

**ONTOGENIC LANDSCAPES: HYDRO-FRACKING, POTENTIALITY, AND
THE ASSEMBLAGE OF IDENTITY OVER THE NORTHEASTERN
MARCELLUS SHALE**

By

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ABSTRACT OF THE THESIS

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Recent environmental, ecological, and economic concerns have interwoven in an increasingly complex manner with movements often coalescing around both particular practices and regions. Of great contemporary interest in the wider New York metro area is the growing public controversy over the practice of hydraulic fracturing, otherwise known as “fracking.” An unconventional extraction process conducted over a massive underground shale gas formation known as the Marcellus Shale, fracking asks residents to pick between the industry’s promise of economic stability and the potential of a radically altered landscape. In part, this thesis is a response to the paucity of work on fracking fully engaging important questions of perception of and one’s position in landscape as well as the attendant dynamics of subject formation. Additionally, the social conflicts inherent to large-scale energy extraction in this region present notable insights into community, environmental identity, and questions of scale. Drawing on participatory qualitative research, particularly among environmental activists, this thesis seeks to illuminate a processual and non-representational theory of nature, landscape, and environmental politics while demonstrating the fecundity of an emergent and rapidly growing environmental activism that is simultaneously “rooted” in notions of locality while dependent upon a fundamental mobility.

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Introduction

A century ago, geologists and paleontologists working in central and northeastern Pennsylvania, the Southern Tier of New York, and other areas across the Mid-Atlantic and northern Appalachia were confused by the relative scarcity of complete fossils in what seemed like a large shale deposit extending through multiple states (Smith 1909). Natural science journals that made mention of the deposit that came to be known as the Marcellus Shale (after the tiny village of Marcellus, NY) often puzzled over the “little known fishes” and other incomplete specimens that could be taken from the places where the shale neared the surface (Smith 1910). Researchers at the time were well aware that their knowledge of the shale only scratched the surface. In his work on fossilized coral beds in the New York shale Smith (1912, 446) noted that “. . . only a small horizontal section is exposed and the delimiting of the actual margins of the coral masses must be left to conjecture.” Geologists noted the peculiar and readily visible Devonian¹ outcroppings near Altoona, Pennsylvania but failed to link them directly to the Marcellus formation, let alone to the future its contents would unleash (Butts 1906). To these researchers, the shale was a different kind of enigma: the remnants of an ancient sea whose strange and wonderful inhabitants had long since died and sank to the bottom, covered by layers of black silt, pressed by incredible pressure, and left to decompose and transform into a resource that could not even be imagined for nearly 400 million years.

In May of 2011, Altoona, Pennsylvania is abuzz with a new group of researchers seeking to learn new things from the shale. Yet this generation is dealing with a far more contentious set of questions. With the discovery of a potentially massive reservoir of

¹ Roughly 380 million years ago.

natural gas trapped within the shale a mile below the surface, industrial concerns, academics, and residents have converged upon the region to debate how, when, and to what degree the shale should or could be explored. Due to the depth of the shale, typical vertical drilling will not be sufficient; this gas will have to be horizontally hydro-fractured or “fracked,” a recent and relatively untested method that some say could lead to environmental catastrophe and unchecked industrialization of formerly rural and exurban areas. In Altoona, the operative word is “uncertainty”; at a conference on Marcellus Shale research a variety of academics and activists note that they “just don’t know” what all the impacts of gas exploration could be. At the conference, some speakers feel that opposition to drilling is simply “a sociological issue” while others fear “an industrial takeover,” a “completely altered landscape,” or even “the death of agriculture.”

Different visions and understandings of nature are on display; are we meant to be “stewards” and “protectors of the earth” or must we “mine responsibly” and “put the gas to use for our communities”? Indeed, which of these choices would be the most “natural”? In such a milieu, nature and landscape – words that have come to be understood as simply the world minus humans and the picture of that world in the mind’s eye respectively – become complex, multiple, and deeply contested. To extricate the landscape and the non-human world from history, sociality, economy, and culture would seem a meaningless dichotomization. As these apparently separate realms inform and permeate each other and the debate over whether or not to drill becomes ever more heated I am drawn to a few questions: how is a politics of environment and landscape formed and enacted? How are concepts such as “identity” and “culture” implicated in

this emergence? How might landscapes, nature(s), and individual subjects constitute each other, and to what end?

It has been noted that the idea of “landscape,” particularly a “cultural landscape” is, at best, duplicitous (Olwig 1996). Nonetheless, questions of the human/nature relationship in regard to environmental politics and perception of landscape have a long history in cultural geography and related disciplines. This has often been related to large-scale projects of environmental modification (Cosgrove, Roscoe, and Rycroft 1996). In its historical conception, the idea of landscape is intertwined with art history, specifically with a particular form of Northern European painting prevalent in the sixteenth century. This formulation, originally denoting a type of “painting whose primary subject matter was natural scenery,” gave rise to a geographical lineage primarily concerned with the aesthetics of land and the visual act of seeing and imagining a cultural landscape (Ibid., 631). Landscape as a way of seeing has historically been connected to the growth of particular classes as well as military and imperial projects. The traditional view in cultural geography, the discipline perhaps most associated with the study of landscape, was thus that of a “visual ideology”; a “realist” epistemological stance seeking particular forms of control for the benefit of particular people (Cosgrove 1985). Earlier research (especially in cultural geography) tended to assume an ontologically static “rural pattern” which fought urban, state, and industrial incursion; essentially a representation of rural or traditional spaces resisting their destruction by the forces of time and history (Muir 1998, 150). Eventually critical studies began questioning this dialectic, instead asking whether the conception of such a “rural pattern” is what was really “static” (Ibid., 150). Such innovation resulted in the application of further layers of complexity as well as a more

astute eye to the role of a wide variety of power relationships and subject positions in the construction of landscape.

In the case of fracking, the uncertain nature of risk weighed against potential economic benefit and the variety of different forms of alteration that may occur (leveling forests, polluting water, but possible revitalizing long-suffering downtowns as well), allows landscapes to assume multifarious characteristics; different individuals and collectives have understood the potential and purpose of the landscape in different ways. Some research in landscape has previously addressed how a landscape can take on two (or more) meanings by groups and individuals with different interests (Johnson and Niemeyer 2008). Studies of risk perception have also attempted to understand the nature of human reaction to environmental risk as well as the consequences, contingencies, and confused reactions (or non-reactions) to a “toxic environment” (Auyero and Swistun 2009). Yet the landscapes in question here are discursive, born of emergent and uncertain political identities assembling in a complex milieu of actors and opinions, drawing upon a range of experiences with the practice gleaned from activists, the natural gas industry, and affected people in different regions. Thus their meaning, and the “nature” of the ostensibly external non-human world landscapes simultaneously contain and constitute must be continually constructed as natural gas development moves forward. Thus, nature writ large becomes a discourse, manipulated and made legible in different ways, and put to use for different ends.

Political ecology in the developed world has broached such topics before, notably in regard to riparian conflict and the naming of species (Crifasi 2007), non-market subsistence forestry in the United States (Emery and Pierce 2005; Kosek 2006), non-

capitalist practices amongst fishermen in New England (St Martin 2007), and conflict between “environmentalists” and “Wise Use” proponents in the American west (McCarthy 2002). Furthermore, political ecologists studying both forests and exurban “receiving areas” on the rim of metro regions (not unlike the area of this study) have pointed to a “lifestyle narrative” whereby the idealization of a pristine environment and desire for a “mythical rural lifestyle” butts heads with historical precedent (such as a history of extraction), causing divisions to form among residents of the same region or between different economic modalities (Costello 2007, 88-87; 92-93; Baldwin 2009). Other instances of exurban political ecology have focused on strife between “newcomers,” ostensibly the bearers of an aesthetic politics of landscape, and long-term residents who hold to a “production” model (Walker and Fortmann 2003). In this instance, in a struggle “emblematic” of those occurring in many exurban areas, a dialectical conflict between “competing forms of capitalism” plays out and the resultant “identities” of those affected are both “product(s)” and “political tool(s)” to be utilized by competing political-economic forces (Walker and Fortmann, 470, 484).

Though this study contains elements familiar to “First World” political ecology, it differs in several important ways. Of course, conflicts between apparently oppositional forms of production and consumption matter in this debate. The impact of fracking on local agriculture and tourism weighs heavily on the minds of some residents, many of whom have been keen to propose alternatives, especially for struggling farmers for whom the temptation to lease is often most relevant. These solutions, albeit often market-driven, are nonetheless attracting significant attention.² However, my focus here, which

² For instance, discussions in Sullivan county, NY often turn to the organization Farmhearts, founded by actor and local resident Mark Ruffalo. The organization’s role is specifically tailored toward family-owned

echoes the focus of many activists and residents, is less about competing forms of production than it is about conflicting environmental imaginaries. Access to the fruits of the resource is important, with large landowners reaping the largest benefits (next to gas companies of course), but wealth, stature, and occupation are by no means sure measures of one's political stance. More important in this case is how the resource (rather than the landscape at large, i.e. Walker and Fortmann) is *known* and *imagined*: either as productive of economic possibility or destructive of lifestyle and landscape. In my time with activists this was frequently voiced as opposition to “an industrial occupation” or resistance to “colonialism.”³ However, rather than resting on such dichotomous assumptions I would prefer to illuminate realms of practice and subject formation by considering actors and landscapes as “articulated moment(s) in networks that stretch across space” (Schein 1997, 662). This is in an effort to challenge the “dualistic, oppositional” manner in which identity and identification is often framed (Cerulo 1997, 392).

This paper will engage with the Marcellus Shale and the people that have organized around it in a number of ways. After an introduction to the practice of hydraulic fracturing and a description of my methods, I will examine the “nature” of natural gas and its transformation into the commodity form, a process dependent upon contradictory notions of fluidity and immobilization and thus, on contradictions between the form of nature advanced by the industry and the pre-cultural characteristics of natural

farms in the Catskill region via “lending assistance through grants, helping to bring added value to a farm’s existing products, offering grassroots support for marketing or distribution or helping to open the door to the next generation of farmers.” Programs include fellowships, business and marketing training, urban outreach/urban animal husbandry training, and sponsoring classes in value-added food production at Sullivan County Community College. See www.farmhearts.org.

³ These terms came up quite often in meetings and conversations with activists especially in Altoona and Pittsburgh, PA (May 2011), Bethel, NY (July 2011), and Kingston, NY (July 2011).

gas its self. This is set to the backdrop of public protest in the Northern Tier of Pennsylvania and the Finger Lakes region of New York, where concerns over natural gas and the destruction of “culture” abound. I argue that this notion of culture, intrinsically linked to environmental activism, is actively and continually produced, along with the notion of culture advanced by proponents of drilling, pointing to a diversity of natures. Following this, I will place these interventions more solidly in the realm of non-representational theory, examining the forms of action and performance realized in this process of making and defining landscapes and their values. Using theory drawn from critical cartography, I hope to demonstrate how maps and other representational images can become spaces into which relationships to nature are projected, and can even act as important mediators in the production of environmental politics. Finally, I will note the scalar dimensions of these politics, and highlight the way in which place-based activism, like natural gas, is also dependent upon both the idea of boundaries and inherent fluidity.

