

Comparing the Politics of Hydraulic Fracturing in New York, Colorado, and Texas

Christopher M. Weible

University of Colorado, School of Public Affairs, Denver, Colorado

Tanya Heikkila

University of Colorado, School of Public Affairs, Denver, Colorado

Abstract

The purpose of this article is to analyze perceptions and activities of policy actors, who are actively involved in or knowledgeable about the politics of hydraulic fracturing in New York, Colorado, and Texas. The analysis is guided by research questions drawn from the Advocacy Coalition Framework that focus on policy actors' policy positions, problem perceptions, political capacity, activities, and interactions. In doing so, we examine the differences between those policy actors who are opposed to hydraulic fracturing relative to those who support hydraulic fracturing across the three states using data from online surveys administered in 2013 and 2014. The results show polarization between opponents and proponents in their policy positions on hydraulic fracturing, which are associated with problem perceptions. Proponents and opponents of hydraulic fracturing also have different capacities, activities, and interactions. The results are similar across states but not without nuanced differences, including greater polarization in New York, higher levels of government support for proponents of hydraulic fracturing in Texas, and more frequent coalition building in Colorado.

KEY WORDS: advocacy coalition framework, fracking, energy politics, energy policy, United States, New York, Colorado, Texas, hydraulic fracturing

Introduction

One of the most contentious political debates to emerge in recent years in the United States, and increasingly worldwide, has involved the rapid development of unconventional oil and gas using hydraulic fracturing or “fracking” (Boudet et al., 2014; Rabe & Borick, 2013). Hydraulic fracturing is the process of injecting sand, water, and chemicals underground, often in shale formations, to release natural gas and oil. The academic literature has examined hydraulic fracturing debates and politics from multiple perspectives. A number of studies have analyzed the opinions of the general public on the issue (Boudet et al., 2014; Davis & Fisk, 2014; Mazur, 2014; Theodori, Luloff, Willits, & Burnett, 2014). These studies have found perceptions of hydraulic fracturing are correlated with political party affiliation, rural or urban residency, and familiarity with hydraulic fracturing. Other studies have described a conflict narrative that centers on the positions of political proponents and opponents of hydraulic fracturing (Cook, 2014; Cotton, Rattle, & Alstine, 2014; Heikkila, Weible, & Pierce, 2014; Jaspal & Nerlich, 2013; Smith & Ferguson, 2013). In general, this conflict narrative depicts opponents as concerned with the risks hydraulic fracturing poses to public health and the environment. Proponents in this narrative argue that hydraulic fracturing is a boom to economic growth and energy independence. Despite the prevalence of this conflict narrative, its accuracy

and generalizability to different locales are open to scrutiny because most studies to date are single case studies or rely on a small sample of interviews to draw conclusions.

The purpose of this article is to explore the nuances of this conflict narrative by analyzing perceptions and activities of people who are actively involved in or knowledgeable about the politics and policy of hydraulic fracturing (called “policy actors”) in three U.S. states. Policy actors are important to study because of their expertise and sustained involvement in attempting to influence policy processes that ultimately shape societal outcomes (Sabatier, 1991). We compare the perceptions and activities of policy actors in New York, Colorado, and Texas and emphasize differences in these perceptions and activities among those policy actors who oppose hydraulic fracturing (“opponents”) relative to those who support it (“proponents”).

In addition to comparing the opponents and proponents, the three states provide a useful comparison because of their differences in the level and experience with the development and governance of unconventional oil and gas, as we describe in more detail below. In descriptively comparing the politics in and across these three states, our research is guided by four questions: (i) *Who are the policy actors and to what extent do they support or oppose hydraulic fracturing?* (ii) *What are the perceptions of potential problems associated with hydraulic fracturing?* (iii) *What capacity do policy actors have and what political activities do they engage in?* (iv) *Who do policy actors interact with?* All of these questions are answered from a comparative perspective, looking at differences across New York, Texas, and Colorado, and between the opponents and proponents within each state, using data from three recent online surveys administered in 2013 or 2014.

Describing Hydraulic Fracturing Politics via Policy Actors

A challenge in describing politics is its complexity and, thus, what is observed or ignored is dependent upon the analytical lens applied (Brugha & Varvasovsky, 2000; May, 1986; Meltsner, 1972; Susskind & Thomas-Larmer, 1999). The lens we apply in this article is the Advocacy Coalition Framework (ACF; Jenkins-Smith, Nohrstedt, Weible, & Sabatier, 2014; Sabatier, 1988).¹ With three decades of research, the ACF is one of the most established approaches in the study of conflict and public policy and has been used to assess contentious politics in a range of issues, including climate and energy issues (Elgin & Weible, 2013; Fischer, 2014; Lodge & Matus, 2014).

The ACF is a flexible research tool that can be applied in multiple ways to answer both descriptive and explanatory questions about the formation and maintenance of coalitions, the likelihood and results of learning, and policy change (Weible & Nohrstedt, 2012). The most useful unit of analysis for answering questions about contentious politics with the ACF is the policy subsystem. A policy subsystem is a partition of a broader political system that focuses on a topic within a territorial area. For example, the policy subsystem studied in this article is oil and gas development that uses hydraulic fracturing in Colorado, USA.

Of interest to this study is the ACF’s descriptive insights on the nature of coalitions that form in policy subsystems. Coalitions form around shared policy core

beliefs in response to a common threat. Central to the belief systems of policy actors is policy core beliefs, which topically span a policy subsystem and include general policy preferences and problem perceptions. Motivated to translate their policy core beliefs into the formulation and design of adopted policies, the behavior of policy actors and their associated coalition allies will be conditioned by different types and levels of political capacity. Political capacity refers to the ability to access and use resources that allow coalition members to influence policy processes. Political capacity can shape the effectiveness of coalitions in the policy process, as well as different types of networks or interactions that can influence their ability to achieve policy goals.

