existing exemptions for storm-water discharges to oil and gas construction. These exemptions leave streams and rivers in high oil and gas areas unprotected from sediment run-off caused by both the operation and construction of well pads, pipelines, drill rigs, and other infrastructure.<sup>200</sup>

The Energy Policy Act similarly impacted the SDWA of 1974. Established to protect America's drinking water from ground and underground sources, both those waters actually designated and those that have the potential to be used, the SDWA exempts hydraulic fracturing from oversight and leaves drinking water sources unprotected from the host of toxic chemicals used during fracking. Congress qualifies this exemption to regulate diesel fuel additives used during fracking, which requires the industry to apply for a SDWA permit if they are using diesel fuel to hydraulically fracture a well, but otherwise requires no oversight.<sup>201</sup>

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<sup>197</sup>"Loopholes for Polluters- The Oil and Gas Industry's Exemptions to Major Environmental Laws," Natural Gas Subcommittee of the Secretary of Energy Advisory Board, [http://www.shalegas.energy.gov/resources/060211\\_earthworks\\_fs\\_oilgasexemptions.pdf](http://www.shalegas.energy.gov/resources/060211_earthworks_fs_oilgasexemptions.pdf).

<sup>198</sup> Gurule, "Halliburton Loophole," Frackwire.

<sup>199</sup> Ibid

<sup>200</sup> "Loopholes for Polluters- The Oil and Gas Industry's," Natural Gas Subcommittee of the Secretary of Energy Advisory Board.

<sup>201</sup> Ibid.

In addition to these two major environmental laws, other federal laws concerning air quality, toxic chemicals, and resource conservation also have exemptions for fracking. The 1970 Clean Air Act (CAA), a comprehensive federal law that regulates air emissions from area, stationary, and mobile pollution sources, exempts oil and gas wells, and in some instances pipeline compressors and pump stations from aggregation. Additionally, in 1991 hydrogen sulfide was removed from the list of Hazardous Pollutants under the CAA despite a 1993 EPA study that clearly concluded the accidental releases of hydrogen sulfide during oil and gas development are serious air quality concern and pose great risk to public health. Exposure to low levels can cause symptoms including headache, skin complications, respiratory problems and system damage.<sup>202</sup>

The Resource Conservation and Recovery Act (RCRA) of 1976 is the principal federal law that governs the disposal of solid hazardous wastes with a “cradle to grave” approach. But in 1980 Congress exempted oil field wastes, which includes waste from natural gas production, from the RCRA until the EPA proves they were dangerous to human health and the environment. Rather than doing so the EPA ceded the authority to regulate these wastes to the states, leaving produced water, drilling fluids, and hydraulic fracturing fluids unregulated under the nation’s premier hazardous waste law.<sup>203</sup> This allows for unsafe handling of toxic substances including conventional transport on roads and treatment in municipal rather than specialized facilities.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or, the “Superfund” law of 1980 makes liable those responsible for a spill or release of a hazardous substance into the environment. The Act includes a list of hazardous substances such as benzene, toluene, and xylene (chemicals used in the fracking process), but excludes them from liability if they are found in crude oil and petroleum, which they often are when used in natural gas production. This definition of hazardous substances also excludes natural gas, natural gas liquids, liquefied natural gas, and synthetic gas useable for fuel. The Superfund allows “Potentially Responsible Parties” to be held liable for clean up costs for a release or threatened release of a CERCLA defined hazardous substance. However, CERCLA excludes natural gas. Consequently, the industry has little incentive to clean up its hazardous waste, or to minimize spills and leaks, in part because the exemption allows companies to escape liability when problem occurs.<sup>204</sup>

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<sup>202</sup> Ibid.

<sup>203</sup> Ibid.

<sup>204</sup> Ibid.

The Energy Policy Act of 2005 also stripped the National Environmental Policy Act (NEPA) of 1970, a broad national framework for protecting the environment, of its strong requirements for public involvement and environmental review when it comes to several oil and gas related activities. It stipulated that these activities should be analyzed and process under the narrow and weaker process known as a categorical exclusion (CE), as opposed to a more comprehensive and stringent Environmental Assessment (EA) or Environmental Impact Statement (EIS).<sup>205</sup> A CE also does not allow for any public comment. In 2006 and 2007, the BLM granted this exemption to about 25% of all oil and gas wells approved on public land in the West.

Lastly, loopholes for fracking exist in the Toxic Release Inventory (TRI), which was created to require industries to report significant toxic substances to the EPA, who then disseminates the information to the public. Despite their use of toxic chemicals throughout production, gas facilities are not required to report to the TRI, leaving communities in the dark about what chemicals are being released, and making it difficult to attribute responsibility and seek remedy for resulting health and environmental problems.<sup>206</sup>

While the Halliburton Loophole and consequent gaps in federal oversight for fracking have effectively crippled the EPA's regulatory authority and federal oversight, they do not impact state regulatory capabilities. As such, many states have used their own regulatory authority to regulate or work towards banning fracking in the absence of a strong federal approach.

### **State Regulatory Efforts**

In the absence of fracking federal regulatory measures states have responded with their own policies. Since October 2010, more than 100 bills across 19 states have been introduced relating to hydraulic fracturing or natural gas.<sup>207</sup> While this has resulted in success for some states, such as New York and Pennsylvania- two of the most politically active states in regulating fracking- in others, fracking remains highly unregulated and the environment and citizen health have suffered as a consequence.<sup>208</sup> For many anti-fracking advocates, major concerns stem from the absence of a policy that requires the disclosure of chemicals used in fracture fluids. In 2010, Wyoming became the first state to require full disclosure of fracking chemicals. Many states followed Wyoming's

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<sup>205</sup> Ibid.

<sup>206</sup> Ibid.

<sup>207</sup> Jacquelyn Pless, "Fracking Update: What States Are Doing to Ensure Safe Natural Gas Extraction," National Conference of State Legislatures, last modified July 2011, <http://www.ncsl.org/research/energy/fracking-update-what-states-are-doing.aspx>.

<sup>208</sup> Ibid.

lead, including Texas, Colorado, Ohio, and Pennsylvania that have recently made this disclosure a requirement under state law.

Other states have gone farther than just requiring chemical disclosures. For example, in February of 2014, Colorado became the first state to adopt a rule that directly regulates methane emissions from fracking. This rule has made state oil and gas producers responsible for their air pollution which otherwise would be overlooked by the federal CAA. Now, companies must find leaks and fix them, and use stronger emissions controls for storage tanks, dehydrators, and gas vents from wells. This change is projected to eliminate 95% of uncontrolled toxic pollutants and volatile organic compounds that come as a result of the fracking process.<sup>209</sup>

New York has also proposed legislation that goes beyond requiring chemical disclosures. SB 425, although it failed to pass, would have prohibited the use of fluids containing chemical substances that pose a risk to human health. Assembly Bill 1265, pending, would prohibit the use of toxic fracking solutions, SB 1230, proposed, would limit fracking near public water supplies, and Assembly Bill 300 would establish a moratorium on disposal of fluids used in hydraulic fracturing that occurs outside of the state until 120 days after the EPA's report is released.<sup>210</sup> These expanded state policies are not just inwardly impacting, but some impact regions as well. For example, New Jersey's pending SJR 60 and AJR 61 would urge Delaware, New York, and Pennsylvania to join the state in disapproving requests to withdraw water for hydraulic fracturing and enacting hydraulic fracturing bans.