The Marcellus Shale: Risks and Promises

Pennsylvania and New York are only two of many states within the purview of the Marcellus Shale, a massive underground shale deposit which holds vast quantities of natural gas underneath parts of New York, Pennsylvania, Ohio, and West Virginia with southerly tendrils snaking as far south as Tennessee. As the states over the Marcellus Shale continue to struggle with unemployment and budgetary problems the promise of tapping into the shale's reserves of natural gas - potentially enough to feed the "nation's energy needs for as many as twenty years" – has become nearly impossible to overlook (Lebron and Kupferman 2009, 6).⁴ For instance, in Pennsylvania where many Marcellus Shale counties have unemployment rates in the double digits, research funded by the natural gas industry has illustrated a virtual windfall for the state's citizens: the creation of tens of thousands of new jobs and hundreds of millions of dollars in state and local tax revenue (Maloney 2010). In such an environment, one might suppose the temptation would be strong. From every town hall one imagines chants of "drill, baby drill" echoing through the community. Yet the reality of public sentiment, tied intrinsically to the controversial process needed to extract this particular kind of gas, is far more complex.

The hydraulic fracturing process, involving "high pressure injection of water, sand, and chemicals deep underground to break up shale formations and release their stores of gas" (Montgomery and Smith 2010; Krauss and Zeller 2010) is quite problematic. "Conventional" hydraulic fracturing, which is typically a vertical process,

⁴ This commonly cited figure is based on a 2008 Penn State study that estimated that the Marcellus Shale could contain as much as 516 trillion cubic feet of gas. However, a 2011 study by the USGS estimated the level of gas to be much lower: approximately 84 trillion cubic feet. In either case, how much of the gas is technically recoverable remains debatable. Indeed, this underscores the notion of uncertainty that flows through the various Marcellus narratives. For a more in-depth examination of these findings see Sue Smith-Heavenrich, "How Much Gas is Really in the Marcellus Shale," *Broader View Weekly*, September 1, 2011 and geology.com/articles/Marcellus-shale.shtml.

has a history dating back to the oil and gas fields of Oklahoma and Texas in the middle of the 20th century (Montgomery and Smith 2010). However, the form of hydraulic fracturing used over the Marcellus Shale, and the shale gas the industry seeks to extract, are considered “unconventional” due to depth, the horizontality of the drilling process, and the sheer volume of fluid needed to fracture the shale.⁵ It sounds simple enough: A formation is targeted, and a hole is drilled just above it, extending thousands of feet down. The bore then “makes a near 90-degree turn,” to “capture more of the natural fractures in the rock” when a massive high pressure injection of water, sand, and a variety of chemicals occurs, forcing additional fractures and “holding them open” to release the gas (Lebron and Kupferman, 6). The gas industry has long maintained that the process is safe, noting that gas deposits are “far below aquifers and separated by rock layers thousands of feet thick” and pointing to “stringent regulation” (Halperin 2010, 18). At a federal level, recent actions have seemed to corroborate the industry’s stance. After a 2005 EPA report found that fracking posed no risk to drinking water the practice, formerly regulated under the Safe Drinking Water Act (1974), was deregulated, opening

⁵ Interestingly, the definition of “fracking” as it applies to the Marcellus Shale is also a deeply contested and intrinsically political issue. Many supporters note that hydraulic fracturing has a long history with a conjoint record of successful mitigation. As Montgomery and Smith (2010) note, this history dates back at least sixty years. However, this older practice, a vertical bore into shallow formations involving comparatively much lower pressures and volumes of frack-related fluids, is far different from the high-volume horizontal hydro-fracking needed to actualize the Marcellus endowment. For its part, “directional” or horizontal drilling dates back to at least the 1930’s. Yet the combination of the two methods, coupled with extreme depths and pressures, massive amounts of water and chemicals, and the proximity to densely populated regions is quite recent. Though the history is somewhat muddled, it is generally accepted that the kind of hydro-fracking needed to release the Marcellus’ stores began being utilized over Barnett Shale in North Central Texas in the late 1990’s and early 2000’s. This shale gas deposit has elicited similar controversy due to its proximity to the Fort Worth metro area and potential environmental issues linked to groundwater pollution and conflict with local agriculture. For a more detailed discussion see the Montgomery and Smith article cited above as well as Abraham Lustgarten, “Does Natural Gas Drilling Make Water Burn,” *Scientific American*, April 27, 2009: accessed at <http://www.scientificamerican.com/article.cfm?id=natural-gas-make-water-burn>.

many states up to drilling. Seemingly overnight, states atop the Marcellus Shale received “thousands of drilling applications” (Hobson 2010). Yet uncertainty continues to reign.

Despite the industry’s assurances to the contrary, researchers and activists have uncovered a wide variety of risks and dangers associated with fracking. Some dangers, such as blowouts, ground water and well contamination, and death of livestock are well documented and experientially imposing. The industry has steadfastly refused to reveal the various chemicals used in fracking fluid, guarding the recipe closely as a trade secret, brushing off suggestions that it should disclose the makeup of the mixture. Though the industry claims that the chemicals are diluted and “kept out of contact with potable water” a number of very real possibilities for contamination and accidents exist:

1. The vertical bore cuts through the water table and is improperly cemented and sealed.
2. Fractured production formations communicate with groundwater formations, either through other fractures or through older wells that were improperly sealed or are decaying.
3. Waste pits (for the storage of fracking’s main byproduct – chemical and sediment-infused waste) overflow, their liners break, or the water evaporates.
4. Other inevitable accidents such as spills or explosions occur. (List from Lebron and Kupferman 2009, 6-7; Halperin 2010)

Independent studies of fracking fluid have found that over ninety percent of the chemicals utilized have “one or more health effects” ranging from skin irritation to hormonal and brain damage. Substances identified in the fluid including “boric acid, ethylene and ethylene glycol” can cause a variety of ailments including “kidney, liver, heart, blood, and brain damage” through long or repeated exposure (Lebron and Kupferman, 6). Infrastructural concerns create further problems. Heavy truck traffic into formerly “pristine” rural areas has resulted in ozone levels in “sparsely populated regions of Wyoming” that have been sites for fracking reaching the same levels as highly industrialized areas (Ibid).

Furthermore, the supposed economic benefits of fracking have been called into question by numerous journalists and researchers. Halperin (16-17) notes that many potential fracking areas are largely poor and rural, with divisions forming between those who want a potentially prosperous jolt to the local economy and others who prioritize environmental sustainability. Yet much of the initial work will have to be performed by experienced “Wildcatters” from Texas who have the training necessary to perform the job safely (Ibid). Additionally, the “high intensity” and high volume work is rather brief; sustaining job growth essentially depends completely upon drilling more wells (Ibid., 20). Land and mineral-rights leases also tend to benefit only those who own large plots of land and even many of these individuals come to regret their leasing decision due to political uncertainties. For instance, one landowner near Ithaca, New York signed on to a fairly lucrative and supposedly unobtrusive deal only to see then-governor David Paterson raise the spacing-unit size to 640 acres, allowing companies to group wellheads together on a central “pad” in order to save money - so many lessees who had signed their contracts before the change now had to live with the possibility of higher volume, multi-head wells on their property (Ibid., 16, 18).

In 2010, public outcry lead to a temporary moratorium in New York and a ban on further gas permits in state forests in Pennsylvania (Maloney, 8; Krauss and Zeller Jr., 1). However, budget shortfalls and economic woes in both states have been met with signals from both incoming administrations (Governors Corbett and Cuomo in Pennsylvania and New York respectively) that bans and moratoria might soon be a thing of the past (Maloney, 8). Pennsylvania, already the home of nearly four thousand Marcellus wells, might soon see a spate of drilling that could fundamentally “change the landscape”

(Halperin, 18, 21). In New York, some have claimed that as many as ten thousand wells could be cleared (Maloney, 8). Amid accusations that the Bush-era EPA report was “politically motivated and scientifically flawed” the agency was asked to take another look (Hobson, 8). As onlookers wait for the new study reports, due in 2012, the debate will likely play out in localized sites of contestation and construction. In these sites, nature is defined and relations to it are performed, environmental politics are enacted, and environmental subjects are created.

Methodology

I employed qualitative methods in my attempt to craft a theory of diverse and changing landscapes as well as to address the construction of environmental politics. This included initial analysis of written material such as journalistic accounts, industry literature, and white papers. I remained in email contact with a variety of activist organizations and town boards and was kept abreast of current events through their letters and communications. Particularly important at this point was analysis of statements related to human/nature relations (e.g. are there appeals for a “pristine” landscape or environment?) as well as the invocation of a place-based specificity (e.g. are the particularities of local “culture” or memory employed as devices of organization?). This early emphasis on how written sources deal with attachments to places follows from the “spectral” image of landscape elucidated by Annabel Cooper (2009), in an expression of kinship with Cooper’s imaginary of a co-constitutive “geography of emotion” and “indeterminate” landscapes both implicated in the creation of identity and the subjects of this construction (136). This stage of research was bolstered by its logical extension into personal participation; I attended relevant town hall meetings, speeches, and other events in the region, as well as two multi-day academic/outreach conferences in Altoona, Pennsylvania and Geneva, New York. At some meetings, such as those in and around Bethel and Kingston, NY, my participation was as activist-oriented as it was academic. In some cases this relationship continues.

At conferences, town halls, and meetings in western Pennsylvania, the Finger Lakes region of New York, and the Catskills I engaged in lively personal discussion with a variety of stakeholders. This was occasionally extended into free-form interviewing.

In one instance, I even found myself being interviewed for a local newspaper. To attempt to gain a wider perspective I engaged in two more formal semi-structured interviews, one with a landowner who had chosen not to pursue a mineral lease and another with one who had chosen to lease. In all cases, how respondents, interviewees, and participants in activism and the creation of discourse imagined themselves in relation to the non-human world and to one another was given precedence.

Interviewees and other participants were all implicated in the illumination and constitution of discursive politico-cultural landscapes. Following from Schein's (1997) work, insights gained from our various interactions contributed to a reimagining of nature and landscape by examining the theoretical meaning of particular "landscape elements" as well as "landscape practices" as the discursive moments of a dynamic landscape (662-663). Such practices include for instance activism or leasing of land, constructed or motivated by the political, ethical, economic, and legal landscape elements. Expressions of political sentiment as well as investigation of how a subject imagines one's self in relation to the "environment" or nature were read as constitutive elements of a politico-cultural landscape.

Though I attended and participated in quite a few meetings of various kinds, practical limitations stifled the scope of my interviews to some extent, possibly raising concerns over generalizability of findings. I would respond to this by offering support for both the notion of a "small-n interview based study" and for working from a "case study" rather than a "statistical logic"; as Small (2009) notes, this method is "probably more effective when asking how or why questions about processes unknown before the start of the study" (17). The basic "how" questions I began with were as follows: how do

environmental politics coalesce around fracking in this region? How do subjects implicate themselves in the non-human world and (perhaps) vice versa? How are understandings of nature and desires for particular landscapes held together, or torn apart? Rather than attempting to generalize answers to such questions for every person living over this section of the Marcellus Shale I instead present here a “set of cases,” consisting of a collective of observances, conversations, interviews, and documentary evidence, allowing for subjective analysis of networks formed and enacted in the construction of landscapes and political identities.

My search for theoretical saturation was far from unproblematic, and I eventually abandoned an earlier method based on representative coding. Yet I do believe that the power of conversation and subjective analysis overcame most of my boundaries. Ultimately, as the project veered more toward participant observation my concern shifted in kind toward emergent subjectivities as expressed through political practice. This is, by its nature, a fleeting phenomenon; what people say and how they constitute nature(s), landscapes, and themselves in the moment of a conversation or a heated debate at a town meeting is a difficult element to “code” for. Ultimately, I saw this as akin to what Dewsbury (2003) has called “witnessing,” a process of producing “knowledge without contemplation.” This helped lead to the final, and perhaps most productive, part of my methodology.