In this article, we use these descriptive insights drawn from the ACF on coalitions to guide our analysis and compare the political landscape of hydraulic fracturing in three states. We focus on identifying the policy actors and their policy core beliefs, including their policy positions and problem perceptions on the issue, their political capacity, and their interactions. Below we explore the four guiding descriptive questions and discuss how they are informed by the ACF, as well as their importance in the broader literature on political conflicts.

Who are the policy actors and to what extent do they support or oppose hydraulic fracturing? Policy actors are those individuals who are actively involved or influential in a given policy subsystem (Jenkins-Smith et al., 2014). Policy actors may work for government as elected, appointed, or bureaucratic officials and may come from nongovernment affiliations, including the private sector, academia, nonprofits, and the news media. Additionally, some policy actors may be engaged citizens without any formal organizational affiliations. Policy actors often become active or engaged in a policy issue area by making arguments for action by government or other authorities—such as stopping or expanding hydraulic fracturing. Such arguments reflect their policy core beliefs (see Jenkins-Smith et al., 2014). The arguments of one policy actor, or group of policy actors, may be perceived as threatening to other people, who then are motivated to become involved as opposing policy actors by making arguments that support their belief system.

What are the perceptions of potential problems associated with hydraulic fracturing? Perceived problems are usually one of the motivating factors for policy actors to engage in collective action when pressuring government action (Olson, 1965; Tilly & Tarrow, 2006). One reason for the emergence of political conflict is the perceived subjectivity of problems. Under the ACF, issues become problems when they are selected and filtered through lenses based on policy actors' normative orientations (Sabatier, 1988). Policy actors with different values and identities will perceive and weigh problems differently. For example, proponents and opponents of hydraulic fracturing perceive different risks and benefits related to the impacts on public health, the economy, and energy security and, thus, perceive different threats and opportunities.

What political capacity do policy actors have and what political activities do they engage in? To a large extent, policy decisions are shaped by the decisions and activities of policy actors. These policy decisions can be described theoretically as a product of a complicated and enduring set of interactions that involve policy actors as fueled by their accessible and usable resources (or political capacity) and the success and failures of their political activities. Policy actor political capacity may include their

access to various resources, such as finances, government officials, scientific and technical information, supporting members of the public, and connections with other political allies and opponents (Elgin & Weible, 2013; Weible, 2007). These resources are useful in enabling various forms of political activities, which are also a function of the degree of democratization of the government. In most democracies, these political activities continuously evolve over time and include activities that put pressure directly on government in the form of petitions, elections, and lobbying or that put pressure indirectly on government by attempting to influence the rest of society, such as online framing contests, protests and demonstrations, and the production and distribution of information.

Who do they interact with? When policy actors perceive a threat to their policy core beliefs and argue to protect or advance what they care about, groups of like-minded policy actors often coordinate or engage with each other to help achieve the reality of those claims (Sabatier, 1988). In doing so, they may form advocacy coalitions. Advocacy coalitions are defined as sharing policy core beliefs and engaging in various forms of coordinated activities. Advocacy coalitions have been shown to be stable over time and to reflect belief and value positions (Jenkins-Smith, St. Clair, & Woods, 1991; Leifeld, 2013; Weible, 2005). At the same time, policy actors do not necessarily interact only with those individuals with whom they share values or beliefs. They may interact strategically or out of necessity with those with opposing beliefs (Jenkins-Smith et al., 2014). The nature of the interactions and the resulting advocacy coalitions that form among policy actors affect, or are affected by, information, trust and distrust, and policy outcomes.

Hydraulic Fracturing in New York, Colorado, and Texas

Unconventional oil and gas development, particularly shale gas, has rapidly expanded since 2008. This expansion has largely been associated with advances in high-volume hydraulic fracturing and horizontal drilling techniques that have made the recovery of unconventional oil and gas resources more economically and technically feasible. The amount and intensity of drilling that uses hydraulic fracturing, however, varies widely across the United States, depending on the geology associated with unconventional oil and gas. Surges in drilling activity have been seen in numerous shale formations, including the Marcellus, Bakken, Eagle Ford, Haynesville, and Niobrara, although some of that activity has slowed since 2014 with declining oil and gas prices (U.S. Energy Information Administration, 2015). While shale formations are the locus of oil and gas resources, states have been the center of much of the policy and political activity that affects how and where unconventional oil and gas development occurs (Richardson, Gottlieb, Krupnick, & Wiseman, 2013). To understand the nuances and differences in politics associated with hydraulic fracturing that can arise at the state level, we focus on three states that represent the diversity in drilling and policy activity: New York, Texas, and Colorado.

In New York State, part of which overlies the Marcellus Shale, the production of unconventional oil or natural gas through high-volume hydraulic fracturing remains at zero (U.S. Energy Information Administration, 2014a). The lack of Marcellus Shale development in New York was previously the result of the state's

decision to maintain a de facto moratorium on high-volume hydraulic fracturing from 2008 through 2014. The de facto moratorium was both a reaction to highly visible opposition to hydraulic fracturing and an opportunity for the New York Department of Environmental Conservation and the New York Department of Health to conduct reviews of the environmental and health impacts of high-volume hydraulic fracturing (Heikkila et al., 2014). At the end of 2014, Governor Andrew Cuomo and his administration concluded that the health and environmental risks were too uncertain and thereby formally banned the permitting of high volume hydraulic fracturing across the state (Weible & Heikkila, 2014).