The ability to regulate state by state does allow for flexibility depending on a state's resources. For example, Colorado, a drought prone state, has made advancements towards limiting fracking due to the impacts it has on water supplies. Meanwhile, Pennsylvania, a large fracking site, has worked towards strictly regulating the practice, rather than trying to limit or ban it.<sup>211</sup> However, a lack of a cohesive, federal policy has major downsides. For example, about 98% of all federal wells are in just seven states: California, Colorado, Montana, North Dakota, New Mexico, Utah, and Wyoming.<sup>212</sup> These states where the majority of fracking occur do not consequently hold the majority of fracking restrictions. The ability to opt in or out of regulating fracking means limited regulation in states that know regulations could negatively impact economic gains from the

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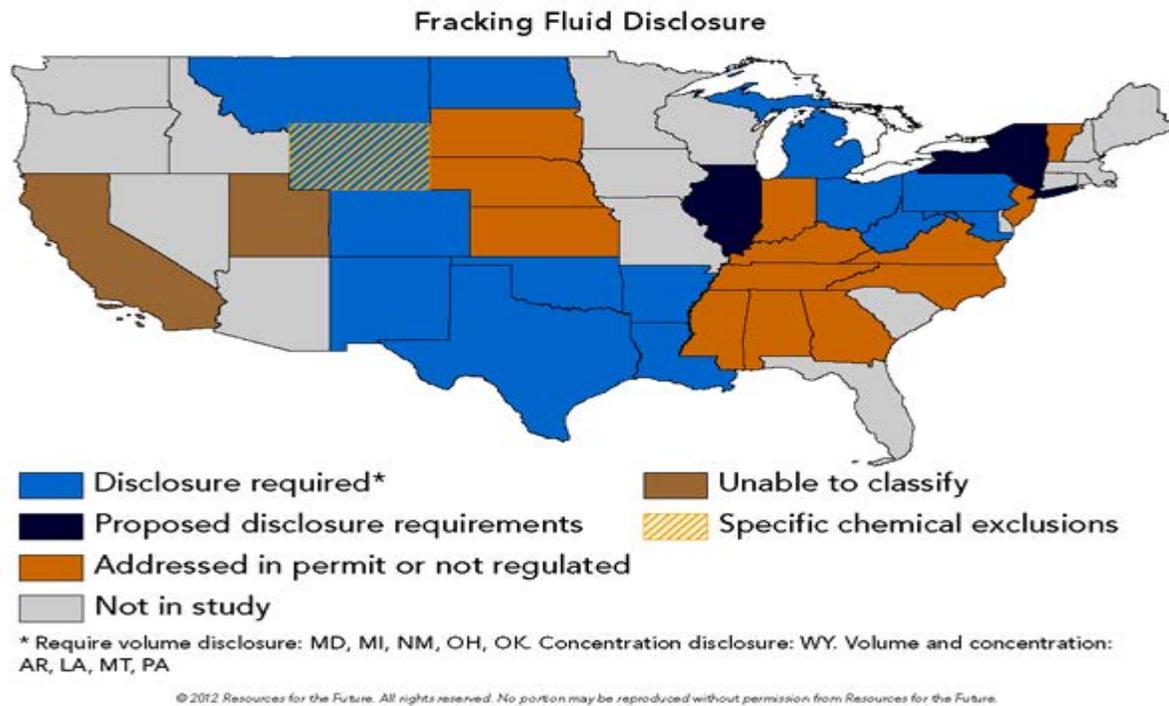
<sup>209</sup> Fred Krupp, "Don't Just Drill, Baby -- Drill Carefully," Foreign Affairs, last modified May 2014, <http://www.foreignaffairs.com/articles/141204/fred-krupp/dont-just-drill-baby-drill-carefully>.

<sup>210</sup> Pless, "Fracking Update: What States," National Conference of State Legislatures.

<sup>211</sup> *Ibid.*

<sup>212</sup> "BLM Fracking Rule," Western Energy Alliance, last modified 2014, <http://www.westernenergyalliance.org/why-western-oil-natural-gas/what-fracking/blm-fracking-rule>.

industry, and a lack of punishment for non-compliance that would be better achieved through federal oversight.



Source: [http://shalegasreporter.com/wp-content/uploads/2012/07/disclosure\\_map.png](http://shalegasreporter.com/wp-content/uploads/2012/07/disclosure_map.png)

Figure 4. Nationwide Variation in Fluid Disclosure (c. 2012)

## Federal Regulatory Efforts

### The FRAC Act

While some state efforts to regulate fracking have proven successful, they still pale in comparison to the benefits of a cohesive, federal policy. As such, select members of Congress continue to press for a federal fracking law to fill the regulation gap and create oversight for fracking’s serious health and environmental impacts.

Introduced a total of three times, first in 2009, then in 2011, and most recently in 2014 by Senator Robert Casey, Jr. (D-Penn), the Fracturing Responsibility and Awareness Act (H.R. 1084, S. 587) (FRAC Act) proposes a repeal of the exemption for hydraulic fracturing in the Safe Drinking Water Act.<sup>213</sup> This Act would require the gas industry to disclose the chemical additives used in its hydraulic fracturing fluid, eliminating the mystery, and holding them to higher more environmentally responsible standards. While the FRAC Act would make strong moves towards a

<sup>213</sup> "Bill Text H.R.2755.IH," The Library of Congress, <http://thomas.loc.gov/cgi-bin/query/z?c111:H.R.2766:>

safer, more regulated form of fracking, it remains highly unlikely that it will become law. The law has been unable to gain momentum the last two times it was proposed, and given the current political climate and fundamental divide between economic gains and environmental protections, Govtrack.us has predicted that the bill only has a 1% chance of being enacted.<sup>214</sup> This prognosis is based on aspects of the Act that correlate with successful or failed bills of the past.<sup>215</sup>

### **BREATHE Act**

Introduced on March 14, 2013, the Bringing Reductions to Energy's Airborne Toxic Health Effects (BREATHE) Act is a follow up to the FRAC Act, put forth to regulate currently de-regulated air emissions caused by fracking. BREATHE was introduced by Congressman Jared Polis (D-CO) and Matt Catwright (D-PA) to close two exemptions in the Clean Air Act (CAA) that threaten the health of communities that grapple with nearby gas production sites. Firstly, BREATHE would establish limits for major pollution sources from the fracking process, and secondly, would close oil and gas loopholes in the CAA. However, similar to the FRAC Act, BREATHE stands just a 1% chance of being enacted.<sup>216</sup> This again stems back to Congressional tensions and strong support for fracking on both sides of the aisle.

Together the BREATHE Act and FRAC Act would successfully regulate two major causes for concern related to fracking: air quality and chemical compositions of fracking fluid as they relate to threats to clean water sources. Despite the potential of such a feat, neither is likely to actually make it out of Congress and across the President's desk.

### **Alternative Pathways: The Bureau of Land Management Fracking Rule**

Given the bleak outlook for using federal lawmaking to regulate fracking and inefficiencies of state level regulations, the use of the alternative pathway, rulemaking, may serve as a more successful means for regulating fracking. Rulemaking is the process by which federal agencies implement existing legislation. In addition, an agency may engage in rulemaking to update rules under existing laws, or to create new rules within existing authority that the agency believes are needed.<sup>217</sup>

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<sup>214</sup> "S. 1135: Frac Act," GovTrac, <https://www.govtrack.us/congress/bills/113/s1135>.

<sup>215</sup> "Analysis Methodology," GovTrac, <https://www.govtrack.us/about/analysis#prognosis>.

<sup>216</sup> "H.R. 1154: BREATHE Act," GovTrac, <https://www.govtrack.us/congress/bills/113/hr1154>.

<sup>217</sup> "Rulemaking, How it Works," U.S. Securities and Exchange Commission, <http://www.sec.gov/answers/rulemaking.htm>.

Although an agency that has a complicated history regarding conservation and is seen by some environmentalists as working against green objectives, the Bureau of Land Management (BLM) has proposed a rule for hydraulic fracturing (fracking) that would update regulations on the process and limit the industry's current evasion from oversight.<sup>218</sup> This rule would apply to more than 750 million subsurface acres of federal and Indian mineral estates, including lands managed by the Forest Service and Fish and Wildlife Service. The BLM Proposal contains three main components: chemical disclosure, well integrity, and flowback water and toxic waste management. In many ways, the BLM will create a cross-nation regulation similar to what many states already have in place. While this means a more cohesive approach to fracking oversight, some argue that given its sweeping power, the BLM rule should try to go farther than state regulations, imposing even stricter oversight. Specifically, environmental group Earthworks insists that the BLM should include provisions concerning safe setbacks from homes, schools, and sensitive environments, require robust baseline testing to document change in water quality, and ban the use of diesel in fracking under federal leases.<sup>219</sup>

Conversely, there are also groups who strongly oppose the BLM rule. In the West, the Western Energy Alliance, Independent Petroleum Association of America, and a number of communities and trade associations are voicing concern that the rule will disproportionately impact their economy. This is because the West, which is home to the majority of the country's public lands, would be most affected by a rule, which requires oversight on public land and Indian Territory. These groups insist that the rule lacks justification, and will discourage investment and job creation in the West.<sup>220</sup>

The rulemaking process allows for both sides of the argument to voice their opinions during a period of public comment, which lasts for 30-60 days. After this period the agency reevaluates the rule, and can re-open the revised rule to additional public comment. While this makes for a lengthy process, the BLM rule looks far more promising than the three-time attempt at enacting the FRAC Act. Currently, the rule appears on track to be finalized before the end of the year.<sup>221</sup>

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<sup>218</sup> Keith Riddler, "US Agency Cancels Permit Allowing Divisive Idaho Wolf- and Coyote-Killing Derby on Its Land," *Star Tribune*, last modified November 26, 2014, <http://www.startribune.com/politics/national/283978001.html>.