Representing the Shale

Graphic representations of the Shale are ubiquitous in nearly all Marcellus-related events and functions. Maps and other graphics (horizontal drilling diagrams, representations of the drilling process, and so forth) are used by activists and industry alike to demonstrate locations, depths, processes, and can generate – often simultaneously – promise and fear. In this instance, how I proceeded methodologically is intrinsically related to how the Marcellus Shale is imagined both by researchers and subjects. The Shale and the images representing it were considered as a space into which economic, academic, and ethical modalities could be projected, carrying with them a variety of codes of conduct. Simultaneously, subjects extract other knowledges and other codes from the Shale and its representative images. Demarcations between practice, representations, and what they were ostensibly attempting to represent became quite blurry. Thus, careful examination of the representation and how people reacted to them became rather important. Ultimately, I found that this supported Dewsbury's (ibid) and Thrift's (2007) notions of non-representational theory as applied to landscape and environmental politics. In addition to enriching the story of hydro-fracking, this aspect of the project helped to address a few key questions; what can representations of space/representational spaces (Lefebvre 1991) tell us about the landscape ideologies of concerned actors? Can other or new ethical landscapes and environmental politics (or insights therein) be drawn from the interrogation of both representations and lived spaces by researcher and subject alike?

Due to the massive amount of maps and other representations available, this was not a difficult journey to begin. Geologic maps focusing on the extent, depth, and

penetrability of the Shale and range from simple and accessible projections (where the Shale's borders are overlaid upon a familiar state map of the Northeastern US) to complicated hydrological maps typically understandable only to experts. Industry maps tend to represent both the processual aspects of drilling as well as the economic potential of certain regions, as well as cartographic images of how best to understand mineral-rights leasing.⁶ Seeing how these representations were utilized by activists, educators, and the industry was an important step toward understanding how ethics are enacted and performed, demonstrating how representations can be much more than simple images. I also personally asked a variety of people – mostly activists – to look at particular maps and explain their understanding of the landscape represented before them. As we will see later in this paper, responses varied from expressions of outright fear to a sense of promise, often implicating graphics and representations as actors in networks expanding far beyond the geographic reach of the Marcellus formation. The various maps and representations of the Shale can be considered as elements of the *spatial practice* (Latour 2005) of particular actors and collectives associated with the debate. Spatial practices as imagined here are mutually constitutive with ethics. Thus, representations allowed me to observe the enactment of landscape as simultaneously a material reality, an ethic, and a practice.

I will turn now to a study of some of the places, people, and ideas implicated in the conjoint production of these various entities and relationships. First, I will examine how the economic product its self – natural gas – must be subjected to a disciplining force that acts to both naturalize it as a commodity and place it within a particular regime of nature. I will argue that this process is intrinsically related to the production of

⁶ Many such maps and representations can be found at <http://geology.com/articles/marcellus-shale.shtml>.

environmental subjectivities and a co-produced notion of “culture,” which acts to mediate this emergence and lay the ground rules for a variety of conducts within an inter-scalar network. I will then look at how environmental subjectivities are simultaneously produced by and productive of both conceptual and material landscapes, and how these network elements manifest in each other.

Finally, using interventions from non-representational theory, actor-network theory, critical cartography, and political ecology, I hope to demonstrate how resultant interactions among scales and a persistent sense of mobility shared by many activists can reap productive change and foster community-driven outcomes. Ultimately, I intend to demonstrate a theory of landscape and nature as ontogenic rather than static: in a state of change and constant construction and reconstruction rather than an immobile text fit only for representation and observation. Thus, the notions of performativity and potentiality will be important throughout; no political or environmental identity exists without the constant reappraisal of its constitutive performance. Likewise, no particular outcome can be considered inevitable.

“Un-Natural Gas” and The Making of Culture over the Marcellus Shale

We have something special. We're not the big city. We don't have the best stores. We are a safe, clean place. . . Get in your cars, drive to Susquehanna County, go to a fracking town and see what's going on, 'cause its coming here.

- Throop, Pennsylvania Council official, August, 2011.

Keep your city out of my country!

- Poster on the wall of Pike County, PA restaurant, October, 2011.

[Man] develops the potentialities slumbering within nature, and subjects the play of its forces to his own sovereign power.

- Marx, *Capital*, 283

Throop, PA

It needs to be stopped. Its evil.

- Throop, PA resident⁷

As I stand in a stuffy high school gymnasium in the northeastern Pennsylvania borough of Throop⁸ I am bombarded with a rapid series of concerns, expressions of anger and contention, and – often – outright fear. I find myself unable to determine a point of origin for the outpouring of emotion flowing thickly into the crowded room. The residents of Throop, out in force this evening, are here to discuss the potential consequences of hydraulic fracturing of natural gas that seemingly pose an existential threat to their community as they know it. Yet Throop is not a fracking town; it lies in the gas-rich Northern Tier of Pennsylvania but it has yet to see the same mass proliferation of drilling activity as its northern neighbors in Susquehanna County. What

⁷ This section draws on attendance at Throop town meetings in early August of 2011 as well as personal communications with residents.

⁸ Located in Lackawanna county.

Throop lacks in drilling rigs, however, it makes up for in a regionally significant landfill. Predictably, the owners of the landfill have entered into the newly lucrative business of accepting and processing fracking-related waste, including potentially toxic drill cuttings.⁹

Communication between the Borough Council and the owners of the landfill has been active but strained with allegations of footdragging and non-compliance on the part of the landfill owners as well as Pennsylvania's Department of Environmental Resources and Department of Environmental Protection (through which Throop's repeated requests for public hearings were submitted). The relationship between the town and the DEP has been sullied by the impression that, in the words of a resident, the "underfunded" organization is willing to "go after the little guy" but ignore the gas companies who "have the power to steamroll it." The incongruous influence of capital over the physical welfare of the collective citizenry is not lost on the townspeople: one speaker notes that "money buys power," necessitating collective action. "We as a group, not as individuals, have to speak up, because we're losing our democracy." A local farmer who asks to speak takes this line further: "I can't believe we've lost our democracy in the Marcellus Shale. Over the last fifty years we have *laid down*. Those people [*government agencies and the gas industry*] want control over you and me. We have no choice. If we don't fight now we will lose." As the farmer continues, temporal dimensions seep into his story as he recounts how things "used to be" in the days of clean air and greater income

⁹ "Cuttings" refer to any solid material removed from boreholes after drilling. Residents at this meeting were concerned that contaminants associated with the chemical inputs inherent to hydrofracking as well as naturally occurring heavy metals native to black shale such as lead, mercury, selenium, and arsenic would be brought to the surface in large quantities and sequestered within Throop's borders. Cuttings, the Throop council reckoned, would pose a serious health risk due to potential dust flows as well as the possibility of water contamination. These assertions were based on a number of studies that found "small but detectable amounts of heavy metals and other elements that can be detrimental to the environment if mobilized and concentrated." Perhaps the most important reference is Soeder (2011).

equality. The complex interpenetration of idealized memory with a fear-ridden present is deeply affective for the audience but confusing when one must consider the nature of the reality at hand.

The situation is further complicated by regulatory issues related to the fracking process (which was exempted from federal clean air and water regulation after a 2005 EPA study) as well as claims by the Pennsylvania DEP that drill cuttings are safe. Calling upon “an abundance of credible information and expert opinion” that drill cuttings are, in fact, hazardous, the Borough has not only requested three public hearings which have allegedly been ignored but also asked that a DEP scientist or “other expert” be present at the hearing(s) to discuss the cuttings more meticulously.¹⁰

For Throop residents the dynamics of the debate collapse into densely inter-related value judgments and scales of analysis. As one resident asks, “What is our air quality going to be?” This seemingly simply question is actually quite complex. It implies both change over time (with the implication that this change will be for the worse) as well as a boundedness and particularity of place; “what is *our* air quality *going* to be?” Additionally, the sense that the borough is being *acted upon* by external forces that hold the power to fundamentally alter air and water quality is quite palpable.

These fears of a toxic future are stacked up against the powerful imagery of exploding water and harrowing experiences of other people in *other places*; indeed, without this imagery – ubiquitous in anti-fracking settings – the idea of natural gas as a destructive force could cease to be legible as the process is still *potential* rather than

¹⁰ Throop Borough Council to Pennsylvania Department of Environmental Resources Program Manager, Re: Keystone Sanitary Landfill, PaDEP Waste Management Permit No.: 11247, June 14, 2011.

actual in many municipalities.¹¹ Moreover, residents are keen to jump scale¹², noting the construction of various pipelines designed to ship gas overseas. As one activist tells me, “if there are benefits, they’re going to the other places where [the gas] is sold.” It seems that spaces are pitted against each other in a battle over how to make use of a potentially valuable (but also potentially destructive) resource endowment; a dizzying variety of interested parties and actors, from the frightened residents of rural communities, to large landowners eager to cash in on lucrative leasing deals, to major industrial concerns and influential politicians are implicated in this process. In a sense, residents fear that the space of Throop as a “special” community will cede to an unstoppable industrial machine: “They’re coming to Bradford County, they’re coming to Susquehanna County, and they’re coming to Lackawanna County. And when they do, it’ll be the worst thing that ever happens to us.” Yet in a moment of brilliant political acumen the space of the community is reasserted as an embodied socio-political barrier. When a resident asks a leading council member how he is going to handle the situation (and fracking in and near Throop more generally) he answers bluntly, and to much applause: “That’s simple. I’m going to stop it.”

¹¹ The comment on exploding water refers to flammability occurring as a result of contamination with methane. The classic, if not infamous, example of this phenomena occurred in Susquehanna County’s Dimock, PA where prominent gas company Cabot Oil was forced to pay 4.1 million dollars in reparation for the contamination of the town’s water. See Pennsylvania DEP Press Release “Dimock Residents to Share \$4.1 Million, Receive Gas Mitigation Systems Under DEP-Negotiated Settlement with Cabot Oil and Gas,” 10/16/2010. Available at <http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=15595&typeid=1>. Josh Fox’s now famous film “Gasland,” (2010) which details the travails of Dimock, is also a popular reference. I have yet to talk to an activist or attend a meeting that did not make reference to the film.

¹² I use this term here to note residents’ understanding of how natural gas is implicated in wider socio-political and economic issues that extend beyond the immediate reach of their communities. Part of this refers to the sense that fracking operates politically at different “levels,” from body, to household, to the regulatory arms of the state, and finally at the “global” scale of international neoliberal trade. The term has a long history in geography beyond this use and is often used to refer to social mobilization through “scales” or as a means to critique hierarchical notions of scale. See Allen and Cochrane (2010); Haarstad and Floydsand (2007); Kitchin and Wilton (2003); Jeroen (2009); van Schendel (2002).

Geneva, NY

We are not a hotspot.

- Finger Lakes agricultural activist, July 2011.¹³

As groups of activists, residents, and lessees looking to get the most out of their deal with the gas industry come together to voice their concerns I am once again confounded by the diversity and variety of flashpoints of contention. New York's Finger Lakes region is a noted recreational and agricultural area, particularly famous for its many wineries. Driving through the countryside surrounding Geneva is something of an odyssey of cultivation, where labyrinthine fields of spinach quickly give way to corn, cabbage, and the often enormous and ubiquitous vineyards. But today the rural idyll threatens to be shattered; the temperature is in the triple digits and the humidity isn't far behind. The building is not well ventilated and the people who fill it are not happy. Numerous heated arguments have erupted between advocates of mitigation and those seeking an outright ban on the extraction of natural gas. A prominent planner from Cornell University who hoped that mitigation and land restoration models developed in Bradford County, Pennsylvania would be applicable to the Finger Lakes region has just verbally attacked an activist who suggests that, perhaps, these two regions are "not the same." The activist claims that hydrofracking is "economically and culturally incompatible" with the large scale farming that takes place in the Finger Lakes region.