The State of Colorado overlies several shale plays, including the Niobrara Shale Formation, which is located near a number of the state's most populous cities and has been the locus of significant drilling activity in recent years. Unlike New York, hydraulic fracturing in Colorado has expanded rapidly since 2009. For example, 13,000 well permits were reviewed and approved in Colorado between 2009 and 2012, and at least 90% of those wells involved hydraulic fracturing (COGCC, 2012). The expansion of unconventional oil and gas development has generated a great deal of political conflict in the state resulting in a few local attempts to ban or put in place moratoriums on hydraulic fracturing. It has also led to public protests and new state-level regulations on disclosure of chemicals, setbacks, baseline water testing, and air quality. Colorado's oil and gas regulations have been recognized as more stringent than other states (Davis, 2012; Richardson et al., 2013), both in terms of the level of regulatory requirements on oil and gas operators and in terms of the diversity in types of regulations. For example, in 2008, the state substantially updated its oil and gas regulations and since 2011, Colorado has passed new policies requiring the disclosure of hydraulic fracturing fluids, mandating increased water quality monitoring near wells, and establishing improved air quality standards for well operations. However, conflict in Colorado has involved questions about state versus local authority to regulate hydraulic fracturing with Governor Hickenlooper creating a Task Force in 2014 to address such questions. Upon completion of the Task Force's mandate in 2015, however, uncertainties about local authority over hydraulic fracturing remained (Jaffee & Frank, 2015).

With a past and recent history of oil and gas development, Texas overlies some of the richest unconventional oil and natural gas formations in the United States with the Barnett, Eagle Ford, and Haynesville Shale Formations. Texas produced 35% of the nation's natural gas from shale deposits in 2012 (U.S. Energy Information Administration, 2014a) and accounted for 36% of all crude oil produced in the United States, with most coming from shale deposits (U.S. Energy Information Administration, 2014b). Similar to the rest of the United States, hydraulic fracturing has brought unconventional oil and gas development closer to urban and rural communities resulting in political conflicts involving the oil and gas industry. In response, Texas has passed policies regarding drilling near public schools, public disclosure of hydraulic fracturing fluids, and integrity of wells for drilling. Yet, some have argued that Texas has not taken as stringent of regulatory or legislative actions as some other states around hydraulic fracturing (Davis, 2012; Rahm, 2011; Richardson et al., 2013). Like Colorado, in Texas the issue of local authority for regulating hydraulic fracturing has recently emerged; in 2014, Denton, Texas voted to pass the first local ban on hydraulic fracturing. However, the state in 2015

barred local governments from banning hydraulic fracturing and the city of Denton removed the ban.

In summary, the three cases provide a diverse set of contexts through which the policy debates around hydraulic fracturing emerge. New York represents a case with no drilling activity and an official state-wide ban on hydraulic fracturing. Texas represents the case with the most extensive drilling and experience with hydraulic fracturing, with some recent policy activity focused on this issue, but in a context where opposition to hydraulic fracturing has been relatively unsuccessful. Colorado has seen rapid growth in drilling in recent years, coinciding with various state-level policy changes related to the governance of oil and gas development, alongside local-level attempts to ban or limit drilling.

Methods

The data for this study are drawn primarily from surveys that we administered in New York, Colorado, and Texas. To inform the design of the surveys we first conducted in-depth interviews with a purposive sample of a cross-section of policy actors from different organizational affiliations, including all levels of government, environmental and citizen organizations, oil and gas industry, and academics/consultants. These included 15 interviews in New York, 14 in Colorado, and 12 in Texas. Interviewees were identified through a review of online sources and news media, as well as through recommendations from other interviewees. The purpose of the interviews was to understand the context of each state, help generate the sample of policy actors for the online survey, and inform the design of the online surveys. The online surveys were administered to the population of policy actors involved in hydraulic fracturing in each state. This population of policy actors was generated through a standard approach used in other ACF research, which included recommendations from our interviews; lists of attendees at state and local public hearings; attendees and presenters at academic, government, environmental, and industry sponsored meetings; lists of participants in lawmaking and rule-making processes; and news media and online media covering events such as public protests related to oil and natural gas development in each state. In total, the survey was emailed to 379 individuals in New York with 129 completed (34%); 398 individuals in Colorado with 137 completed (34%); and 324 individuals in Texas with 78 completed (24%). The number of policy actors responding should not be compared in relation to the citizen population per state but rather to the population of policy actors sampled in each state. In comparison to the population sampled, the representation of policy actors who responded are comparable across states and affiliations with a few anomalies, including a slightly lower response rates for industry in Texas and the lack of responses from the journalists in Colorado and New York.² Response rates are typical for online surveys of policy actors and political elites.

To answer our first research question, we use data from several of our survey questions, including basic demographic questions (e.g., organizational affiliation, years of experience, age, sex) and a question that asked respondents to report their position on stopping, limiting, continuing at the current rate, or expanding

hydraulic fracturing. To answer our second research question, we use data from a survey question that asked respondents to rank the degree to which they agree or disagree with a list of potential problems associated with hydraulic fracturing. The list of potential problems includes both environmental and public-health-related topics as well as political issues, which were informed by our interviews. The survey questions used to answer the third research question asked respondents to (i) rank their capacity to use or mobilize various resources (e.g., financial, technical, support from different actors) and (ii) rank the importance and frequency of different political activities (e.g., forming coalitions, posting information online, lobbying officials, etc.). In examining the fourth research question, we use data from a survey question that asked respondents to report their frequency of collaboration with different types of policy actors.³

Results

To map and compare the politics of hydraulic fracturing across the three states, we present descriptive statistics of the responses to the survey questions described above and include cross-tabulations with ANOVA tests for statistical significance between the opponent and proponent respondent coalitions. The results are organized by the four research questions. To aid in the comparison across states, the data for the survey items are reported as percentages of the total number of policy actor respondents.