<sup>219</sup> "BLM's Proposed Fracking Rule: Earthworks Factsheet," Earthworks, <http://www.earthworksaction.org/files/publications/blmrulefactsheet.pdf>.

<sup>220</sup> "BLM Fracking Rule," Western Energy Alliance.

<sup>221</sup> Charlie Passut, "Agenda Shows BLM Frack Rule on Track, But Others Delayed," *Shale Daily*, last modified November 24, 2014, <http://www.naturalgasintel.com/articles/100534-agenda-shows-blm-frack-rule-on-track-but-others-delayed>.

## **The Politics of Fracking**

An interesting aspect of fracking is the fundamental split that exists not between political groups, but rather, within them. While most environmental issues seem to create a divide between the typically conservative Republican Party and liberal Democratic Party, for fracking, there instead exists a great amount of people from both groups that support the industry and therefore do not support regulating it. This split in party ideologies is most apparent in the Democratic party, where the backing of fracking is not as complete as it is for issues like wind and solar. This is because while the Democratic Party is composed of environmentalists and progressives, it is also home to people with ties to labor unions and support job growth. President Obama, who has even called for fracking monitoring but has never pushed for federal restrictions on it, further represents this split. Obama's stance is strikingly similar to that of Republican President George Bush, who also gave fracking the green light.<sup>222</sup> The Republican Party continues to overwhelmingly support fracking, as it offers what they see as energy security and economic stimulation. With both sides supporting fracking, moving forward federal reform to regulate the practice becomes even more challenging, as neither side wholly wants to see the fracking industry impacted.

## **Looking Forward: Policy Recommendations**

Given the hold that natural gas and the process of fracking currently have on the United States energy structure, it is unlikely that a policy simply banning fracking and the expansion of fracking due to its environmental and health costs is possible. While this would prompt expedited renewable energy research, as this "bridge fuel" could no longer be exploited, this is unrealistic. Therefore, the ideal policy response to the fracking industry would be strict, federal regulations, and the subsequent closing of the many loopholes or gaps that currently exist in federal policies and are meant to ease the industry's exploitation of the environment and lack of responsibility for externalities. While the proposed FRAC and BREATHE Acts begin to close the major Halliburton Loophole, the federal regulation of fracking must go even further in controlling this process. Regulations should extend beyond chemical disclosures and include, as have some states, regulations on well proximity to drinking water, regulations on which chemicals can and cannot be used depending upon their toxicity to human health, and require baseline testing. Without these types of regulations, fracking presents itself as an easy and economic form of energy production,

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<sup>222</sup> Roarty, "Are Democrats About to Fracture," National Journal.

but by limiting fracking's freedom, not only will strides be made to protect the environment and human health, but also, this could increase the benefits of pouring more resources into expanding renewable energy, rather than expanding the dangerous extraction of this non-renewable fuel.

However, it remains very unlikely that such an act would ever get passed federally. Given the challenges that the FRAC Act, which simply requires chemical disclosures, has faced, it appears that an alternative policy pathway must be taken. The first of these is by using state level regulations. While not ideal, these measures have proven highly effective for those states that have implemented them. An additional promising pathway is the BLM rule, and although this rule has taken a significant amount of time to move forward, should it become enacted it will mark one of the strongest federal rules against fracking to date. Most recently, the BLM has sent a revised final rule to the White House Office of Budget for review. If the White House approves the rule, the BLM will succeed in achieving its goal of creating fracking oversight.<sup>223</sup>

Putting market pressures on fracking companies can also help to create change by requiring the industry to act more responsibly. Although not a policy pathway, Michael Holloway, an advocate for fracking and advisor to the industry, explains the benefits of safe practice for both the environment and business and the subsequent push they can create in changing industry behavior.<sup>224</sup> Holloway explains how topics previously seen as issues, like disclosing chemicals, are actually good for business. Companies that have chosen to disclose the chemicals they use have realized that they benefit from using environmentally friendly chemicals and advertising it. For example, some companies boast using gaur gum as a gel frack, and explain to communities that this is same ingredient found in ice cream, helping to negate public fear.<sup>225</sup> This is good for business, but also for the environment, if the industry holds itself to public release of its chemicals it is less likely that toxic chemicals will be used when they can be supplemented for "greener" alternatives. Other practices like preventing flowback, spillage, leaks, and recycling flowback are methods that Holloway presents that work for both the industry and mitigating environmental consequences.

Clearly, at this point in time there are no one-size fits all solutions to regulate fracking. Due to fundamental splits in party ideology and strong support for the economic benefits that fracking is believed to yield, it remains unlikely that federal policy will succeed or that state policy will ever fully accomplish the regulations needed. Rulemaking and market pressures also pose possible

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<sup>223</sup> Abigail Jones, "Draft Final BLM Rules Under White House Review," Shale Energy Law Blog, last modified September 3, 2014, <http://www.shaleenergyblog.com/tag/bureau-of-land-management/>.

<sup>224</sup> Holloway and Rudd, *Fracking: The Operations and Environmental*.

<sup>225</sup> *Ibid*, 44.

regulatory solutions, but like current federal and state outlooks, are not perfect. Therefore, this policy brief maintains that in order to best regulate fracking utilizing a combination of all available alternative policy pathways is best. While no singular pathway is perfect, each has aspects that have helped push the issue of deregulated fracking toward change. It is through these pathways that, despite a lack of traditional federal environmental policymaking, the environmental policy arena has remained dynamic and policies continue to become more environmentally conscious.<sup>226</sup> For fracking, change is not going to happen over night or through one strong federal law. Instead, slowly but surely, through a combination of pathways, this industry will drift towards becoming more green.<sup>227</sup>

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<sup>226</sup> Christopher Klyza and David Sousa, *American Environmental Policy, 1990-2006* (Cambridge, MA: MIT Press, 2008), 296.

<sup>227</sup> Klyza and Sousa, *American Environmental Policy, 1990-2006*, 297.

## Section 4.2

### Fracking and Wildlife Protection in the American West

***Federal Policy and the Gunnison Sage-Grouse:  
An Analysis of the Endangered Species Act as a  
Conservation Tool***

**by Charlotte Benishek**

**December 19, 2014**

U.S. Environmental Politics  
Environmental Studies Program

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## **Timeline of Events Concerning the Listing of the Gunnison Sage-Grouse**

<b>January 2000</b>	Scientists designated the Gunnison sage-grouse as a separate species from the closely related greater sage-grouse.
<b>January 2000</b>	FWS designates GSG as a candidate species for ESA listing.
<b>May 2004</b>	FWS increases priority ranking of GSG from 5th to 2nd on the waiting list for ESA listing due to increasing threats.
<b>April 2006</b>	FWS issued a “not warranted” listing for the GSG and removed it from the candidate species list.
<b>November 2006</b>	San Miguel County, Colorado, sued the FWS over its “not warranted” decision. As part of the settlement, FWS agreed to publish a new finding.
<b>September 2010</b>	FWS found the GSG “warranted but precluded” from an ESA listing. GSG is added to the candidate species list.
<b>September 2011</b>	Washington D.C. district court settlement requires that the FWS reexamine the listing of the GSG.
<b>January 2013</b>	FWS issues a proposed rule to list the GSG as endangered.
<b>November 2014</b>	FWS issues a final rule listing the GSG as threatened and designating critical habitat for the species.
<b>December 2014</b>	Congress withdraws funding from FWS, prohibiting the agency from continuing with the listing process for the GSG during the upcoming fiscal year.

## **Federal Policy and the Gunnison Sage-Grouse: An Analysis of the Endangered Species Act as a Conservation Tool**

### **Executive Summary**

The Gunnison sage-grouse (GSG) (*Centrocercus minimus*) is a small turkey-like bird that roams the sagebrush plains of southeastern Colorado and southeastern Utah. Degradation of its native sagebrush habitat due to residential, transportation and fossil fuel development has caused its population to decline considerably in recent decades. The GSG now occupies 8% of its historic range, and its population numbers approximately 4,700 individuals.<sup>228</sup> The individuals are spread among distinct 7 populations, 6 of which are small satellite populations, each numbering no more than 206 birds.<sup>229</sup> All satellite populations were in decline until 2010, but thanks to extensive voluntary conservation efforts, the primary population of 4,000 individuals, which is located in Gunnison Basin in Colorado, has been stable for a decade.<sup>230</sup> The primary contention involving the ecology of the bird is the relative importance of the satellite populations to the primary population and whether the decline of the satellite populations is a threat to the health of the main Gunnison Basin population.