¹³ The following section draws on participant observation research in the Finger Lakes area in mid July 2011. This included attendance and participation in a two-day regional research conference as well as conversations with a variety of local stakeholders. The "hotspot" refers to an area where geological modeling has predicted a large volume of natural gas with high extractive and productive potential. The Finger Lakes region, though subject to massive leasing, is not considered "hot" to the same degree as Northeastern and Southwestern Pennsylvania.

The planner, for his part, bristles at this localist assumption of prohibitive difference and notes with anger that his presence is being devalued.

As I talk with the same activist later, her ethical-local sentiments become much more obvious. When queried on the idea of the possibility of generalization she notes that “we need to look at our specific situation,” and “people have to decide what they want their *place* to be in the future.” Such invocations of agency gleaned from spatial particularity are nonetheless threatened by socio-economic realities and a sense of inevitability; many locals still see their fight as a losing one, shackled by an unstoppable “industrialization.” New York is currently under moratorium for the drilling of new wells, but this could easily change, especially in such economically uncertain times. Yet the economic argument is not lost on this activist; it is simply altered to make way for other forms of production. Fracking, I am assured, will hurt or destroy the “economically beneficial trend toward locally grown food,” a trend that is quite observable in the region. Indeed, New York has one of the fastest growing organic farming industries, which the activist (who is also an organic farmer) ensures me is also partially the result of local particularity: “We don’t plow fence post to fence post like they do in the Midwest. Pest control is different here. We’re more biodiverse.”

When it comes her turn to address the conference the activist adds spatial representations to her local/economic attack on hydrofracking. Utilizing maps of agricultural space overlaid with county maps of gas-leased parcels she demonstrates that the industry’s assertion that “all farmers are interested in gas” is a rather incomplete assumption. Though there is some overlap, many large agricultural parcels remain unleased. “They want to stay farmers,” she says, “not retire to Florida on their gas money.”

She addresses the prospect of job growth and diversification with an interesting lens of class and difference: “This might create some jobs, but what kinds of jobs? Do you want your son driving a truck?” Finally, the ethical, cultural, economic, environmental, and region-specific nexus of her argument – a discursively created landscape – comes full circle in her closing remarks: “We created an industry, we created a certain kind of place. Now, Europeans come and say, ‘you know, those Finger Lakes are something special.’ *Don’t frack it up.*”

This is a curious notion. What systems, relations, and ways of being are residents and activists worried about “fracking up”? How are the “cultural” battles over the Marcellus Shale to be framed, both theoretically and by those on the ground? The debate seems both viscerally local and intrinsically global, tied as it is to ideas of corporate hegemony, industrialization, and energy crises. Simple dichotomizations – conflicts between ontologically material “cultures” and systems of economic production – may not suffice in explaining the role of culture and subjectivity over the Marcellus Shale. This debate and how culture is implicated in it as a mediator, spans spheres of economy, society, and ideas of nature. Both human and non-human forces are imbricated in it as relational elements of an assemblage: the constitutive parts of the Shale as a producer of cultural and environmental subjects.

At the conference, culture, economy, and locality are fused together. As we move to breakout mode and I choose to sit in on the “Cultural and Economic Issues” session. The job of the session, lead by the same agricultural activist, is to commit ten main concerns to a whiteboard and discuss potential problems and possible solutions to be submitted for further research. Residents are uniformly concerned that the region’s

transformation from “rural to urban” and the influx of “outsider” gas company employees will bring increases in crime and social divisiveness. To this they add the related fear of the destruction of the local tourism industry which, they contend, is dependent upon the beauty of the natural landscape as well as the productive capacity of local agriculture. At the end of the session we are handed two small strips of five circular stickers and asked to place them on the whiteboard near the object of our greatest concern. We are told that we can use multiple stickers on one issue if we please. The clear winner in terms of how residents articulate their concerns – by dozens of stickers – is “Changes to Community Character.”

Practice and Materiality

Though the fracking debate and the role of culture in it is clearly complex, it is not intractable. This section is an attempt to place the cultural invocations employed in relation to hydrofracking in a wider socio-natural and economic network, examining culture not as an external entity, utilitarian tactic, or a representation of place(s) but as a relational process of articulation among human actors, forms of production, and non-human forces. Along with the empirical content outlined above, I will examine this process through engagement with cultural geography, political economy, and theory drawn from fields such as actor network theory and critical cartography. I hope to demonstrate the efficacy of imagining cultural and environmental identities in this way by contextualizing this particular environmental conflict and illuminating the contradictions inherent to the commoditization of gas. In addition to avoiding essentialist or external theories of culture this approach grounds, contextualizes, and de-naturalizes the commodity form.

More traditional narratives might frame this discussion in terms of collective identity, utilizing this form of analysis to explain why certain “tactical choices” are made by activists as well as to explore who participates in activism and who does not (Poletta and Jasper 2001). This approach is not without merit. Indeed, constructed collectives as well as “common ideological commitment(s)” “matter to social movements” (Poletta and Jasper 2001, 298). This is not unlike John Dewey’s (1927) concept of “the public,” a collective body actualized in order to mitigate consequences which “expand beyond those directly engaged in producing them” (27).

I claim some kinship with collective identity theory in my desire to examine relations between “identity and an individual’s [*I would also add collective’s/community’s*] calculus of self-interest” (Ibid, 299). However, I wonder if collective identities and/or social movements mobilized through a shared ideology can be conceived of as a “particular form of culture” (Poletta and Jasper, 298); environmental movements intrinsically incorporate concerns and actors beyond those traditionally conceived of as existing within the “cultural” realm. These include physical landscapes and material objects which, although they may pre-exist our perception, can still be cast as “cultural” insofar as they become “meaning-laden” (Robbins, 2007: 32). In this case, culture is also continually reimagined and reasserted. The construction of meaning, as well as the place of *invisible and fugitive* resource endowments such as natural gas is still somewhat obscure. To draw upon Bruno Latour, my concerns are less about “using society to explain” elements, processes, or organizations than they are about examining how particular social formations are “held together” in networks of actors (Latour 2005, 13-14). As the cases of Throop and Geneva demonstrate, how social power and cultural interventions interact to create perception is quite important in this regard.

To this end, it is helpful to take a closer look at “culture” as a conceptual category. The nature of this term has been widely debated in geography for many years. Traditionally, cultural geography took for granted that “any sign of human action in a landscape implies a culture, recalls a history, and demands an ecological interpretation” (Mikesell 1978, 4). Beginning in the 1980’s, this notion of a foundational/essential culture as a root cause or motivator of human action came under assault. The critiques

levied by many of the so-called “New Cultural Geographers” are rather helpful in understanding cultural interventions over the Marcellus Shale.

The most noted area of attack for the New Cultural Geographers was the perceived “superorganicism” of traditional cultural geography which allegedly posited culture as “as an entity unto itself,” possessing its own inherent logic and “exhibiting its own causal power” (Price and Lewis 1993, 11-12). “New” cultural geography turned these assumptions on their head, suggesting that culture is a socially-produced “idea” rather than an essential identity. Perhaps the most notable work in this field is Don Mitchell’s famed 1995 essay “There’s no such thing as culture: towards a reconceptualization of the idea of culture in geography.” Mitchell’s critique is summed up in his own words:

“This reconceptualization begins by asserting that there is no such (ontological) thing as culture. Rather, there is only a very powerful *idea* of culture, an idea that has developed under specific historical conditions and was later broadened as a means of explaining material differences, social order and relations of power. But these explanations are not of ‘culture itself,’ whether defined as a level, medium or signifying system. These ways of seeing ‘culture’ do not avoid reification, rather they perpetuate it by smuggling right into the heart of geography what are still a quite mystified set of assumptions about how social practice proceeds” (103-104).

Mitchell goes on to recommend that theorists eliminate ontological culture from the lexicon, instead focusing upon “how the very idea of culture has been developed and deployed as a means of attempting to order, control and define ‘others’ in the name of power or profit” (104). Openly hostile to superorganicism (which he refers to as the “culture is everything” modality) Mitchell views culture as an idea that can only be represented through a “proliferation of examples that presumably (and self evidently)” constitute it including everything from art to forms of political resistance (106). As such, “culture” is an abstraction used to simplify “the incredible suite of differences that mark the world,” failing even in that regard because it is just too “chaotic” (Ibid).

For Mitchell this implies that “culture, *per se*” does not exist as anything more than a “list of activities” (Ibid). Once culture is granted firm ontological status it requires definition. In Mitchell’s view, attempts to define culture cause theorists to resort to “other (external) concepts and realms, each of which themselves, it turns out, cannot be defined in an “internally coherent and inclusive manner.” This represents a feedback loop of increasing, and (in Mitchell’s view) pointless complexity. Culture, as Mitchell says, is an “infinite regress” (107). Only by recognizing the “fallacy” of ontological culture can geographers “get on with the important work of understanding how the idea of culture functions in society,” namely to “regularize or normalize contradictions between systems of production and consumption” (110).

The applicability of Mitchell’s thought to this case is quite clear. As my research in Geneva, NY demonstrates the mobilization of “the cultural” can act as a mediator in the battle between allegedly incompatible systems of production and consumption. Yet Mitchell does walk a potentially precipitous line in skirting the rim of another essentialization: that of a foundational and inexorable “role” for the idea of culture to play as well as a dichotomization of economic identities that could just as easily be imagined as hybrids (Gibson-Graham 2005; Gibson-Graham 2006). Pursuant to this critique, it is efficacious to add notions of performativity and practice to the valid theoretical constructions of Mitchell and other New and Marxian cultural geographers.

Though drawing from a much different case study – that of copper miners in Zambia – anthropologist James Ferguson’s (1999) notions of cultural style and localism provide a useful path toward integrating these concerns into a wider examination of the place of culture in this case and, perhaps, environmental activism writ large. It is

important to note, as Ferguson does, that one's "culture," linked with how a person and position is presented both conceptually and aesthetically, is less about a normative stance than it is about performing an action in the world (104). The implication is that the idea of culture is an embodied practice rather than a set of values or beliefs; "you don't *believe* in localism, you *do* it" (Ibid). Thus, how one positions one's self in relation to hydrofracking – how fears are expressed and articulated, how the desire (however unclear) for a certain landscape is made legible – "is a capability, a performative competence" (Ibid).

As such, it is not necessary to imagine the idea of culture as, for instance, an idealized representation of Geneva, New York or Throop, Pennsylvania. This said spatial particularity clearly plays a structuring role in giving shape to the relationships that "culture" attempts to mediate or regularize. To draw briefly on research in critical cartography, a field specializing in re-thinking what maps are, culture can thus be conceptualized as "processual, not representational, in nature" (Kitchin and Dodge 2007, 343). Thinking culture, landscape, and environmental politics in this way requires attentiveness to how such politics "emerge" from experience and practices to address the "relational problems" inherent to environmental issues (Kitchin and Dodge, 341-342). "Culture," divested from a discrete role or a representational identity, can be imagined as a node in networks that continually unfold. Individual subjects – activists, researchers, drilling proponents – are created through the unfolding of these networks.