Who are the policy actors and what are their preferences for stopping or expanding hydraulic fracturing?

Table 1 provides a descriptive overview of respondents based on organizational affiliation, sex, education, and the years involved and hours per week devoted to policy and political issues related to hydraulic fracturing.⁴ Across the three states, the highest percentage of respondents is from the oil and gas industry and related associations, constituting just over a quarter of respondents. The next highest affiliation category is local government for New York and Texas but with a lower percentage of local government respondents for Texas. Between 7 and 18% are affiliated with environmental groups or organized citizen groups. Roughly 10% of respondents are academics or consultants. The affiliations with the lowest percentages of respondents are state and federal governments and the news media.

The male-to-female ratio and the age distribution among respondents are about the same across the three states, with about two thirds of respondents being male and older than 50. A large majority of respondents across states have a college degree or higher. Colorado has a few more respondents with master's or professional degrees at 57% compared to 38% for New York and Texas but have fewer respondents holding a Ph.D. or M.D. In all three states, most respondents have been involved in this issue from 2 to 9 years and devote 20 hours or less each week to the issue.

Figure 1 provides the distribution of respondents' positions on hydraulic fracturing with responses ranging from stop to expand extensively.⁵ The results show

Table 1. Respondent Demographics

		New York	Colorado	Texas
Organizational Affiliation	Local government	23%	27%	13%
	State government	3%	9%	7%
	Federal government	1%	10%	1%
	Oil and gas industry & associations	33%	27%	29%
	Environmental groups	12%	12%	15%
	Organized citizen groups	17%	7%	18%
	News media	0%	0%	6%
	Academics/consultants	11%	8%	11%
Sex	Male	64%	66%	67%
	Female	36%	34%	33%
Age	18–29	3%	5%	1%
	30–39	7%	12%	14%
	40–49	15%	20%	12%
	50–59	32%	41%	39%
	60 or older	42%	23%	33%
Education	High school	2%	2%	0%
	Some college	12%	4%	4%
	Bachelor's degree	31%	29%	39%
	Master's or professional degree	38%	57%	38%
	Ph.D. or M.D.	17%	8%	19%
Years Involved	0 to 1 years	2%	4%	6%
	2 to 4 years	35%	31%	38%
	5 to 9 years	49%	31%	35%
	10 to 20 years	5%	18%	19%
	21 or more years	10%	15%	1%
Hours Per Week	9 hours or less per week	51%	48%	46%
	10 to 20 hours per week	24%	20%	19%
	21 to 30 hours per week	15%	11%	9%
	31 to 30 hours per week	4%	14%	12%
	41 or more hours per week	7%	6%	14%

that, in New York, the largest proportion of respondents prefer to stop or limit hydraulic fracturing, followed by those who want to see it expanded extensively. In contrast to New York, a majority of respondents in Colorado support continuing hydraulic fracturing at the current rate. The distribution in Texas is similar to Colorado with about half of respondents either in favor of limiting or continuing the practice and the least for expanding moderately.

In answering the remaining questions, we organize the results around the position on hydraulic fracturing by clustering respondents who support stopping or limiting hydraulic fracturing into the opponents' coalition and clustering respondents who support continuing or expanding hydraulic fracturing into the proponents' coalition. Across the three states, the proponents consist of individuals affiliated with environmental, organized citizen groups, and federal government officials; the opponents consist of respondents from the oil and gas industry, mineral rights groups, and state government. Academics, consultants, and local government officials can be found in similar proportions in both coalitions. We analyze the remaining results according to the two coalitions to show the differences in reporting the data per state. Doing so offers insights into the conflict narrative without adding too much complexity, which might be the case if, for example, we were to organize the results by organizational affiliation. This decision is also based on existing ACF research and theory that show political conflicts over policy issues are rooted in normative orientations or coalitions (Jenkins-Smith et al., 2014).

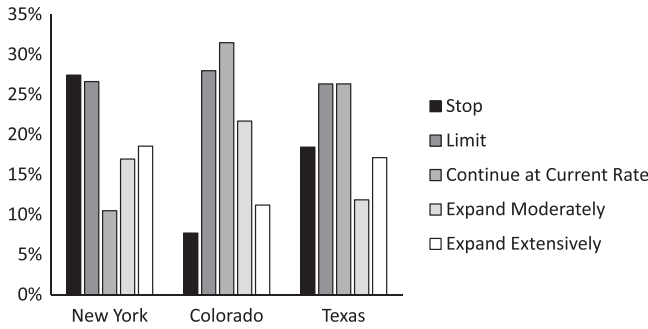


Figure 1. Survey Respondents' Positions on Hydraulic Fracturing by State

What are the perceptions of potential problems associated with hydraulic fracturing?

Table 2 shows the means for the level of perceived problems associated with unconventional oil and gas development that uses hydraulic fracturing. The potential problems are divided into those associated with the environment/health, such as water and air quality impacts, and those associated with politics, such as regulatory capacity and conflicts between landowners and their neighbors.⁶ Respondents are split into opponents and proponents. Statistical significance is calculated for differences between the two coalitions per state. The results show strong polarization between the position coalitions across all items. The opponents tend to view all issues as severe problems, with the means of most of the problem items ranging from 4 to 5. The proponents are most concerned about scare tactics and demonizing of hydraulic fracturing by opponents (means greater than 3.7). With other problems, however, proponents tend to rank them as not a problem at all or a moderate problem, with means ranging from 1.4 to 3. One exception to this tendency for opponents to rank problems as more severe than opponents is that both coalitions report similar perceptions of public distrust of the oil and gas industry.