The GSG has long and contentious policy history. It has been a candidate for an Endangered Species Act listing since 2000. Following a 2011 lawsuit by WildEarth Guardians, the Fish and Wildlife Service (FWS) was forced to review it for potential listing under the ESA. The FWS originally proposed an endangered listing. However in response to public comments, the agency downgraded the listing to threatened, indicating that the GSG is not currently in danger of extinction, but is likely to become endangered within the foreseeable future.<sup>231</sup> FWS also designated 1,429,551 acres of critical habitat for the GSG at this time.<sup>232</sup>

The threatened designation and definition of critical habitat impose restrictions on public and private land use. If the GSG is listed as threatened, activities on public or private land that require a federal permit and might harm the GSG will not be approved. An endangered listing

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<sup>228</sup> U.S. Department of the Interior, “Endangered and Threatened Wildlife and Plants; Threatened Status for the Gunnison Sage Grouse,” *Federal Register* 79, no. 224 (November 20, 2014): 69192 – 69310, <http://www.gpo.gov/fdsys/pkg/FR-2014-11-20/pdf/2014-27109.pdf>

<sup>229</sup> Bureau of Land Management et al., “Gunnison Sage-Grouse Rangewide Conservation Plan,” April, 2005.

<sup>230</sup> U.S. Fish and Wildlife Service, “Gunnison Sage Grouse: Threatened Designation and Responsibilities Under the Endangered Species Act,” (November, 2014), <http://www.fws.gov/mountain-prairie/factsheets/Gunnison%20Sage-grouse%20Threatened%20Designation%20Factsheet.pdf>.

<sup>231</sup> U.S. Department of the Interior, “Endangered and Threatened Wildlife and Plants; Threatened Status for the Gunnison Sage Grouse,” *Federal Register* 79, no. 224 (November 20, 2014): 69192 – 69310, <http://www.gpo.gov/fdsys/pkg/FR-2014-11-20/pdf/2014-27109.pdf>

<sup>232</sup> U.S. Department of the Interior and the Fish and Wildlife Service, “Designation of Critical Habitat for Gunnison Sage-Grouse,” *Federal Register* 79, no. 224, November 20, 2014: 69312 – 69363.

would impose even stricter regulations on land use. The fossil fuel industry, land owners and the states of Colorado and Utah are generally opposed to the listing of the GSG because they fear the land use restrictions it imposes will have a negative economic impact on the regional economy. Environmental groups contend that a threatened designation does not provide the GSG enough protection.

Both the environmental groups and the state of Colorado have sued the Department of the Interior to appeal the listing, with the environmentalists arguing for an endangered classification and the state of Colorado arguing for no listing at all. While resolving these lawsuits will take time, based on accelerating threats to the bird's habitat, it is likely that the environmentalists will win the legal battle. However, the outcome of the lawsuits may ultimately be rendered irrelevant by the appropriations process, through which Congress recently denied the FWS funding to list the GSG under the ESA.<sup>233</sup> This provision creates considerable policy volatility because it must be renewed annually, leaving the GSG at the mercy of Congressional budget battles.

## Introduction

The Gunnison sage-grouse (*Centrocercus minimus*) (GSG), shown in Figure 1, is a small bird that lives on the sage prairies of southern Colorado and southeastern Utah.<sup>234</sup> Currently the total U.S. population is estimated at just 4,700 individuals spread among 7 distinct groups throughout its range.<sup>235</sup> The largest of these is a 4,000 individual population in the Gunnison Basin in southern Colorado.<sup>236</sup> The remaining satellite populations are generally quite small, with the largest population estimated at 206 individuals.<sup>237</sup> Today the GSG only occupies 8.5% of its historic range, which once included southwest Colorado, southeast Utah, northeastern Arizona, and northwestern New Mexico.<sup>238</sup> In 2000 it was recognized as a species distinct from its close relative,

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<sup>233</sup> Consolidated and Further Continuing Appropriations Act, 2015. H.R. 83, 113<sup>th</sup> Cong. (2014).

<sup>234</sup> U.S. Fish and Wildlife Service, "Gunnison Sage-Grouse," November 20, 2014, <http://www.fws.gov/mountain-prairie/species/birds/gunnisonsagegrouse/>.

<sup>235</sup> U.S. Department of the Interior and the Fish and Wildlife Service, "Designation of Critical Habitat for Gunnison Sage-Grouse," *Federal Register* 79, no. 224, November 20, 2014: 69312 – 69363.

<sup>236</sup> *Ibid.*

<sup>237</sup> U.S. Department of the Interior, "Endangered and Threatened Wildlife and Plants; Threatened Status for the Gunnison Sage Grouse," *Federal Register* 79, no. 224, November 20, 2014: 69192 – 69310, <http://www.gpo.gov/fdsys/pkg/FR-2014-11-20/pdf/2014-27109.pdf>

<sup>238</sup> U.S. Fish and Wildlife Service and Colorado Division of Wildlife, "Candidate Conservation Agreement with Assurances for Gunnison sage-grouse," July 15, 2006.

the greater sage-grouse (*Centrocercus urophasianus*), which faces similar conservation threats, but has a larger population and range that spans 11 states throughout the American West.<sup>239</sup>



Figure 1: Gunnison Sage Grouse (*Centrocercus minimus*)

The GSG requires a diverse habitat that includes both abundant grasslands and wetlands, where hens raise their young.<sup>240</sup> In addition, sagebrush is the species' exclusive food source during the winter months, making a healthy sagebrush population essential to a healthy GSG population.<sup>241</sup> The GSG's requirement of a wide range of viable habitat means that the health of the GSG population can be considered a barometer of the health of the entire sagebrush plain ecosystem.<sup>242</sup>

Residential, transportation, and energy development pose a threat to the GSG population because these activities cause habitat loss and fragmentation and necessitate construction of roads, fences and power lines, all of which destroy habitat and contribute to the species' precarious position.<sup>243</sup> In fact, the GSG's rangewide conservation plan, developed by the Colorado Parks and Wildlife Department, stated that the preservation of the GSG's habitat is "...fundamental to the longer-term preservation of the GSG..."<sup>244</sup> In addition, as the total population size decreases, it becomes progressively harder for the species to recover due to a loss of genetic diversity.<sup>245</sup> While a minimum viable population size has not been conclusively established, populations of less than 100

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<sup>239</sup> "U.S. Fish and Wildlife Service Protects Gunnison Sage-Grouse as Threatened Under Endangered Species Act," November 12, 2014, [http://www.fws.gov/mountain-prairie/pressrel/2014/11122014\\_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php](http://www.fws.gov/mountain-prairie/pressrel/2014/11122014_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php).

<sup>240</sup> U.S. Fish and Wildlife Service and Colorado Division of Wildlife, "Candidate Conservation Agreement with Assurances for Gunnison sage-grouse," July 15, 2006.

<sup>241</sup> Ibid.

<sup>242</sup> <http://www.csmonitor.com/USA/2014/1112/Why-did-Colorado-governor-oppose-threatened-listing-of-Gunnison-sage-grouse-video>

<sup>243</sup> U.S. Fish and Wildlife Service and Colorado Division of Wildlife, "Candidate Conservation Agreement with Assurances for Gunnison sage-grouse," July 15, 2006.

<sup>244</sup> Bureau of Land Management et al., "Gunnison Sage-Grouse Rangewide Conservation Plan," April, 2005.

<sup>245</sup> Bureau of Land Management et al., "Gunnison Sage-Grouse Rangewide Conservation Plan," April, 2005.

individuals are generally thought to face a high risk of extinction.<sup>246</sup> The main population unit of GSG in the Gunnison Basin has a stable population, but experts believe that if the main population unit were to decline due to locally specific factors, the smaller surrounding GSG populations might not be affected and would be essential to the rangewide population's recovery.<sup>247</sup> Smaller satellite GSG populations also maintain genetic diversity, which improves species' resilience.<sup>248</sup> Therefore all populations of the GSG are important to the species' long term health.<sup>249</sup>

The U.S. Fish and Wildlife Service (FWS), the federal agency responsible for designating endangered species, has investigated whether either the GSG or its close relative, the greater sage-grouse, merit protection under the ESA. Thanks to a successful 2011 lawsuit by WildEarth Guardians, the FWS is obligated to make a listing decision for the greater sage-grouse by September 2015.<sup>250</sup> Due to the numerous biological similarities between the greater sage-grouse and the GSG, the FWS's decisions about the GSG are generally regarded as an informal precedent for decisions about the greater sage-grouse. The greater sage-grouse has a much larger range than the GSG, and a listing of the greater sage-grouse under the ESA could broadly restrict economic activity on lands across the West. Due to the similarities between the two species, states, property owners and industry groups are paying particularly close attention to the FWS's decisions about the GSG.