Network Logic, Flows, and Contradictory Cosmology

Althusser's (1971) notion of "interpellation" is a useful way to visualize the process of subject formation. Althusser described this as the bringing of a social relation into a state of being through his famous street metaphor: "Hey, you there!" (174). In Althusser's original formation ideology and interpellation exist as one: ideology recruits a subject and is materialized in the process of interpellation, which is also the conceptual form of the particular ideology (the nature of which is not really important). The role of "power" (in Althusser inextricably linked to the operations of capitalist state apparatus) is to obscure the hailing action and couch the subjectivity in ideological immutability. This is a powerful way of imagining how political-economic subjectivities come into being but its privileging of socio-governmental structures presents some problems for this case study. In this case, the action of hailing is less a reflection of state structure than it is of both the idea of culture as a mediator and the historically conditioned agency of both human and non-human actors.

Drawing on Paul Robbins (2007) to further this point, the hailing is, in part, conducted by the Marcellus Shale itself. Speaking of the American lawn Robbins notes that "desire and diazinon [*a lawn care chemical*] are demanded by the lawns, if not by the grasses that constitute them." "When it becomes dry," Robbins continues, "its signals are apparent to homeowners, whose response is an act of subjection, not only to the lawn, but also to the ideology of community and the international concept of turf maintenance" (Robbins, 16). Subjects have to recognize themselves as such in order to "respond accordingly" to a commoditized landscape that, within capitalism, has certain needs and a variety of applications. Resistance to this operation, interpellated through other ideas of

landscape, other forms of production, and other formulations about the “proper” relationship between nature and society are also subjectivities that operate through networks of communication and activism.

Indeed, the shale, like the lawn, can be envisioned as a “political and economic network,” that “gathers together, enrolls, and connects human and non-human actors under its own momentum” (Robbins, 14). Thus the actors and “cultures” implicated in processes unfolding around and through the shale are not “independent” or discrete but are “made to be [the way they are] by virtue of [their] relationship to all the other parts of the assemblage” (Ibid). Emergent subjectivities do not exist “outside of a political and economic history in which property, citizenship, and proper consumer behavior are conjoined,” (Ibid, 17) but only in relation to these processes as something to be made and re-made, hailed and re-hailed, to give meaning to fears and promises and mitigate inherent conceptual dissonances.

To help elucidate some aspects of this context, I have chosen to imagine the processes and practices examined here as co-constitutive with particular landscapes – political, material, economic, cultural, and environmental. This is in order to provide some consistency and reflect the sense of boundedness implied by the geographical referent to “the Marcellus Shale,” a geological entity with defined, albeit porous and somewhat arbitrary, boundaries. Yet this shale formation is adjacent to a variety of others and the production of natural gas is clearly implicated in international networks of trade and transportation. To draw on Appadurai’s (1996) notion of late modernity, natural gas and the industries, conflicts, and – dare I say – “cultures” that surround it are truly “at large,” both physically and conceptually. However, this is not to suggest a free

flow of ideas and capital over a flat ontological landscape where only momentum and brute power decides which ideology wins. These flows, and the social relationships created in attempts to “dam” them are intentional political moments (Appadurai, 80).

The role natural gas plays in today’s neoliberal landscape is illustrative of this point. As little more than a cursory glance at the television or a quick web search can demonstrate, natural gas is marketed as the solution to America’s energy “crisis” and an important commodity implicated in economic growth and job creation. Furthermore, the gas industry makes spatial references and vaguely nationalistic sentiment an active part of its marketing strategy: “The established, scientific consensus is that our nation has as much gas as Saudi Arabia has oil. We are the envy of the world for this natural abundance. It is time we put it to greater use for our nation’s economy, environment, and security.”¹⁴ Here, the industry becomes the guardian of unfettered trade and the global free market, as well as the protector of America’s national security and a great patron of the environment.¹⁵ Contradictorily, the boundedness of the American state is also drawn upon in an invocation of exceptionalism, but this is only to place the American resource endowment within the context of fluid global competition. Social organization against extraction is imagined as a rupture in this flow and a direct assault on the order of things: a challenge the neoliberal world as it *ought to be*. Resisting the generalizations inherent to this process - as noted by the defense of the local economy in Geneva - hinders the ability of the gas-commodity to flow (from the ground, as capital waiting to be valorized,

¹⁴ www.anga.us/srdlanding

¹⁵ Although a variety of research indicates that the industry’s claims that natural gas is necessarily cleaner than petroleum are dubious. Correlative forms of pollution including methane leaks and increased truck traffic have been noted and studies suggest that the increased cleanliness of natural gas may be insignificant, especially if the entire lifetime of the resource – from drilling to consumption – is taken into account. See for instance Howarth (2011) and http://www.nytimes.com/2011/04/12/business/energy-environment/12gas.html?pagewanted=1&_r=1.

through pipelines, into our homes or onto tankers for shipment elsewhere) and thus acts directly against the primary engine driving leasing and speculation. I am reminded here of a passage from Lenin (2008):

[Finance] capital is not only interested in the already known sources of raw materials; it is also interested in potential sources of raw materials, because present-day technical development is extremely rapid, and because land which is useless today may be made fertile tomorrow if new methods are applied (to devise these new methods a big bank can equip a whole expedition of engineers, agricultural experts, etc.) and large amounts of capital are invested. This also applies to prospecting for minerals, to new methods of working up and utilizing raw materials, etc., etc.

Capital, in this sense, “cannot abide a limit” (Marx 1858). Furthermore, the political motive of a world of unfettered flows – “free trade” being the most notable example in this instance – is naturalized as an essential state of being, thus obscuring the variety of enclosures needed in order for this system of “fluidity” to work. Doreen Massey’s (2010) critique of globalization, though not directly related to hydrofracking, provides valuable insight into this process. Massey considers neoliberal globalization “*aspatial*”; spaces not yet “part” of the globalized world have their futures “occluded” by a robust teleology. “Mali and Chad,” notes Massey, are “not yet drawn into the global community of instantaneous communication.” “Don’t worry; they soon will be. Soon they will, in this regard, be like ‘us’” (82). Adapted to the situation in question, if natural gas has not been extracted *here*, it soon will be, with propitious results for neoliberal capitalism, or so the industry would have us believe. In the process the gas is brought into “proper” relation with capital and industry, and takes its rightful place as the fuel of growth and accumulation. However, for many Marcellus residents this is experienced not as a promising economic development but as a fundamental – and fundamentally negative – transformation. I am reminded of the fears of community change expressed in Geneva as well as anxiety over a sense of enclosure in Throop. In both cases concerned

residents felt they were being surrounded and isolated, their communities slowly being integrated into a foreign and unwelcome regime of industrial production. The feeling of inevitability prompted by the fracking boom plays a double role, bracketing debate as well as contradicting notions of fluidity; “space has been marshaled under the sign of time” and people and places not yet part of the inevitable rising tide “have no space – precisely – to tell different stories, to follow another path” (Ibid). As Massey notes it is this enclosure, with all its contradictions and paradoxes, which gives the imaginary of fluidity its power.

As was evident in Throop, the discourse of “powerlessness” in the face of an “ineluctable” future either acts to resign people to a certain fate or create a constant sense of trepidation (Ibid). Like globalization, the naturalized commoditization of resource endowments acts as a veil, and “the consequent occlusion of the contemporaneous multiplicity of the spatial occludes also the nature of the relations in play” (Ibid, 83). To draw on Marston et al (2005), “conceptualizations of ‘global flows’ become double abstractions, harnessed *a priori* to a fluid imaginary of pure mobility, while also flying over the materialities they endeavor to explain.”

Thus, the industry’s claim that it is “*time*” to drill because of the specific conditions of global capitalism acts to obscure the spaces of resistance and difference (of opinion, of perception of landscape, etc) that inhere in this process, as well as the particularities of the physical, geologic space that contains the gas and the potential problems drilling in this environment might incur. These occlusions, and the potential for profit, accumulation, and, of course, conflict that they engender, are made possible by a key series of contradictions.

Notable in this regard is the legal status of natural gas as a “fugitive” resource. Thousands of feet below the surface, the gas flows through the Marcellus formation, transgressing surface-level individual property, municipal, and state boundaries. Because of this ambiguity in relation to property, the ownership of the gas – and by extension the ability or right to commoditize it – is quite complicated. Along with oil and gas, the problems inherent to fugitive resources have been examined in water politics, common resource allocation, and fisheries and wildlife harvesting and management (Goodwin and Shepard 1979; Campbell, Herrick Jr., and Squires 2000; Naughton-Treves and Sanderson 1995). To quote Naughton-Treves and Sanderson (1995, 1266) the questions that inhere in this debate are related to both property and management: “whose [property] is it” and “how do we govern it?” As the authors note, “these questions are doubly important” when the controversy is political, i.e. when it exists in the “realm of publically contested issues, in which state and civil society determine the allocation of values among a politically constituted community” (Ibid).

Natural gas, as a subterranean fugitive resource, cannot be properly “owned” unless it is brought to the surface. The landowner whose parcel lies atop a presumed gas deposit possesses the correlative right to mine the gas. Since the typical landowner simply does not have the available resources to extract shale gas independently this process has to be conducted by a drilling concern. When a parcel of land is leased to a gas company for extraction and/or exploration, the owner of the land is transferring a right of possession; from that point onward the gas company “owns” the extracted resource as well as the right to extract it. The landowner is paid a fee per-acreage as well

as a variable percentage of profits gleaned from gas sold.¹⁶ In this process, the dynamics of gas leasing are reduced to possession and ownership. As legal expert Chris Denton noted in Geneva, it is “a complex business transaction masquerading as a lottery ticket.”¹⁷

Considering the importance of fluidity in neoliberal capitalism, this process illuminates an interesting contradiction. The imagined fluidity that is essential to the trade of commodities depends upon an immobilization; in order to be owned and subsequently transformed, gas has to be extracted, “stopped,” and sequestered in reservoirs then “owned” by a company powerful enough to extract it. Yet the ability of gas to valorize as capital is once again dependent upon its re-mobilization: its movements through economized space via truck traffic, pipelines, and the global networks of capitalist trade. In actuality, the “visibility” of the resource is never realized; no one “sees” natural gas, only the material artifacts of its representation as mobile commodity. It comes to signify the supposed incontrovertibility of its monetary form – a timeless resource, intrinsically linked to the engines of capitalist growth and progress, indeed the very *fuel* of that progress – as well as the embodiment of the economic potential of mobility, carrying progress forward and beyond, leaving untold riches in its path. A

¹⁶The credit for this explanation lies with lawyer Chris Denton of Elmira, NY who articulated it to me at the Finger Lakes regional conference. Denton, a leading legal expert on the gas industry, has made his name representing landowners and coalitions in an attempt to gain more favorable terms on lease negotiations. Collectively, his clients represent hundreds of thousands of acres in New York State. The leasing situation in New York (but not Pennsylvania) is further complicated by the possibility of “compulsory integration.” By this law, the state’s Department of Environmental Conservation sets a bounded “spacing unit” of up to 640 acres “from which one producing well or a cluster of wells may be drilled to draw gas from a specific reservoir.” If at least 60% of the land within that unit has been leased by other landowners, remaining holdouts “may be required to participate” in the unit. The integrated landowners will then be presented with a few “royalty” options “depending on the amount of risk or cost they are willing to assume up front.” For this discussion and a brief bio of Denton see http://webapps.co.sullivan.ny.us/docs/dpem/gasdrilling/SC_Gas_Forum_2010Jun29_program.pdf. See also NYS Department of Environmental Conservation, “Notices of Intent to Issue Well Permits in Spacing Units Which Conform to Statewide Spacing in New York State,” 2008. Available at http://www.dec.ny.gov/dmndata/Well_Reports/Unit_Spacing_SW_Rpt.html

¹⁷ Chris Denton, “Negotiating Financial and Surface Use: Components of the Oil and Gas Lease,” Finger Lakes Proactive Management Conference, 22 July 2011.

variety of slogans carry this message forth: “You could share in the windfall”; “cash in on the shale boom” (Kiplinger’s Personal Finance 2011, 55-59). The sloganeering has its own concealing action, notably obscuring a situation wherein gas tycoons can make billions with little Marcellus gas being produced while smaller-scale (and often economically disadvantaged) landowners are left struggling with leases or possibly in the precarious situation of compulsory integration (see footnote 16).¹⁸

For the industry, gas must be made economically legible. In order for this to occur the nature of the Shale must be constructed as a commodity and actualized through contradictory moments of immobilization and movement. As Latour notes, inscribing legibility on an object must surmount these obstacles of perception by solving the problem of mobilization. “In sum,” Latour (Date unknown, article at bruno-latour.fr, 6) continues, “you have to invent objects which have the properties of being *mobile* but also *immutable*, *presentable*, *readable* and *combinable* with one another.” The object in question here – natural gas – is rendered legible through the contradictory process of commoditization. This process is no less “cultural” than those that craft environmental subjectivities over the Shale. The discourse of neoliberal capitalism, like environmental activism, depends upon relationships with other actors in the network to derive both meaning and power.