When looking across the states, responses by opponents to perceived problems are similar. The biggest difference is that opponents in Texas are, on average, nearly a point higher on perceptions of problems with competition over available water supplies compared to New York on the 5-point scale (from 5 = severe problem to 1 = not a problem). Opponents' perceptions of nuisances from well sites and their concerns about contamination of ground and surface water from hydraulic fracturing fluids are lower in Colorado relative to Texas and New York by about a half-point. In New York, because hydraulic fracturing was not permitted at the time of the survey, the question was asked about potential problems in New York if hydraulic fracturing were permitted.

Compared to the opponents, there are more differences across states in the proponents' responses. We find that proponents in New York are less concerned than proponents in Texas and Colorado about most environmental issues, especially degradation of air quality from well-site operations and insufficient capacity by state agencies for regulation. The biggest difference in the responses of proponents when looking across states is the perceptions about competition over available water supplies, with the Texas proponents reporting a mean of 3.4 (moderate to severe problem) and the New York proponents coalition reporting a 1.6 (not a

Table 2. Mean Reported Levels of Perceived Problem Severity Associated with Unconventional Oil and Gas Development that Uses Hydraulic Fracturing^a

		New York		Colorado		Texas	
		Opponents	Proponents	Opponents	Proponents	Opponents	Proponents
Environmental Problems	Degradation of air quality from flaring, diesel exhaust, and dust from well-site operations	4.6	1.7***	4.3	2.3***	4.6	2.6***
	Competition over available water supplies	3.7	1.6***	4.3	2.5***	4.5	3.4***
	Nuisance to the general public caused by truck traffic, noise, and light from well site operations	4.4	2.3***	3.9	2.8***	4.4	3.0***
	Contamination of ground and surface water supplies from the injection of hydraulic fracturing fluids	4.4	1.4***	3.9	1.9***	4.3	1.8***
Political Problems	Insufficient capacity by state agencies for regulation	4.7	1.9***	4.3	2.1***	4.7	2.7***
	Conflict between land-owners and their neighbors	4.1	2.4***	4.1	3*	4.1	2.5***
	Public distrust of the oil and gas industry	4	2.9***	3.6	3.9*	3.9	3.1**
	Scare tactics and demonizing of hydraulic fracturing by those who oppose the practice	2.5	4.3***	2.4	4.3***	2.3	3.7***

Notes: ^a1 = not a problem, 3 = moderate problem, 5 = severe problem. Statistical significance calculated per item between the opponent and proponent coalitions at $p < .01***$, $p < .05**$, and $p < .10*$.

problem). In Colorado, proponents' perceptions of environmental related problems tend to fall between those in New York and Texas. However on most concerns over political issues, Colorado's proponents rank higher than the other two states. For example, the mean level of public distrust of the oil and gas industry reported by proponents in Colorado is 3.9 compared to 2.9 in New York and 3.1 in Texas.

What capacity do policy actors have and what and what political activities do they engage in?

Table 3 lists the means for the reported levels of capacity to use or mobilize resources (1 = no capacity and 4 = substantial capacity). In all three states, the means for proponents are higher than opponents for financial resources to hire staff. The means for opponents are higher and statistically significant in New York and Colorado for support from the public. As another capacity measure, we asked respondents to identify the level of support from people who share similar positions on hydraulic fracturing, as well as the support they have from people who have different positions on the issue. Support from those with similar positions is

Table 3. Mean Reported Levels of Political Capacity to Use or Mobilize Resources^a

	New York		Colorado		Texas	
	Opp.	Prop.	Opp.	Prop.	Opp.	Prop.
Financial resources to hire staff	2.2	2.4*	2.2	2.6*	1.8	2.8**
Support from the media	2.9	2.8	3.2	2.9*	2.9	2.6
Support from govt. officials	3.1	2.9	3.3	3.2	2.3	3.3***
Support from the public	3.3	3.1*	3.0	2.4***	2.8	2.7
Technical expertise	3	3.1	2.6	2.3	3.2	3.6
Support from those with similar position	3.7	3.4*	3.5	3.2*	3.2	3.2
Support from those with different position	2.5	2.5	3.1	2.8**	2.0	2.7**

Notes: ^a1 = no capacity, 2 = limited capacity, 3 = moderate capacity, 4 = substantial capacity, Opp. = opponents, Prop. = proponents.

Statistical significance calculated per item between the opponent and proponent coalitions at $p < .01$ ***, $p < .05$ **, and $p < .10$ *

Table 4. Mean Importance or Frequency of Activities^a

	New York		Colorado		Texas	
	Opp.	Prop.	Opp.	Prop.	Opp.	Prop.
Forming and maintaining a coalition with allies	2.9	2.8	3.3	2.3**	2.2	1.8
Participating in or organizing public meetings	2.8	2.4*	2.8	2.5	2.1	1.2**
Posting information online	2.8	2.5	2.7	2.0*	2.8	1.4***
Generating and disseminating research and reports	2.7	2.6	2.4	1.6**	1.6	1.0
Testifying at legislative or agency hearings	2.7	2.4*	2.2	1.8	2.2	1.2**
Communicating with the news media	2.7	2.5	2.4	2.2	3.0	1.9***
Providing written comments to state agency notices	2.7	2.5	2.4	1.6**	1.6	1.0
Taking legal action	2.5	2.4	2.2	1.8	2.2	1.2**
Organizing or participating in public protests	2.4	1.8**	1.9	1.5	1.3	1.2
Formal complaining to regulatory agency	1.7	0.8**	1.7	0.8**	1.5	0.5**
Organizing or participating in public protests	0.9	0.2***	0.9	0.2***	1.5	0.1***
Taking legal action (e.g., lawsuits)	0.7	0.4	0.7	0.4	0.6	0.4

Notes: ^a0 = never, 1 = annually, 2 = quarterly, 3 = monthly, 4 = at least weekly, Opp. = opponents, Prop. = proponents. Statistical significance calculated per item between the opponent and proponent coalitions at $p < .01$ ***, $p < .05$ **, and $p < .10$ *

higher among opponents in New York and Colorado, relative to proponents. The opponents in Texas report lower support, relative to proponents, from those with a different position but in Colorado opponents have more support from those with a different position. In comparing the differences in capacity measures across states, opponents show lower support from government officials and lower capacity in financial resources to hire staff in Texas, compared to opponents in Colorado and New York.