### **Current Policy Landscape**

In 2010 the FWS found that the GSG was eligible for federal protection and placed it on the candidate species list. However the agency was overwhelmed by reviewing other species of higher priority, and the GSG was not reviewed.<sup>251</sup> The environmental advocacy group WildEarth Guardians eventually sued the FWS, forcing the agency to decide whether the bird would be listed as threatened or endangered by November 12, 2014.<sup>252</sup> The agency originally proposed an

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<sup>246</sup> Sara J. Oyler-McCance et al., "Population Genetics of Gunnison Sage-Grouse: Implications for Management," *Journal of Wildlife Management* 69, no. 2 (April 2005): 630–37.

<sup>247</sup> "U.S. Fish and Wildlife Service Protects Gunnison Sage-Grouse as Threatened Under Endangered Species Act," November 12, 2014, [http://www.fws.gov/mountain-prairie/pressrel/2014/11122014\\_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php](http://www.fws.gov/mountain-prairie/pressrel/2014/11122014_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php).

<sup>248</sup> Oyler-McCance et al., "Population Genetics of Gunnison Sage-Grouse."

<sup>249</sup> "U.S. Fish and Wildlife Service Protects Gunnison Sage-Grouse as Threatened Under Endangered Species Act," November 12, 2014, [http://www.fws.gov/mountain-prairie/pressrel/2014/11122014\\_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php](http://www.fws.gov/mountain-prairie/pressrel/2014/11122014_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php).

<sup>250</sup> *WildEarth Guardians v. Salazar*, U.S. District Court, Washington, D.C., 2011.

<sup>251</sup> Scott Streater, "FWS Lists Gunnison Sage Grouse as Threatened, Sets 1.4M Acres of Critical Habitat," *Greenwire*, November 12, 2014.

<sup>252</sup> *Ibid.*

endangered listing for the GSG in January 2013.<sup>253</sup> However, according to the FWS, “new information received during the public comment period and peer-review process,” caused them to reverse their decision in the final rule, listing the grouse as threatened rather than endangered.<sup>254</sup> According to the FWS, the agency originally overestimated the negative effects of residential development on the main Gunnison Basin population, resulting in a downgrade of the original finding from endangered to threatened.<sup>255</sup> In their final rule, the FWS explained they pronounced the GSG threatened because 32% of the GSG’s range is currently threatened by residential development, and the agency predicts that residential development pressure on GSG habitat will increase in the future.<sup>256</sup> Furthermore, the FWS found that “[current] regulatory mechanisms ... are insufficient to fully reduce or eliminate the increase in threats that may act on the species in the future.”<sup>257</sup>

Designating the GSG as endangered would have imposed tight restrictions on land use in order to stop any activities that might harm the GSG, regardless of whether the activities occurred on public or private land. A threatened listing restricts potentially harmful activities on federal land but only limits activities on private land which require a federal permit. The possibility of a listing for the GSG motivated stakeholders in southwestern Colorado and eastern Utah to initiate voluntary conservation efforts in order to avoid restrictions on private land use.<sup>258</sup> The Park Service, Bureau of Land Management, ranchers and local government officials worked together to implement initiatives such as road closures during breeding season, planting of trees to increase breeding and rearing habitat, and increased scrutiny of building permits to identify potential impacts on the sage-grouse.<sup>259</sup> These efforts remained in place even after the FWS decided not to list the GSG in 2006.<sup>260</sup> Fearing negative economic consequences of a listing, the Colorado Division of Wildlife,

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<sup>253</sup> U.S. Fish and Wildlife Service, “Gunnison Sage-Grouse.” <http://www.fws.gov/mountain-prairie/species/birds/gunnisonsagegrouse/>.

<sup>254</sup> “U.S. Fish and Wildlife Service Protects Gunnison Sage-Grouse as Threatened Under Endangered Species Act,” November 12, 2014, [http://www.fws.gov/mountain-prairie/pressrel/2014/11122014\\_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php](http://www.fws.gov/mountain-prairie/pressrel/2014/11122014_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php).

<sup>255</sup> US Department of the Interior, “Endangered and Threatened Wildlife and Plants; Threatened Status for the Gunnison Sage Grouse,” *Federal Register* 79, no. 224 (November 20, 2014): 69192 – 69310, <http://www.gpo.gov/fdsys/pkg/FR-2014-11-20/pdf/2014-27109.pdf>

<sup>256</sup> *Ibid.*

<sup>257</sup> *Ibid.*

<sup>258</sup> Scott Streater, “FWS Lists Gunnison Sage Grouse as Threatened, Sets 1.4M Acres of Critical Habitat.”

<sup>259</sup> Kelly Bastone, “The Grouse Effect,” *National Parks* 85, no. 3 (Summer 2011): 13.

<sup>260</sup> *Ibid.*

the agency responsible for overseeing animal and plant conservation in the state, had spent over \$40 million on efforts to bolster the health of the GSG in an attempt to avoid a listing as of 2014.<sup>261</sup>

While the threatened designation is not as restrictive as an endangered listing, local residents and industry are nevertheless unhappy about any restrictions, especially in light of what they see as a robust voluntary conservation effort. However, the FWS also announced that it plans to submit a rule in early 2015 that would allow private land users who implement conservation agreements to operate under those agreements rather than the restrictions of the threatened listing and critical habitat designation.<sup>262</sup> This brief will explore the implications of the Endangered Species Act and stakeholders' reactions to the recent threatened designation of the GSG, as well as comment on potential implications of the GSG's threatened status for other similar species such as the greater sage-grouse. Finally, the brief will provide a policy outlook, evaluating whether the GSG is likely to retain its threatened status, be upgraded to an endangered listing, or lose its protection entirely.

### **The Endangered Species Act**

The Endangered Species Act (ESA) was passed in 1973 with broad bipartisan support. A few minor amendments have been added to the legislation since then, but the practical effect of the law has remained largely unchanged.<sup>263</sup> The Fish and Wildlife Service and the National Oceanic and Atmospheric Administration (for marine species) are responsible for administering the ESA. There has long been regulatory tension between the state and federal governments surrounding the management of endangered species.<sup>264</sup> State governments are responsible for managing non-endangered wildlife, but the FWS has complete control of managing endangered species in all states.<sup>265</sup> States are allowed to create their own endangered species regulations in addition to federal laws, but the regulations states create cannot contradict existing federal laws.<sup>266</sup>

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<sup>261</sup> State of Colorado, Department of Law, "Notice of Intent to Sue for Violations of the Endangered Species Act Related to the November 12, 2014 Decision to List the Gunnison Sage Grouse as Threatened and to Designate Critical Habitat in Conjunction with the Listing," December 12, 2014.

<sup>262</sup> "U.S. Fish and Wildlife Service Protects Gunnison Sage-Grouse as Threatened Under Endangered Species Act," November 12, 2014, [http://www.fws.gov/mountain-prairie/pressrel/2014/11122014\\_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php](http://www.fws.gov/mountain-prairie/pressrel/2014/11122014_ServiceProtectsGunnisonSageGrouseAsThreatenedUnderESA.php).

<sup>263</sup> Joe Roman, *Listed: Dispatches from America's Endangered Species Act* (Cambridge, Mass: Harvard University Press, 2011).

<sup>264</sup> *Ibid.*

<sup>265</sup> Christopher McGrory Klyza and David Sousa, *American Environmental Policy, 1990-2006: Beyond Gridlock* (Cambridge, Mass: MIT Press, 2008).

<sup>266</sup> Michael Bean, "The Endangered Species Act," *Annals of the New York Academy of Sciences* 1162 (April 2009).