These networks are constructed through technological and socio-natural performances and processes mediated by technologies, ideas of place, and representations of landscapes both visible and invisible. Yet the networks and their political and social

¹⁸ This is a reference to Trevor Rees-Jones, Texan owner of Chief Oil and Gas who added an estimated one billion dollars to his personal wealth after Chevron purchased over two hundred thousand acres of Chief-owned land over the Marcellus Shale in early 2011. Rees-Jones was an early entrant into the Marcellus gas rush and purchased much of the land at \$100 an acre starting in 2006 – a fraction of the amount currently demanded for a lease deal. Reported by Forbes.com, 5/4/2011.

elements are not representations in and of themselves; they are performed moments in time and space. The next section will closely appraise how nature, landscape, and community are performed and how they move within each other in intrinsically political ways. Constantly changing subjectivities and landscapes both material and ethical are constructed out of these performances and actualize in vivid political moments where praxes and conducts are assessed and chosen through a mutually constitutive process of subject, landscape, and politics formation. As I hope the next section demonstrates, this process can be deeply productive and transformative, opening the doors for highly fecund forms of activism that center upon community but depend upon mobility through various scales.

Practicing Environmental Politics: Non-Representational Landscapes

Natural Gas Narratives

Sitting at a bar in Port Jervis, New York I have found myself in a rather interesting position for a researcher.¹⁹ I'm on my way to Matamoras, Pennsylvania, just over the Delaware River at the corner of the New York, New Jersey, and Pennsylvania borders to attend a town hall meeting hosted by a prominent environmental activist. I've stopped for dinner at a popular local restaurant and hotel. As it turns out, a number of the guests at the hotel are workers engaged in expanding the Tennessee Pipeline²⁰ over the Delaware to link up with the regionally significant Millenium Pipeline. The new extent of pipeline, which is made of wider pipe that is capable of shipping much larger quantities of gas than the older pipe, will snake through many of Pennsylvania's gas-rich northeastern counties and is implicated in wider networks of pipeline construction throughout the Marcellus Shale. As is abundantly clear by now, fracking and related processes of pipeline development are far from uncontested. Yet the conversation at the bar is lively. The workers, all from out of state, are pleased with the economic opportunity the pipeline project and the Marcellus Shale has provided. Despite environmental and safety concerns including toxic discharges, forest habitat destruction,

¹⁹ This section is drawn from participant observation in the Delaware River valley region in summer 2011.

²⁰ This pipeline, one of the largest in the country, extends from the Gulf of Mexico through Appalachia and up to the Canadian border.

and explosions, this sentiment is not surprising.²¹ As one worker notes, in these economic times people are just happy to be working.

Across the river in the Matamoras town hall, the mood is much less jovial. The meeting, hosted by one of the founding members of perhaps the most influential environmental advocacy organization operating in the Delaware River basin, bears the motto of “Will we Sacrifice Water for Natural Gas?” Matamoras, located in far northeastern Pike County, has not been the site of any active mineral leasing or well applications. However, concerns over the pipeline and leasing in nearby Wayne County are giving the residents a great deal of pause. The kind of talk here is far different from the bar; a much different assessment of environmental risk is at play in the town hall.

Concerns over speed and regulations are voiced consistently and repeatedly. It is noted that Pennsylvania “doesn’t require the highest quality cement.” Furthermore, drilling is fastest in Pennsylvania with the activist noting that on average six permits are granted per day, with 2700 granted in 2010 alone. Eleven environmental violations were handed out in the first six months of 2011; it is noted that though this has “raised the profile” of fracking it has also “destroyed the environment and many communities.” The people in the room, many of whom are farmers, hunters and fishermen, some long term residents, and some newcomers, are particularly angry when confronted with the idea that some Pennsylvanians are “leasing away our finest forests.” In the words of one activist, “89% of the forested upper Delaware can become an industrial landscape.” The continued integrity of the Delaware River basin, a watershed providing water for tens of millions of people in the Northeastern United States, is one motivation to stop this

²¹http://www.philly.com/philly/living/green/20111212_Environmentalists_and_sportsmen_raise_alarms_over_pipelines.html

“industrial expansion.” However, for the activist group represented here, this is intrinsically linked to the preservation of the Delaware as a “Wild and Scenic” river.²² Hydrofracking, not only potentially polluting, will also “change the nature of the Delaware River.” Indeed, I learn later that the activist group hosting this meeting actually filed the petition to have the Delaware designated as “Wild and Scenic” in the first place. Here, the meta-ethics of the protection of water for all and the aesthetic-ethical desire to protect a particular *kind* of river and particular forms of landscape, nature, and economy (some in attendance note that “rural forms” such as agriculture do not produce the kinds of degradation that “industry” does) meet in a complex ways.

The fear of these relationships going out of order – of the gas industry gaining the upper hand because state and federal authorities are “afraid to deal with them” and Wild and Scenic nature being subsumed by drilling rigs – is expressed in many ways, from concern over the changing flavor of onions to the fear that the gas companies will become public utilities and begin exercising eminent domain. For some, including the activists in attendance, the can be halted by pushing for a total moratorium in Pennsylvania until rules and regulations are revamped. But for others, the battle seems lost. When I mention the workers in Port Jervis and ask how activists and residents might respond to the economic arguments in favor of drilling one resident notes that “all they [*the state government*] care about is ‘jobs, jobs, jobs.’ What about our water?” Another resident, upon seeing a map of the Marcellus Shale and the proximity of wells to Pike County responds rather bluntly: “So we’re screwed.”

²² This designation, made law in 1968, is intended to preserve rivers with “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, cultural, or other similar values.” The upper and middle Delaware, the region examined in this study, achieved this classification in 1978. See <http://www.rivers.gov/>.

Mobilization and Construction of Nature

I will return to Matamoras shortly, but first it is important to lay some theoretical groundwork that will help trace some of the practices implicated in the emergence of Marcellus subjects and the creation of non-representational landscapes. In the Matamoras borough hall and countless others like it, in conference rooms and high school gymnasiums, in the living rooms and schoolhouses throughout the region, political-environmental subjects and with them new landscapes and contested natures are being created, performed, and enacted. During the time I spent with people on the front lines of the fracking debate I noticed a wide variability in how nature was imagined and how the anxieties associated with industrial development of natural gas were processed. However, the consistent articulation of constructed natures with emergent political subjectivities was noticeable in all cases. Practice and performance assume significance in this instance and can potentiate politically valuable notions of community and place.

Following from Thrift (2007) this focus on practice asks us to look “beyond” the representational, into the world of practice, performance, and enactment in order to negotiate the relationship between people, culture, and nature in a manner which attempts to comprehend how “social” understandings of the “natural” world are formed. I do not wish to forget the important role “conceptual dichotomies” have performed, namely “making sense of the world and maintaining it in place” (Ivakhiv 2008, 259). But in kinship with literature moving beyond the nature/society dualism, I am considering the “natural” as a perceptual element “deeply embedded in all social forms” (Goldman and Schurman 2000, 564). Thus the practices, politics, and constructed landscapes examined here will be viewed as nodes in networks of what have variably been called “social

natures” (Castree 2005) and “nature-cultures” (Latour 1997). Through this lens, these practices are constituents in and of a relational world where human and non-human elements are “simultaneously construct(ed)” (Latour 1997, 107). In order for this to occur, “nature,” as it is known, must be “mobilized” (Ibid., 97).

In order to better articulate the relationship between environmental politics and constructed, mobilized natures it is helpful to clarify what is meant by both construction and “nature” in this case. This said the task remains somewhat daunting since, as Demeritt (2006) notes, there are a wide variety of constructionist approaches to nature as well as a number of meanings “nature” can take. In Demeritt’s view, forms of constructionism range from the positivist “construction as refutation” argument on one side which intends to refute poorly constructed forms of nature and replace them with new more accurate ones to radical critiques such as those advanced by fields such as the sociology of scientific knowledge (SSK). The further edges of the latter field, according to Demeritt, imagine natural phenomena as socially constructed “in the same way that national identity or beautiful music are: it is only our conventional belief in their existence that makes them ontologically ‘real’ (773). My own position lies somewhere in between; I am more interested in the practices that create nature as it is known than I am in the characteristics of nature as object.

The stance taken on this issue is of deep epistemological resonance. In my view, the construction of particular natures can not be alienated from socio-political and historical context; as these contexts vary so too will the manner in which nature is constructed. Thus for some, concerns over a “Wild and Scenic” river and the potential for water pollution cede to economic exigencies and the potential for job growth. As I

mentioned earlier however, clear social distinctions are difficult to draw in this case. I have encountered farmers both virulently against fracking and others deeply supportive. One informant considered himself an avid environmentalist in favor of “keeping the land pristine” but still leased his land because “it was going to happen anyway.” Some residents who could have benefitted financially from leasing have chosen not to; other residents who haven’t seen much money at all still chose to lease. How nature is imagined and represented and how this construct is put to use is deeply implicated in the tenor of debate.

However, “nature,” like the idea of construction, can be a rather duplicitous term. Demeritt identifies three uses for the term: “Nature i” is “the essential quality or character” of a particular object, person, thought, etc. (777). Typically, constructionism appraises this form of nature in an “anti-essentialist” light arguing that it is “contingent and socially constructed” rather than the absolute and foundational essence of object X (Ibid.). Broadly, I agree with this contention to the extent that, for instance, natural gas is not a commodity in its “natural form,” but rather had to be constructed as one through historically and socially contingent processes (more on this in a moment). Demeritt’s “Nature ii” can be imagined as a set of immutable rules which govern the world, human behavior “or both” (Ibid). This nature serves a double role as a system of identification whereby objects or behaviors can be stacked up against “the rules” in order to determine what is or is not “natural.” Finally, and in relation to the first two points, Demeritt outlines “Nature iii” or “the external, material world its self”; the total realm, pre-existing both human action and thought (778). This is perhaps the most problematic nature, since

ideas of what exists within it and what lies apart (particularly humans and the role of cognition) are deeply contested.