Table 4 lists the results for the activities, which were asked in two different ways. In New York, respondents were asked to rate the activities based on the importance

in achieving their political goals (from 1 = not important to 3 = extremely important). In Colorado and Texas, respondents were asked to state the frequency within which they engage in various activities (from 0 = never to 4 = at least weekly). Despite the different question wording there are some similar patterns within and across states.

When looking at the data from Colorado and Texas, we find that opponents are more engaged in activities than proponents, with higher means for every type of activity. The differences are statistically significant for five out of ten activities in Colorado and six out of ten in Texas. In Colorado, the biggest difference between coalitions is related to forming and maintaining a coalition with allies, where there is a one-point difference. In Texas, the biggest differences between coalitions are related to posting information or advocating online, communicating with the news media, formal complaining to a regulatory agency, generating and disseminating research and reports, and organizing or participating in public protests. Overall, there are larger differences between the opponents and proponents in Texas compared to Colorado.

In New York, the biggest differences between the reported activities of the opponents and proponents are with testifying at legislative or agency hearings and organizing or participating in public protests, where opponents are significantly more active. Similar to the responses in Texas and Colorado, the opponents have higher responses compared to the proponents.

Who do policy actors interact with?

Table 5 shows the patterns of collaboration among proponents and opponents with seven different organizational affiliation categories. Specifically, it shows the percentage of respondents within each coalition that listed one of the seven organizational affiliations as a collaborative partner in helping to achieve their policy goals.

The results demonstrate that the two coalitions interact with state and federal governments at similar proportions. In New York and Texas, however, there are statistically significant differences between the two coalitions in their interactions with local governments, with opponents reporting higher interactions than proponents. However, we do not see statistically significant differences in Colorado between proponents and opponents in their interactions with local governments.

Compared to their interactions with governmental organizations, more significant differences between the coalitions are found in their interactions with non-governmental actors. Opponents are more likely to interact with the news media, environmental organizations, and citizen groups compared to proponents, who are more likely to interact with the oil and gas industry, as would be expected. The exception is in Colorado where the difference between the two coalitions in their interactions with the media is not statistically significant.

Among the differences between states, opponents interact with the oil and gas industry the least in New York and both coalitions interact with federal governments in New York at lower proportions than in Colorado or Texas.

Table 5. Percent of Respondents Who Report Regularly Interacting with Different Groups to Achieve Their Policy Goals^a

	New York		Colorado		Texas	
	Opp.	Prop.	Opp.	Prop.	Opp.	Prop.
Local governments	58%	35%**	79%	70%	35%	20%**
State governments	47%	37%	65%	77%	48%	56%
Federal governments	11%	17%	75%	63%	58%	26%
Oil & gas industry	8%	51%***	39%	76%***	45%	69%**
Environmental organizations	76%	31%***	75%	52%**	87%	37%***
Citizen groups	76%	32%***	67%	33%*	81%	15%***
News media	51%	31%**	47%	40%	81%	47%**

Notes: ^a0 = no, 1 = yes, Opp. = opponents, Prop. = proponents. Statistical significance calculated per item between the opponent and proponent coalitions at $p < .01$ ***, $p < .05$ **, and $p < .10$ *.

Discussion

This is one of the few studies on oil and gas development using hydraulic fracturing that directly compares political activities of policy actors across multiple states. Most studies of hydraulic fracturing debates have focused on single states or countries based on a limited number of interviews. The benefit of a comparative state approach is that it helps both identify case-specific insights and glean common patterns across cases. The findings from this research highlight the similarities and differences in the perceptions and activities of policy actors involved in hydraulic fracturing issues across three states. Below we discuss the main highlights of the results that we draw from our comparison of the coalitions and from the comparison across states. We also discuss the insights these findings offer for the ACF.

Common Insights about Coalitions for and against Hydraulic Fracturing

This analysis organized respondents into a coalition of opponents against hydraulic fracturing and a coalition of proponents for hydraulic fracturing. Opponents are unified in their perceptions of potential problems associated with hydraulic fracturing. They perceive all environmental problems and most political problems as moderate to severe. Opponents may have fewer financial resources than proponents but they tend to report higher levels of support from the public and from their allies in New York and Colorado. They also report more support from the media and from those with different positions in Colorado. In Texas and Colorado, opponents reported higher levels of political activities than proponents. The highest frequency was in forming and maintaining a coalition in Colorado and in communicating with the media in Texas. Similarly, opponents in New York view more political activities as important compared to proponents, with forming and maintaining a coalition as the most important activity. Opponents primarily interact with environmental organizations, citizen groups, and local governments.

In contrast, proponents of hydraulic fracturing perceive all environmental problems and most political problems as moderate to not a problem at all. They have more financial resources than their opposition in all three states. This is not

surprising given that industry actors constitute a large proportion of the proponent coalition and non-profits constitute a large proportion of the opponent coalition. Compared to opponents, proponents are less politically active in all three states with most of their interactions occurring with oil and gas industry. This finding supports the conflict narrative common in the literature in describing political context of hydraulic fracturing in the United States.