In order for a species to become listed under the ESA, the FWS first must submit a listing proposal to the Federal Register, where the public may review it and submit comments. The FWS might find that a species is either endangered, threatened, or that it does not merit a listing. The ESA defines endangered species as, “any species which is in danger of extinction throughout all or a significant portion of its range,” and threatened species as, “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”<sup>267</sup> The law stipulates that the determination of endangered status must be determined “solely on the basis of the best scientific and commercial data available.”<sup>268</sup> This notably excludes concerns of economic impact from the listing process. Once a species is considered threatened or endangered, it becomes illegal to “take” the species, which the Act defines as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”<sup>269</sup>

### **Critical Habitat**

Once a species has been listed, through rulemaking the FWS may designate an area of land as “critical habitat” for the species – an area which the FWS deems essential to the species’ continued existence or recovery.<sup>270</sup> The ESA defines critical habitat as areas “on which are found those physical or biological features” which are “essential to the conservation of the species.”<sup>271</sup> The law also notes that these lands, “may require special management concerns or protection,” and protects areas that are determined to be crucial to the recovery of the species, including areas where the species is not currently found.<sup>272</sup> Designating critical habitat is optional, and the FWS has only designated critical habitat for about 44% of all threatened and endangered species.<sup>273</sup>

Critical habitat is designed to both protect areas where the organism is already found and protect lands that might be necessary to accommodate the population as it expands. Once an area is designated a critical habitat, according to the FWS, “activities [on critical habitat] that involve a Federal permit, license, or funding, and are likely to destroy or adversely modify the area of critical habitat” must be reviewed by the FWS in order to assess their impact on the listed species’

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<sup>267</sup> Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884, (1973). Sec 3(6).

<sup>268</sup> Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884, (1973). Sec 4(b).

<sup>269</sup> Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884, (1973). Sec 3(19).

<sup>270</sup> Amanda Paulson, “Why Did Colorado Governor Oppose Threatened Listing of Gunnison Sage Grouse?” *The Christian Science Monitor*, November 12, 2014.

<sup>271</sup> Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884, (1973). Sec 3(5)(A)(ii).

<sup>272</sup> Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884, (1973). Sec 3(5)(A)(i)(II).

<sup>273</sup> U.S. Fish and Wildlife Service, “Critical Habitat Frequently Asked Questions,” July 15, 2013, <http://www.fws.gov/endangered/what-we-do/critical-habitats-faq.html>.

habitat.<sup>274</sup> If the FWS determines that an activity on critical habitat will negatively impact a species, the FWS will impose modifications to the permitted action designed to minimize harm to the critical habitat.<sup>275</sup> The activity will not be approved unless the modifications are implemented.

While the ESA prohibits the FWS from considering economic impacts in the listing process, the Act specifically requires that the FWS weigh the costs and benefits of designating critical habitat.<sup>276</sup> The Act states, “The secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such an area as part of the critical habitat, unless he determines ... that the failure to designate such area as critical habitat will result in extinction of the species concerned.”<sup>277</sup> This analysis of the costs and benefits of designating critical habitat necessitates considering economic losses caused by land use restrictions on critical habitat. However, weighing costs and benefits can be difficult because the benefits of a healthy GSG population are more accurately described biologically rather than economically and can be difficult to quantify.<sup>278</sup> Economic costs of designating critical habitat in the case of the GSG might include lost revenues derived from limitations on fossil fuel and mineral development, livestock grazing, residential development, or renewable energy development.<sup>279</sup> The FWS’ final economic analysis of the proposed critical habitat designation for the GSG found that the economic costs of designating critical habitat for the GSG were less than the benefits of preserving these areas.

On November 20, 2014, the FWS proposed a rule designating 1,429,551 acres (an area roughly equivalent to the area of Delaware) in Colorado and Utah as critical habitat for the GSG. The area, shown in Figure 2, spans 9 counties in Colorado and 2 counties in Utah, and is composed of 55% federal land and 43% private land.<sup>280</sup> The critical habitat is relatively large is due GSG’s need to move a great deal throughout the year and utilize different habitats at different times throughout the year. In the spring, the GSG breeds and rears young in riparian areas, and during the rest of the year it remains in sagebrush plains and uses sagebrush as a food source.<sup>281</sup> Therefore in

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<sup>274</sup> U.S. Fish and Wildlife Service, “Listing and Critical Habitat,” November 26, 2014, <http://www.fws.gov/endangered/what-we-do/critical-habitats.html>.

<sup>275</sup> *Ibid.*

<sup>276</sup> Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884, (1973). Sec 4(B)(2).

<sup>277</sup> *Ibid.*

<sup>278</sup> Industrial Economics, Incorporated, “Economic Analysis of Critical Habitat Designation for the Gunnison Sage-Grouse,” November 7, 2014.

<sup>279</sup> *Ibid.*

<sup>280</sup> *Ibid.*

<sup>281</sup> *Ibid.*

order to support a healthy GSG population, an area must have both types of habitat as well as healthy sagebrush plains connecting both habitats.



Figure 2: Critical habitat for GSG in CO and UT

Conservation efforts required by the ESA in order to avoid a take of existing GSG are similar to efforts that would be required to preserve GSG critical habitat. Therefore the relative impact of designating critical habitat currently occupied by GSG is less than the impact of designating critical habitat where GSG is not currently found. Approximately 55% of the critical habitat area proposed by the FWS is currently occupied by GSG.<sup>282</sup> In its economic analysis, the FWS estimated that the direct cost of listing the GSG as threatened would amount to \$48 million over 20 years, and the additional cost of designating GSG critical habitat would be \$6.9 million per year over 20 years.<sup>283</sup> The analysis also found that designating critical habitat would result in a loss in economic activity in the area. One of the largest losses in economic activity would stem from a shift in oil and gas production away from the regions of Colorado and Utah within the critical habitat, resulting in the loss of \$290 million in annual economic activity and 79 jobs in Colorado and an annual loss of \$410,000 and 10 jobs in Utah.<sup>284</sup>

### Voluntary Conservation Efforts

Largely out of fear of the land use restrictions an ESA listing would impose, private landowners and county governments in Colorado and Utah have undertaken significant voluntary

<sup>282</sup> Industrial Economics, Incorporated, “Economic Analysis of Critical Habitat Designation for the Gunnison Sage-Grouse,” November 7, 2014.

<sup>283</sup> U.S. Department of the Interior and the Fish and Wildlife Service, “Designation of Critical Habitat for Gunnison Sage-Grouse,” *Federal Register* 79, no. 224, November 20, 2014: 69312 – 69363.

<sup>284</sup> Industrial Economics, Incorporated, “Economic Analysis of Critical Habitat Designation for the Gunnison Sage-Grouse,” November 7, 2014.

conservation efforts in the past decade in order to avoid the listing of the GSG. In addition to economic losses caused by land use restrictions, county officials also feared a listing would mean losing local control of conservation efforts. Ron Henderson, the chairman of the Montrose, Colorado, Board of County Commissioners, confirmed this fear of federal intervention, saying, "Montrose County is concerned because once the species is listed, this becomes a federal issue beyond the control of the locally affected areas. We'd prefer to keep this issue within the reach of our constituents."<sup>285</sup> In 2013, ten counties in Colorado and one county in Utah signed a memorandum of understanding announcing their intent to formally collaborate in order to "reach the goal of increasing the current abundance, viability and vitality of the Gunnison sage-grouse and their habitat."<sup>286</sup>

The results of the voluntary conservation efforts have been mixed. While the largest GSG population, located in the Gunnison Basin, has remained stable over the past decade, other smaller populations in surrounding counties have declined by between 50% and 75% over the same period.<sup>287</sup> Conservation efforts have been focused on the Gunnison Basin population, as this is the largest population and, based on population viability analyses, the population most likely to survive over a 50 year period.<sup>288</sup>

In order to acknowledge and support the ongoing voluntary efforts to support sage-grouse populations, the FWS excluded certain private lands that are already under voluntary conservation management plans from the critical habitat designation. These areas are managed under conservation easements (CEs) or candidate conservation agreements with assurances (CCAAs).

CCAAs are formal agreements between the FWS and another entity such as a state or local government, tribe, or private property that agrees to take specific actions on their land to reduce threats to a species that is a candidate for listing under the ESA.<sup>289</sup> CCAAs provide an incentive to landowners to engage in conservation measures before a species is listed under the ESA because the CCAA guarantees that a landowner will not have to implement measures beyond those described in the candidate conservation agreement if the species becomes designated as threatened or

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<sup>285</sup> "Colorado, Utah Counties Sign Gunnison Sage-Grouse Memorandum of Understanding," *Targeted News Service*, April 3, 2013.

<sup>286</sup> Board of County Commissioners of Gunnison, Saguache, Dolores, Montezuma, Delta, Montrose, Hinsdale, Mesa, San Miguel, and Ouray Counties, CO, San Juan County, UT, "Memorandum of Understanding," March 20, 2013.