Once again, how natural gas is actualized economically can give us some insight into how social processes interface with constructions of nature. As I mentioned earlier, gas is “fugitive” in its pre-human form. This makes exploration and ownership of the gas rather problematic. To reiterate, a landowner approached with a leasing offer possesses the correlative right to mine; if the lease is finalized, this right and the attendant ownership of the resource (predicated on its movement to the surface) is transferred to the gas company. Examining this process using Demeritt’s natures illuminates the sociality of nature and how the ostensibly natural informs the social: the “original” state of the resource (Nature i) is fugitive and invisible, and thus economically illegible. This state is subject to the laws of nature (Nature ii) which allow it to be identified as something “natural,” as well as imbue it with the apparently inherent utility of combustibility. This identification places the resource in an external, value-free environment (Nature iii) which has been disciplined from the “outside” under a regime of property. Yet to make the *gas* property it must be removed from its Nature iii (the shale), have its Nature i fundamentally altered through immobilization and finally be subjected to a new set of laws (Nature ii), the “man made” laws of capitalist property which have been – somewhat paradoxically – naturalized (Macpherson 1978). Because this extraction and transformation has consequences that extend beyond those directly involved in producing the gas-commodity, the interplay of human and non-human stretches across boundaries of space, law, ethics, culture, and politics.

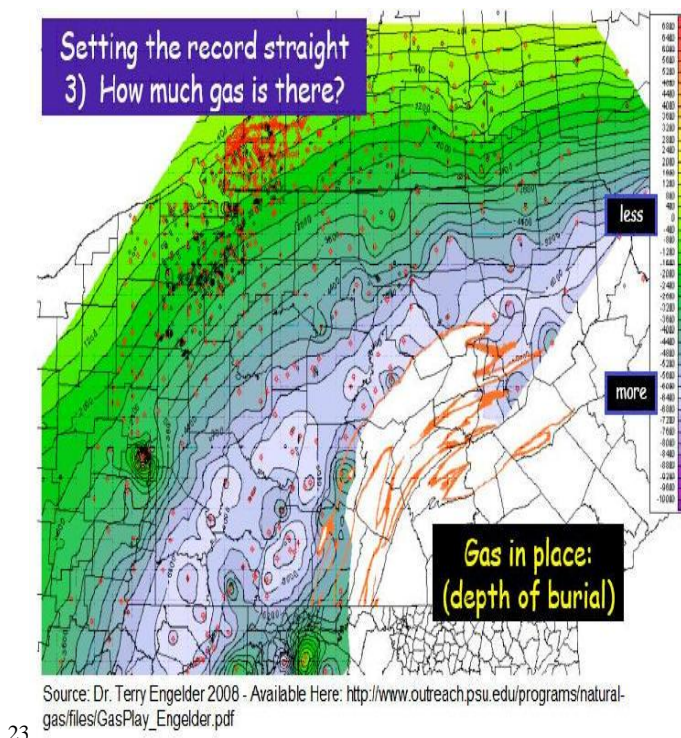
Ultimately, I agree with Demeritt that the *act of construction* (“the verb ‘construct’”) must be privileged over the metaphysical entities (the “constructs”) in order to make “arguments regarding the construction of nature . . . more precise and more convincing” (Demeritt, 786). However, this is not to obscure the importance of the material construct; how people imagine what the shale and the non-human world around it “is” makes a difference in crafting subjectivities. Thus, the human and the non-human are constituted in each other and a disciplining force exists in this constitution. I contend that the relationship between the construction of nature and the construction of new environmental subjects can be – and often is – harnessed by those affected by fracking in deeply politically productive ways. I will return to Matamoras to illustrate how some of these processes play out in relation to the observation of representations of space.

Maps and the Performance of Environmental Politics

When I left off, a concerned resident of Matamoras had bluntly stated his feelings about fracking based on the location of his town on a typical Marcellus Shale map. His point was succinct: “So we’re screwed.” The map was met with fear in the room; this is not a unique situation. In nearly every such meeting I have attended the Marcellus maps appear, the attendees place themselves on the maps, and often react with anger and shock over the extent of the shale and how this might harm them. However, the sense of exasperation expressed by many residents often cedes to a re-politicized landscape both in terms of the shale as represented and the material relations between people. The shale maps, no longer mere representations of space, become deeply implicated in the construction of environmental politics. Interestingly, this practice is linked with the basics of cartographic practice; maps with isopleths showing areas of concentrated gas are greeted with more trepidation as they can help to indicate which regions will be on the receiving end of more drilling.

But as I mentioned, Matamoras, in the northeastern corner of Pennsylvania on a tri-state border with New York and New Jersey, is not in an area of high gas density, at least not as represented on the map. Fears here are related both the sense of closeness to high density areas engendered by the map as well as corollaries such as increased truck traffic, degraded water quality, construction of nearby pipelines in New York and New Jersey, and the perception of a change in “community character,” an idea that came up quite often in Matamoras as well as elsewhere. Politics, in this case, can be seen as elements of wider networks and ethical landscapes. Maps are one mediator in the emergence of these politics and the attendant understandings of nature that co-occur.

The inclusion of some aspects of feminist epistemology is helpful in understanding the possibility of a non-representation landscape vis a vis a processual cartography. In critiquing the technocratic “masculine gaze” Gillian Rose (1993) has criticized observational landscape politics for interpreting landscape as “a feminine body” demanding examination by “the cultured knowledgeable look” in an act of “masculinist power.” Rose’s points are well taken, especially considering the history of landscape observation and mapping as tools of imperial conquest (Cosgrove 1985). However, Catherine Nash (1996) notes that despite the conflation of landscape with “generalized notions of masculinism, imperialism, and oppression” the idea can be “reclaimed” by attending to the “multiple and mobile identifications with and ways of seeing landscape” (Nash 1996, 157). Indeed, in this case the inverse of a traditional understanding of landscape, nature, and the role of maps appears to be true. The subject is formed not through a one-way observation of nature in opposition to another “industrial” imaginary but through a complex network of interaction between representations, ideas of the natural, and environmental discourse.



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The maps, for their part, are necessary nodes in networks that extend far beyond the Matamoras town hall; they give shape to fears and mediate emergent politics by providing strata for the invisible. Indeed, the gas in the Marcellus formation is subterranean and fugitive; maps and other representations are needed to make the resource legible. As we have seen, this legibility is a dynamic moment productive of both economic possibility (and the process of commoditization that comes with it) as well as confusion, fears, and – ultimately – forms of environmental subjects.

Representations of the shale thus articulate with other elements in the shale network including economic systems and ideological concerns such as the idea of a

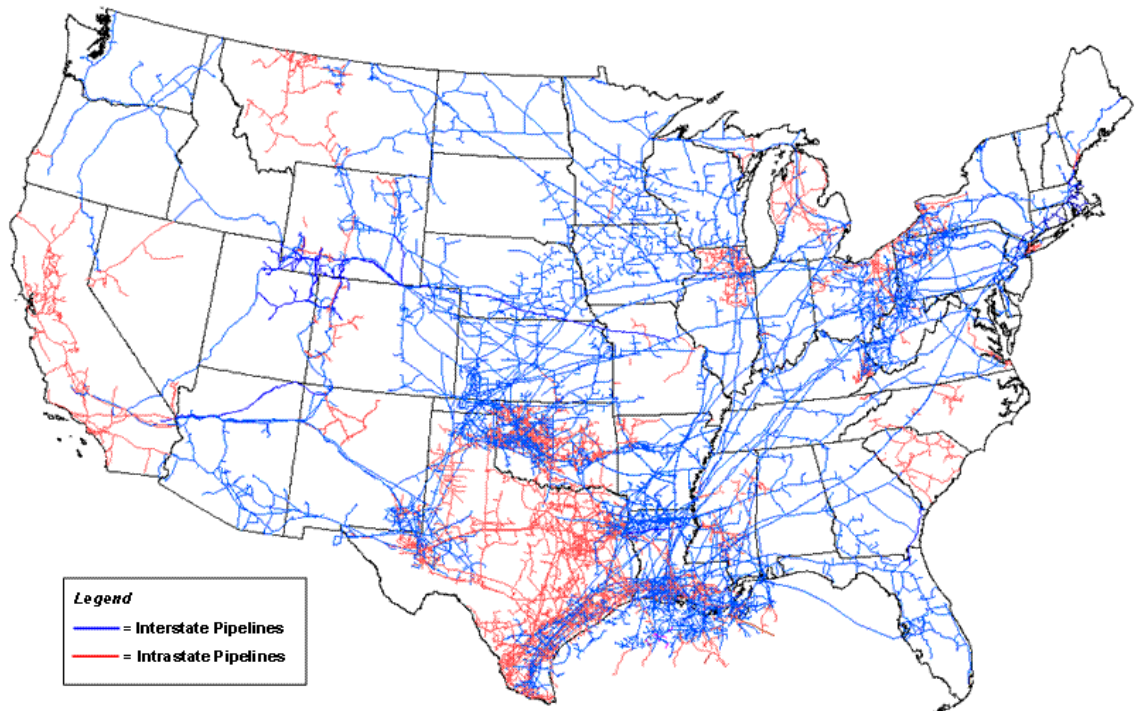
²³ Penn State geoscientist Terry Engelder's ubiquitous gas level map. This is the particular map which caused the tension in Matamoras and was also featured in a variety of other activist meetings in, for example, Bethel and Onandaga, NY as well as academic conferences in Altoon, PA and Geneva, NY. It has also made appearances in a variety of emails, letters and other documentary sources. It has the unique position of being popular among both anti-drilling activists and industry representatives, obviously with different implications. Dr. Engelder, through his calculation of the quantity of Marcellus gas, was instrumental in "putting the Marcellus on the map." See <http://www.post-gazette.com/pg/11079/1133325-503.stm>.

“Wild and Scenic” river in a process of identity and politics formation. In this instance, maps are not discrete representations of nature but elements of what Latour has called a “spatial practice,” mutually constitutive with ethical landscapes (Latour, “Visualization and Cognition” date unknown, available at bruno.latour.fr). To imagine the shale, maps, and human actors in such a way moves beyond a mere politics of representation. Instead, the shale becomes a space in which economic and ethical modalities are performed and enacted; a nexus of conduct and variable relationships to nature are carried in this performance. Simultaneously, codes of conduct and forms of environmental knowledge are extracted from the shale (along with the economic product – natural gas) to mutually produce both discourse and material reality, and thus the landscapes in question.

This isn’t to say that, in Lefebvre’s (1991, 38-39) terms, conflicts between *representations of space* (“conceptualized space, the space of scientists, planners, urbanists, technocratic subdividers and social engineers”) and *representational spaces* (“space as directly *lived* through its associated images and symbols, and hence the space of ‘inhabitants’ and ‘users’”) don’t matter. My goal is more to expand this agenda by imagining the map as a living document. Moreover, both sides of the fracking debate are replete with representations of space, and thus representations of ethical landscapes; the prosperous economic space of a revived downtown in the midst of a gas boom has been a powerful representation which carries with it certain assumed ethical-political formulations, i.e. the beneficence of industry and the importance of economic growth. The relationship between this spatial imaginary and the map pictured above is obviously far different than that expressed in Matamoras. Conversely, the representation of an untouched “natural” or “pristine” landscape has been equally seductive and is equally

rich with a multiplicity of actors, agents, and emergent discourses. However, the demarcations between these representations and their coeval *representational spaces* are, at best, blurry and fluid. The Marcellus maps become “spaces into which” new subjectivities and relationships to nature can be “projected” (St Martin 2009, 504). “Local desires” and “environmental knowledge” can be drawn from maps; in turn, the maps help to mold these desires and ground knowledge in a manner productive of politics and, sometimes, political possibility (St Martin 2009, 502).