Overall, the results show that the two opposing coalitions have divergent problem perceptions as well as differing levels of capacity and political activities, and distinct interactions with other groups.

Coalition Differences across States

Despite commonalities within the two coalitions across the three states, there are notable differences in the perceptions, resource capacity, activities, and networks that underscore how state contexts matter. For example, proponents in New York are less concerned about most environmental issues than proponents in Texas and Colorado. This may be due to the experience in Texas and Colorado with hydraulic fracturing, or it may reflect those views of proponents in New York who want hydraulic fracturing expanded extensively, who do not see hydraulic fracturing as problematic. As one proponent in New York stated in our interviews: “The issue has been sensationalized by opponents. They claim that fracking will kill people. Relative in comparison to heavy industrial processes the practice of fracking is benign and in comparison to what environmental groups claim” (anonymous interview, June 15, 2013).

In terms of the capacity measures, one notable difference is that proponents in Texas report more support from government officials, while opponents report low financial capacity compared to the other states. This suggests that the opposition to hydraulic fracturing has not gained as much traction in Texas compared with New York and Colorado, despite the fact that opponents reported engaging in more activities than proponents in Texas. The greater level of opponent capacity in New York and Colorado, relative to Texas, also is reflected in the policy outcomes: the New York state government has banned hydraulic fracturing, the state of Colorado has been active in passing new oil and gas regulations, while the state of Texas has prevented local governments from banning hydraulic fracturing.

In looking at the state-level differences in interactions or networks, we find that opponents in New York and Texas report significantly higher interactions with local governments than proponents, which we did not find in Colorado. The institutional context in these states may allow proponents to view local governments as a viable venue for promoting their positions. This was certainly the case in New York, as numerous local governments banned hydraulic fracturing before the state made its decision to ban the practice. In Texas, at the time of our survey, opponents were pushing the first local ban in Denton, Texas. However, after our survey was completed, the state barred local governments from banning hydraulic fracturing. So it is unclear if these interactions with local governments among opponents in Texas have been sustained. At the same time, in Colorado, the lack of different levels of engagement between proponents and opponents with local governments may suggest that both coalitions are working at the local level to win

policy debates. The ongoing uncertainty around the role of local governments in regulating hydraulic fracturing and oil and gas development more broadly in Colorado seems to support this conclusion. We also noted a lower percentage of both opponents and proponents in New York who reported interactions with the federal government, than those respondents in Colorado and Texas. This may have to do with the lack of drilling activity in New York; in states with drilling, the federal government does play a limited regulatory role related to issues such as air quality and wastewater disposal. Federal agencies such as the Department of Energy are also involved in research and technical assistance related to oil and gas development. In Colorado, oil and gas drilling on federal lands also has become an issue that intersects with the interests of proponents and opponents of hydraulic fracturing.

Understanding coalition differences across states can be gained by examining recent state-level efforts to adopt various policies and regulations. In Colorado and Texas, the state-level debates are primarily about how hydraulic fracturing should be regulated with more recent local-level debates about whether hydraulic fracturing should happen. In Colorado, for example, much of the state-level focus has been on establishing regulations to address some of the key concerns associated with hydraulic fracturing. These include regulations mandating disclosure requirements for hydraulic fracturing fluids, increasing setback distances between wells and occupied buildings, water quality monitoring, and mandates to reduce air emissions from drilling operations. Policy efforts in Texas have focused on well integrity and disclosure requirements for hydraulic fracturing fluids. Such regulatory activity in Colorado and Texas is not an indication of a lack of conflict. The issue remains politically contentious in both states as evident by attempts to ban hydraulic fracturing at the local level, although notably efforts at local bans have gained more traction in Colorado to date. But such efforts to ban hydraulic fracturing at the local level in Colorado and Texas have not reached the state level at similar levels of intensity as found in New York where the state-level debate has primarily been about whether hydraulic fracturing should happen and not how. Questions about whether hydraulic fracturing should happen is evident in the state's de facto moratorium on hydraulic fracturing that persisted for six years and its recent state-wide ban. One of the interviewees in New York suggested: "Because the issue became so polarized it makes it difficult to get to a rational solution" (anonymous interview, June 13, 2013). In Colorado, on the other hand, an interviewee suggested: "States with experience with shale gas often move more toward the middle—trying to look at the costs and benefits" (anonymous interview, March 4, 2013). Thus, while hydraulic fracturing is a contentious issue with opposing coalitions, the degree of contention varies across states and is reflected not only in the coalition attributes but also by state-level regulatory and policy activities.

Theoretical Insights for the ACF

The insights about coalitions and the comparison across the states are informative for the ACF. Many ACF studies have identified coalitions and coalition attributes (Fischer, 2014; Leifeld, 2013). This is one of the few studies that offer deep insights into opposing coalitions and a comparison of those insights across different

contexts. The results confirm some of the established patterns about coalitions, such as a tendency for policy actors with similar beliefs to have similar interaction networks in contentious political debates (Jenkins-Smith et al., 2014; Weible et al., 2011). In these political debates, problem perception is usually associated with position-based presuppositions. For example, opponents claim that environmental and most political problems associated with hydraulic fracturing are moderate to severe. Proponents claim that environmental and most political problems are moderate to not a problem at all.⁷ These presuppositions are also linked to the selective use of scientific and technical resources by policy actors to influence policy decisions (Öberg, Lundin, & Thelander, 2015; Weible, Pattison, & Sabatier, 2010).