<sup>287</sup> Phil Taylor, "Tomorrow's Listing Decision for Gunnison Grouse Will Ruffle Feathers," *Greenwire*, November 11, 2014, <http://www.eenews.net/greenwire/stories/1060008709>.

<sup>288</sup> Bureau of Land Management et al., "Gunnison Sage-Grouse Rangewide Conservation Plan," April 2005.

<sup>289</sup> U.S. Fish and Wildlife Service, "Candidate Conservation Agreements," March 2011, <http://www.fws.gov/endangered/esa-library/pdf/CCAAs.pdf>.

endangered or their land is included in a critical habitat designation.<sup>290</sup> CCAAs are similar to Safe Harbor Agreements (SHA), which also encourage landowners to take voluntary species conservation measures on their land in exchange for assurance that no stricter conservation measures will be imposed in the future.<sup>291</sup> However CCAAs differ from SHA's in that landowners may only enter into an SHA after a species has been listed.<sup>292</sup> Whereas the goal of CCAAs is to support a species so it does not become listed. Since the GSG has now been listed, landowners are no longer eligible to enter CCAAs for the GSG. Given the GSG's recent listing and history of voluntary conservation efforts in the area, it is likely that the FWS will begin a new SHA program for the GSG.

The conservation measures in CCAAs might be less restrictive than those imposed by the ESA, and therefore allow private landowners more freedom if a species becomes listed. Some examples of conservation measures included in CCAAs for the GSG include using prescribed burning to control encroachment of trees and shrubs in sagebrush, discouraging construction of new power lines to reduce raptor predation, limiting the construction of new roads and structures, and controlling existing invasive plants that would compete with sagebrush.<sup>293</sup> The FWS has excluded 81,156 acres of current or potential GSG habitat from the critical habitat area due to existing protection through CCAAs.<sup>294</sup>

Land that is managed under CEs, which makes up 16% of occupied and unoccupied GSG habitat on private land, is also excluded from the critical habitat.<sup>295</sup> CEs are legal agreements between private property owners and another entity such as a land trust or state government wherein the property owner agrees to not develop subdivide the land or construct new structures or roads on the land.<sup>296</sup> While not designed to conserve sage-grouse habitat specifically, CEs protect the land from all forms of development, which also protects the GSG by preserving its habitat.

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<sup>290</sup> Ibid.

<sup>291</sup> U.S. Fish and Wildlife Service, "Safe Harbor Agreements for Private Landowners," July 2011, <http://www.fws.gov/endangered/esa-library/pdf/harborqa.pdf>.

<sup>292</sup> Ibid.

<sup>293</sup> Colorado Division of Wildlife and U.S. Fish and Wildlife Service, Candidate Conservation Agreement with Assurances for Gunnison Sage-grouse, July 15, 2006, <http://cpw.state.co.us/Documents/WildlifeSpecies/SpeciesOfConcern/GunnisonSageGrouse/CCAA/GuSGCCAAfinal.pdf>.

<sup>294</sup> U.S. Department of the Interior and the Fish and Wildlife Service, "Designation of Critical Habitat for Gunnison Sage-Grouse," *Federal Register* 79, no. 224, November 20, 2014: 69312 – 69363.

<sup>295</sup> Ibid.

<sup>296</sup> Ibid.

## Stakeholders

### State Politicians

State-level politicians are largely opposed to any listing for the GSG, as a listing would have negative economic impacts by limiting activities which require a federal permit such as oil and gas development or grazing livestock on federal lands. Colorado governor John Hickenlooper called the FWS' decision to list the GSG a "major blow to voluntary conservation efforts," and asked the FWS to give Utah and Colorado more time to implement conservation efforts before listing the GSG as threatened or endangered.<sup>297</sup><sup>298</sup> In his remarks at the annual meeting of the Colorado Oil & Gas Association, Hickenlooper also announced that the state of Colorado would sue the EPA if the GSG received a threatened or endangered designation.<sup>299</sup> The FWS acknowledged the state's conservation efforts, but stood behind their decision to list the GSG as threatened. On December 12, 2014, the state of Colorado published a notice of intent to sue the FWS based on alleged violations of the ESA in listing the GSG. The state of Colorado claims that the FWS improperly equated declining satellite populations to a future rangewide population decline, even though the primary Gunnison Basin population has been stable for a decade.<sup>300</sup> The state also asserted that the FWS did not sufficiently consider the positive impact of current voluntary conservation efforts on the GSG population. Based on these factors, the lawsuit contends that the FWS did not rely on the "best scientific data available," as required by the ESA.<sup>301</sup>

Utah Reps. Jason Chaffetz, whose district contains GSG critical habitat, and Rob Bishop, who chairs the House Natural Resources Public Lands and Environmental Regulation subcommittee, also reacted negatively to the listing. Chaffetz said of the issue, "Local land users are better equipped [than the federal government] to develop management plans that both maintain and improve the health of wildlife and local habitat."<sup>302</sup> For his part, Bishop commented, "This is yet another case of the federal government thinking it is smarter and more capable than the states and

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<sup>297</sup> Cathy Proctor, "Sage Grouse Declared 'Threatened'; Colorado, Others to Sue over Oil and Gas Impact," *Denver Business Journal*, November 12, 2014, [http://www.bizjournals.com/denver/blog/earth\\_to\\_power/2014/11/feds-say-gunnison-sage-grouse-threatened-colorado.html?page=all](http://www.bizjournals.com/denver/blog/earth_to_power/2014/11/feds-say-gunnison-sage-grouse-threatened-colorado.html?page=all).

<sup>298</sup> Amanda Paulson, "Why Did Colorado Governor Oppose Threatened Listing of Gunnison Sage Grouse?" *The Christian Science Monitor*, November 12, 2014.

<sup>299</sup> Ibid.

<sup>300</sup> State of Colorado, Department of Law, "Notice of Intent to Sue for Violations of the Endangered Species Act Related to the November 12, 2014 Decision to List the Gunnison Sage Grouse as Threatened and to Designate Critical Habitat in Conjunction with the Listing," December 12, 2014.

<sup>301</sup> Ibid.

<sup>302</sup> Amanda Paulson, "Why Did Colorado Governor Oppose Threatened Listing of Gunnison Sage Grouse?" *The Christian Science Monitor*, November 12, 2014.

communities, a notion I flatly reject.”<sup>303</sup> These legislators’ statements typify longstanding tensions between federal and state management of public lands in the West.

## **Oil and Gas Companies**

While no fossil fuel companies have directly commented on the recent threatened designation, in January 2013, several oil and gas industry trade groups jointly submitted comments expressing intense opposition to the FWS’s proposed endangered listing for the GSG and critical habitat designation. The organizations stated in their comments that the Draft Economic Analysis used for the cost benefit analysis of rules was “fundamentally flawed” because it “understates the economic impacts on future oil and gas activity.”<sup>304</sup> Two areas with GSG populations have been classified as having “high” oil and gas potential.<sup>305</sup> Although oil and gas trade groups have not yet sued to attempt to reverse the threatened listing and designation of critical habitat, it is possible they will do so in the future.

The designation of critical habitat in these areas and listing of the GSG does not explicitly prohibit oil and gas production. However, oil and gas production requires a permit from the BLM, which must deny the permit if the activity will result in a “take” of a listed species. Traditional oil and gas development would harm GSG habitat through the construction of well pads, roads, pipelines, and power lines as well as raise the risk of GSG collisions with cars due to increased traffic.<sup>306</sup> Therefore it would likely result in a “take” of the species and would not be permitted in areas where the GSG was present.

In areas of critical habitat where the GSG is not yet present, oil and gas companies might still be able to operate, as long as they did so in a way that minimized harm to the habitat. However, oil and gas companies would likely choose not to extract oil and gas within the critical habitat due to the increased regulatory burden and cost of modifying their operations. Areas with similar oil and gas resources exist, and oil and gas companies would likely preferentially develop land that does not have the additional regulations the ESA imposes.

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<sup>303</sup> Ibid.

<sup>304</sup> Western Energy Alliance et al., “Comments on U.S. Fish and Wildlife Service Draft Economic Analysis and Environmental Assessment of Proposed Critical Habitat Designation for Gunnison Sage-Grouse,” October 18, 2013, [http://www.eenews.net/assets/2014/11/11/document\\_gw\\_01.pdf](http://www.eenews.net/assets/2014/11/11/document_gw_01.pdf).

<sup>305</sup> US Department of the Interior, “Endangered and Threatened Wildlife and Plants; Threatened Status for the Gunnison Sage Grouse,” *Federal Register* 79, no. 224 (November 20, 2014): 69192 – 69310, <http://www.gpo.gov/fdsys/pkg/FR-2014-11-20/pdf/2014-27109.pdf>.