Given these notable confirmations, one novel theoretical contribution for the ACF from this research is variance in coalition attributes across states on the same topic. These findings point to the need to incorporate contextual factors, such as institutions or historical patterns of political behavior, into the analysis and interpretation of coalition structures. Although this certainly can be done with single case studies, a comparative approach with common methods of data collection and analysis across cases is preferred.

Conclusions and Policy Implications

The purpose of this article was to map the politics across three states and then to explore differences and similarities and identify some of the nuances of the politics often described in a conflict narrative between opponents and proponents of hydraulic fracturing. The results show polarization between two opposing coalitions with their normative perspectives about stopping or expanding hydraulic fracturing associated with their problem perceptions. Additionally, both coalitions have different levels of political capacity and engage in different activities and interactions. The results show similarities across states but not without some nuanced differences, including higher levels of polarization in New York, higher levels of government support for proponents of hydraulic fracturing in Texas, and high frequency of coalition building in Colorado. One of the similarities across all states is that both opponents and proponents share concern about public distrust of the oil and gas industry.

In mapping the attempts by policy actors to influence their government and their future of society, this study provides valuable insights into political behaviors and collective action by examining how people interact and relate to their government. From the perspective of policy actors, this description of hydraulic fracturing politics can provide practical insights. For example, policy actors may glean a better understanding of the professional world in which they live or help them navigate similar politics in achieving their objectives. For general citizens, a political map might help orientate them to an issue that directly or indirectly affects them.

Theoretically, this article utilizes the ACF to help guide the descriptive map of the political landscape on hydraulic fracturing in three states. To date, this framework has rarely been applied comparatively using similar methods of data collection and analysis (Leach & Sabatier, 2005; Weible et al., 2010). The results from this analysis underscore that coalitions can vary across locations on the same issue

at approximately the same time. As this particular framework is increasingly applied globally across different topics, times, and locales, more comparative analyses using similar methodological tools, as done here, is needed to draw lessons and advance knowledge about coalitions. One of the primary theoretical contributions of this research therefore is to offer an approach for doing comparative political analysis using the Advocacy Coalition Framework.

Methodologically, this article provides a rare large-sample comparative analysis of policy actors in three states. The results complement existing studies on policy actors that tend to focus on single cases and consist of a small sample of interviews. Nonetheless, there are challenges with the current approach. First, the three states described here may not be sufficiently representative of all states in the United States to draw generalizable conclusions to other states. Second, the study is limited in that it only takes a single snap-shot for each state and the response rates by some policy actor affiliations; hence, generalizing the results over time and to the general public should be done with caution. Third, the study also emphasizes state-level politics and does not adequately uncover how state-level actors interact with or influence local and national level politics, which may be valuable for understanding the nature of contentious politics on this issue. Even with these limitations, this study provides a rare comparative analysis of policy actors across states on one of today's most contentious energy issues.

To address these challenges, we recommend more comparative research across other states, as well as additional exploration of the politics emerging at the local and national scale. This will inform how policy actors interact and diffuse ideas and strategies. Additionally, analyzing the politics of this topic over time will help assess learning and changes in the beliefs, activities, and capacity of policy actors. Such longitudinal analyses could then provide insights into how politics is shaping policy outcomes and vice versa. Energy politics are dynamic and complex. Clarifying the nuances to debates on issues such as hydraulic fracturing will continue to be important for policymakers, stakeholders, and interested citizens who want to engage in and influence energy policy in the future.

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About the Authors

Christopher M. Weible and **Tanya Heikkilä** are Associate Professors and co-directors of the Workshop on Policy Process Research at the University of Colorado Denver's School of Public Affairs.

Notes

- 1 For a fuller description of the Advocacy Coalition Framework, see Jenkins-Smith et al. (2014).
- 2 Response rates per organizational affiliation type for New York, Colorado, and Texas, respectively, were the following: federal government (33%, 34%, 100%), state government (21%, 27%, 14%),

- local government (40%, 38%, 50%), environmental and conservation groups (24%, 36%, 52%), organized citizen groups (38%, 53%, 34%), oil and gas industry and professional associations (34%, 38%, 16%), academics (45%, 33%, 32%), news media (0%, 0%, 17%), and other (44%, 50%, 0%).
- 3 All online survey instruments are available at the authors' website: <http://www.ucdenver.edu/academics/colleges/SPA/natgasdev/Pages/Understanding-the-Politics-of-Shale-Gas-Development.aspx>
 - 4 The differences in responses across states might reflect the actual abundance and distribution of policy actors in the state and the approach used to generate our sample.
 - 5 Since the state of New York had a de facto moratorium on hydraulic fracturing at the time of the survey, we asked respondents about their position on hydraulic fracturing nationally, not within the state. In Colorado and Texas, the question was asked specifically about preferences for hydraulic fracturing within the state.
 - 6 The problems that we included on the survey instruments were identified in our interviews in 2013. Inevitably, interviewees may miss problems that emerge. One of the most recent problems that has been associated with hydraulic fracturing is induced seismicity. At the time of our interviews, this was not recognized widely as a problem across the three states.
 - 7 There is also limited and inconsistent evidence that policy actors' problem perceptions are shaped by their knowledge of the issue, which is a possible counterargument. A supplemental analysis of the data shows limited support for the argument that knowledge matters. One indicator of knowledge is the time policy actors devote to hydraulic fracturing. Proponents report significantly more time devoted to hydraulic fracturing issue in Colorado but the time devoted to the issue is only significantly different in favor of proponents in New York. No differences in time devoted to hydraulic fracturing is found between proponents and opponents in Texas. And, while not directly related to hydraulic fracturing, opponents have higher levels of formal education than proponents. Finally, Weible and Heikkila (2016) found that professional competency in subject areas related to hydraulic fracturing was unrelated to problems and positions on the issue in Colorado.

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