<sup>306</sup> Ibid.

## Private Property Owners

Private property is an investment, and any activity that limits an owner's use of their property has the potential to diminish the return on their investment.<sup>307</sup> While the threatened listing is not as restrictive as an endangered listing would have been, it nevertheless imposes restrictions on activities on private lands which require a federal permit. Private lands within the critical habitat face similar restrictions on activities that require federal permits. Therefore most landowners wanted to avoid the GSG being listed. Since the GSG has already been listed as threatened, it is likely that voluntary private conservation efforts such as Safe Harbor Agreements will remain popular with landowners attempting to avoid the even stricter land use restrictions that would be imposed if the GSG was listed as endangered. Examples of possible conservation efforts these voluntary agreements might require include promoting sagebrush growth via controlled burning, employing sustainable grazing practices, limiting insecticide application, and minimizing the construction of fences and structures where predatory birds might roost.<sup>308</sup>

## Environmental Groups

Environmental groups are not satisfied with the FWS's decision to list the GSG as threatened rather than endangered. The Center for Biological Diversity (CBD) and the Western Watersheds Project (WWP) notified the Department of the Interior of their intent to jointly sue the agency for their decision to list the GSG as threatened rather than endangered. The groups feel the FWS's determination was unlawful because it was not based on the "best available science," as the Act stipulates because it was influenced by political pressure from state officials and representatives who anticipated negative economic impacts from an endangered classification.<sup>309</sup> The suit asserts that, "the ESA does not allow for this trade-off between politics and science and the Service's rule is thus, unlawful."<sup>310</sup> The CBD alleges that the FWS inappropriately relied on goals set by voluntary conservation plans rather than the best scientific literature available in order to justify a threatened listing.<sup>311</sup> The suit specifically challenges the downgrading of the threat of residential development in the Gunnison Basin, one of the primary factors cited by the FWS in their decision to list the GSG

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<sup>307</sup> J. Peyton Doub, *The Endangered Species Act* (Boca Raton: CRC Press, 2013).

<sup>308</sup> Bureau of Land Management et al., "Gunnison Sage-Grouse Rangewide Conservation Plan," (April, 2005).

<sup>309</sup> Scott Streater, "Enviros to Sue Interior over Gunnison Sage Grouse Protections," *Greenwire*, November 20, 2014.

<sup>310</sup> Center for Biological Diversity and Western Watersheds Project, "Notice of Intent to Sue: Violations of the Endangered Species Act ('ESA') in Listing," November 20, 2014, [http://www.enews.net/assets/2014/11/20/document\\_gw\\_05.pdf](http://www.enews.net/assets/2014/11/20/document_gw_05.pdf).

<sup>311</sup> *Ibid.*

as threatened. Finally, the CBD and WWP allege that the FWS violated the public comment requirement of the Administrative Procedures Act, which requires that all new rules have a 60 day public comment period before they are finalized, because the FWS never created a comment period for the “threatened” designation or the rule included in the threatened designation which exempted certain farmers and ranchers from the ESA.<sup>312</sup>

A separate group of conservation organizations including WildEarth Guardians, Wild Utah Project and Great Old Broads for Wilderness, also notified the Department of Interior of their intent to sue, claiming that the FWS “relied on unproven and speculative conservation measures” in their process of listing the GSG as threatened, and that the critical habitat designated by the FWS is insufficient to protect the species.<sup>313</sup> The suit called the FWS’s designation “arbitrary and capricious,” and claims that the FWS, “failed to properly apply the ESA’s listing factors, failed to adhere to the best possible science, and failed to adequately explain why it reversed course.”<sup>314</sup> This suit challenges the FWS’s conclusion that based on the stability of the primary Gunnison Basin population, the GSG does not face an imminent threat of extinction. The groups claim that the FWS ignored the best scientific information, which supports a threatened designation, including a 93% reduction in the species’ range, continued habitat destruction, and population decline in all 6 satellite populations.<sup>315</sup> The key point of contention is the importance of the declining satellite populations to health and continued existence of the main Gunnison Basin GSG population. Environmental groups claim that satellite populations are essential, and that their decline is detrimental to all GSG population groups. State and industry groups maintain that the stability of the primary population in the Gunnison Basin is enough to maintain the species’ overall health.

## **Policy Outlook**

The FWS’ decision to list the GSG as threatened is final. However it already faces legal challenges from both sides – industry groups and state politicians aiming to weaken the protections by not listing the species at all, as well as environmental groups aiming to elevate the GSG to endangered status. States, property owners and industry groups hope that by challenging the listing

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<sup>312</sup> Center for Biological Diversity and Western Watersheds Project, “Notice of Intent to Sue: Violations of the Endangered Species Act (‘ESA’) in Listing,” November 20, 2014, [http://www.eenews.net/assets/2014/11/20/document\\_gw\\_05.pdf](http://www.eenews.net/assets/2014/11/20/document_gw_05.pdf).

<sup>313</sup> Todd Tucci, “60-Day Notice of Intent to Sue over Violations of Sections 4 of the Endangered Species Act (‘ESA’) Relating to the November 20, 2014 Decision to List the Gunnison Sage Grouse As Threatened and to Designate Critical Habitat Under the ESA,” November 20, 2014, [http://www.eenews.net/assets/2014/11/20/document\\_gw\\_07.pdf](http://www.eenews.net/assets/2014/11/20/document_gw_07.pdf).

<sup>314</sup> Ibid.

<sup>315</sup> Ibid.

of the GSG, they are also indirectly challenging the potential listing of the greater sage-grouse, which would create significant land use restrictions across the West.

Two separate environmental groups, as well as the State of Colorado have already published notices of intent to sue in Federal District Court in Washington, D.C. It is possible that neither the environmentalists nor the state and industry groups will be successful, and the GSG will retain its threatened designation. However, given the development pressure on the GSG's habitat and its small population size, it is more likely that the GSG will be even more threatened by the time the court hears the lawsuit, and the court will order the FWS to review the listing yet again. The court might also find in favor of the environmental groups on a procedural basis, ruling that it was illegal for the FWS to amend its proposed endangered listing to threatened without opening a separate public comment period on the proposed rule.<sup>316</sup>

The court's decision will hinge on whether the court believes declining satellite populations present an imminent threat to the stability of the primary Gunnison Basin population. Furthermore, the FWS's reliance on conservation plans prepared by the state of Colorado rather than independent scientific data is troubling and does not fulfill the requirement of utilizing the best scientific data available. While it is possible that the courts will maintain the status quo of threatened status for the GSG, it is most likely that they will rule in favor of the environmental groups, and the GSG will be awarded endangered status. Given the accelerating threats to the GSG due to development of its habitat, it is unlikely that the GSG will be delisted altogether.

Lawsuits are not the only federal action that might alter the GSG's fate. Congress has taken aim at the GSG's threatened status through the appropriations process. On Sunday, December 14, 2014, the Senate approved an omnibus spending bill which funds the federal government for the upcoming fiscal year.<sup>317</sup> The spending bill included a policy rider introduced by Republican Rep. Mark Amodei of Nevada that denies the FWS funds for writing or issuing an ESA listing for either the greater sage-grouse or GSG.<sup>318</sup> This provision effectively halts the listing of either species and denies ESA protections for the duration of the fiscal year. While such riders addressing specific environmental controversies are rare and must be renewed each year, once included in an appropriations bill, they tend to remain in the bill from year to year. If President Obama signs the

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<sup>316</sup> Center for Biological Diversity and Western Watersheds Project, "Notice of Intent to Sue: Violations of the Endangered Species Act ('ESA') in Listing," November 20, 2014, [http://www.eenews.net/assets/2014/11/20/document\\_gw\\_05.pdf](http://www.eenews.net/assets/2014/11/20/document_gw_05.pdf).

<sup>317</sup> Phil Taylor, "Sage Grouse Rider -- What It All Means," *Greenwire*, December 12, 2014, <http://www.eenews.net/greenwire/stories/1060010499>.

<sup>318</sup> Consolidated and Further Continuing Appropriations Act, 2015. H.R. 83, 113<sup>th</sup> Cong. (2014).

spending bill, as he has promised, neither the GSG nor the greater sage-grouse will be protected under the ESA for the upcoming fiscal year. While industry groups and property owners likely consider this appropriations decision a victory, the action creates instability around the issue because Congress could restore funding in any given fiscal year, which would rapidly impose land use restrictions associated with the ESA in areas occupied by the birds.