On this point, shale maps need not only produce a politics of fear. Indeed, the maps elicit a wide variety of responses and are productive of diverse politics. Over the course of this project I often asked informants to respond to maps, some of which only obliquely implied “the shale” as an entity. One such map was the following:



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

This map²⁴, representing oil and gas pipelines in the continental United States as of 2010, often brought to the surface a wealth of desires and political sentiments. Rather visible in this representation are the clustered pipelines of the oil and gas plays in Texas and Oklahoma, the refineries of the Gulf coast, and the increasingly dense pipelines over the Marcellus in western Pennsylvania, western New York and West Virginia. Visible in the Southern Tier of New York, just north of the tri-state border of New York, New Jersey and Pennsylvania is the Millennium Pipeline which stretches across the Southern Tier and serves as an extremely visible reminder of the power of commoditized natural gas to shape landscapes and alter both local economies and natural imaginaries.²⁵ For many, this map engendered a sense of place in a “bigger” or “wider” network: one with implications far beyond the northeastern extent of the Marcellus formation. For some, the expressed desire was couched in local political sentiment; these respondents did not want to “be like” the western shale counties and sought to curtail further pipeline development in order to “protect the Delaware” as well as preserve “ways of life.” In at least one case, this was met with an understanding that some aspects of life would have to change; namely, Americans would have to “consume fewer fossil fuels,” including the ostensibly “cleaner”²⁶ natural gas, and begin creating a “green” energy infrastructure. In many instances, engagement with maps produced a clearer sense of how individuals fit into the shale as agents and as actors in relation with nature. Thus, maps as spatial practice and elements in an environmental imaginary are important mediators of politics and valuable elements of productive activism. To examine some of these issues more

²⁴ Originally from www.marcellusshales.com/marcellusshalemap.html.

²⁵ <http://www.millenniumpipeline.com/>

²⁶ Though, when the entire “life cycle” of Marcellus gas is taken into account the idea that it is necessarily “cleaner” than coal or petroleum is deeply uncertain. See Howarth, Santoro, and Ingraffea (2010).

closely I will turn in closing to anti-fracking activism in Bethel, NY and themes of community, place, and scale in the construction of social natures.

“Speaking Bettelese”: Community and Scalar Politics in Bethel, NY

Bethel, NY, perhaps best known for hosting the Woodstock festival of 1969 is a rather sleepy community in Sullivan County, nestled in the bucolic hills of the southern Catskills. Located just south of New York’s Southern Tier and thus slightly outside of the purview of one of the densest areas of natural gas in the New York section of the Marcellus formation, Bethel has nonetheless emerged as a significant home site for a variety of regionally prominent anti-fracking organizations. This night, I am in attendance at a screening of David Morris’ new film “Frack! The Movie” (2011). The film has been something of a mobile display of anger and urgency, attracting large crowds at showings throughout the Marcellus region, as well as in Hoboken, NJ and Manhattan. Physical alternation of the landscape as well as degradation of water quality features heavily in the film. The river is even anthropomorphized; the upper Delaware is called “humbling” and “generous.” It is a “pristine environment” which is under threat from an “industrial occupation.” Interviewees in the film make salient points regarding a sense of enclosure; as one man notes, residents of the region have to resist becoming part of an “energy extraction colony.” This is the first direct reference to colonization (but certainly not “occupation”) that I have heard. Another man notes that he is “not interested in being in a third world contaminated waste land.” For his part, director David Morris has personal stakes in this fight. Morris, a resident of heavily-leased Hancock, NY in nearby Delaware County is neighbors with the owner of the largest leased plot in Hancock: a plot of 2800 acres which paid out a nearly \$16 million bonus.²⁷

²⁷ Since a number of my informants have residences or property in Hancock the identity of this landowner is known to me. I will not reprint his name here, but I will note that he has been an active and vocal supporter of hydrofracking in the region and is a fixture at open debates, zoning board meetings, and town halls in Delaware County.

After the film ends a lively discussion breaks out. Many of the people at the assembly are concerned with the fact that gas rig workers are “not from here.” One Bethel resident goes so far as to call them “gypsies,” implying that they are stateless, placeless people who will not contribute to the local economy or do much of anything for the betterment of the community. It seems that residents fear an invasion by faceless corporate giants, led by a vanguard of unwelcome workers and all the concomitant traffic, air and noise pollution, and the potential for environmental catastrophe. The placelessness of this “invasion” is particularly noticeable in contrast to the community of Bethel, which appears to have a very clear sense of place. This moves the debate beyond pollution, beyond merely drilling and into a world of ethical landscapes and visions of community.

As Escobar (2001) has famously noted, “culture sits in places.” Place, Escobar notes, “or more accurately the defense of constructions of place” has taken a front seat as an “important object of struggle” in many social movements. Furthermore, Escobar has noted that place is not “a scale” but a “location,” a concept around which boundaries must be constructed as an “important aspect of the active material and cultural production of place by groups of people that, while heterogeneous and diverse, do share . . . the here and now of social practice” (152). Thus, place is an embodied experience “of and from” a particular location with a “sense of boundaries” and an inherent link to one’s practices. Place, as it were, is an “event” (Ibid.). “The erasure of place,” Escobar continues, “is a reflection of the asymmetry that exists between the global and the local in much contemporary literature on globalization, in which the global is associated with space, capital, history, and agency while the local, conversely, is linked to place, labor and

tradition” (155). In Bethel, the material equivalent of this discursive asymmetry is not lost on concerned people. As one resident says, “the most powerful corporations in the world want to turn the Catskills into an industrial wasteland.” “Its like an alien coming to our land and saying we’re going to rape you and throw you out.”

Despite such morbid metaphors the tone at meetings I attended in Bethel was never dark for long. There is always a sense of momentum, but one of an intensely local character. In this environment, one activist notes, “You have to speak Bethese. If you want to get something done, you have to speak the language. If gas from elsewhere communicates with Bethel’s underground rivers it becomes a political issue. But we have to keep it very local.” However, a town resident is quick to note that “Bethel is funded by weekenders, yet they are excluded from town meetings. They should have a say in this.” This comment is met with warm approval and applause at the “Frack! The Movie” meeting. The meaning of community and the forms of boundedness this concept implies cannot be simply abstracted to a representation of the “local”.

To further this argument I point to the case of Craig and Julie, residents of Dimock, Pennsylvania who have dealt first hand with water contamination from both leaked methane and fracking chemicals.²⁸ Their case, perhaps the most emblematic of the fracking debate thus far, involves the realization of many of the risks associated with Marcellus gas. They have become a part of the mobile community of fracking activism, appearing in Bethel to speak after the film and travelling throughout Pennsylvania and New York to “spread the word.” Craig and Julie, who signed a lease with a major drilling company, did so after having been in Dimock for only a short time; within a

²⁸ See <http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=15595&typeid=1>. Josh Fox’s now famous film “Gasland” (2010) also prominently features Dimock and its citizens.

month of signing, their land and water was contaminated and their community was “ruined.” To stop this process and avoid “pitting neighbor against neighbor” Greg noted that “everyone has to talk to everyone they know.” As such, this community, constituted as it was by a group of people from both Bethel and elsewhere – “gypsies” as it were - and with a conflicted desire to incorporate “outsiders” while retaining “local, rural character” became mobile. Community, like the shale gas, is fugitive rather than stationary; this construction moves through the hierarchical scales of political entities, carried in the desires and fears of residents, activists, and tourists alike. Demeritt’s Nature ii, a system of identifying what is “natural” and, I would argue, a means for establishing which forms of conduct are appropriate in particular landscapes, is continually reworked to create a new Nature iii. As a number of activists and residents have told me, people are “a part of (this) nature” and its pollution or destruction is an attack on the whole community. In this regard, community, held but not bound to place, is constituted of a shared ethical praxis; the socio-political moments embodied in the shared experience of activism provide unique insights into the construction of communal meaning.

As it turns out, the mobile community approach to activism appears to be working. On November 18th, 2011 the Delaware River Basin Commission decided to indefinitely postpone a vote that could have lifted a moratorium on drilling in the Delaware River Basin.²⁹ After mass public outcry over the DRBC’s failure to conduct a full environmental examination spilled into demonstrations in Trenton, NJ and a massive

²⁹ The DRBC, a water management agency promulgated in 1961, is responsible for water quality regulations throughout the Delaware River Basin and is thus entreated with protecting the safety of over fifteen million residents. Voting members include the governors of New Jersey, Pennsylvania, Delaware, and New York, as well as a special representative from the Army Corps of Engineers. See <http://www.stateline.org/live/details/story?contentId=614392> and <http://www.state.nj.us/drbc/>.

campaign of letter writing, governors Merrell of Delaware and Cuomo of New York both indicated that they would vote “no” on the proposal. Many of the activists I worked with in Bethel and Matamoras were instrumental in organizing these efforts; though their battle is far from over, their ability to jump scales and to encourage others to do so proved successful in this instance.

Conclusion

As Marx (1990, 182) noted in *Capital*, “the constant repetition of exchange makes it a normal social process.” The mediation of labor, or the embodiment of production, acts as the go-between for the social and natural realms, turning the *stuff* of nature into the valuated *things* of society; in Marx’s terms this is a “metabolic” relationship whereby “use-values” become the “physical bodies of commodities” (133). “When man engages in production,” notes Marx, “he can only proceed as nature does herself, i.e. he can only change the form of the materials” (Ibid). Yet “in this work of modification” man is “constantly helped by natural forces.” Labor, it seems, “is not the only source of material wealth, i.e. of the use-values it produces.” Paraphrasing William Petty, Marx notes that “labor is the father of material wealth, the earth is its mother” (Ibid).

Natural gas as a physical entity is the “child” of the earth and a potential wellspring of material wealth, if only for a few, but it has no innate “use-value.” It is simply the organic byproduct of geologic time and slow processes of decay and decomposition. Its utility, and thus the potential of its valorization as capital, is intrinsically tied to historically contingent “modern” ways of being, forms of consumption, and technological development. Without our homes and our gas driven appliances the potential of a gas-commodity would still lie dormant within a mile of black shale. Yet these relations have come to be and thus, the Marcellus Shale is transformed into a palimpsest of wealth as well as the potential guarantor of American “energy impendence” and economic growth. This is no more the “natural” state of the Shale than that advanced by any other player in the debate. However, historical and

social contingencies – the neoliberal moment, energy crisis/security – have contributed to the construction of the Shale as a pivotal reservoir of a vitally important commodity.

This image of the Shale, created through processes of occlusion and contradiction, is imagined by some as being inherently incongruous with ways of life. These include basic quality concerns such as access to clean water to more esoteric fears such as the idea of a faltering democracy and fears over the destruction of entire systems of production. There are rarely clear winners in these debates and they are likely to continue for the foreseeable future. Yet as they unfold we are left with a variety of abiding questions. How will residents both old and new, tourists, activists, and supporters of drilling coexist in changing landscapes, both physical and ideological? How can we negotiate the complex interaction of constructions and representations of nature, emergent politics, and economic exigencies that characterize this controversy? In part, this project has been an attempt to address these questions by moving beyond representation into a landscape of practice, performance, and action. This action constitutes and is constituted by natural imaginaries, representative imagery, and inter-scalar relationships. Somewhat paradoxically, the forms of community and kinds of politics I have examined here depend both on boundedness – of a “unique” place being subsumed to the industrial machinations of an “outside” force – as well as a mobility of community and the ability of “local” politics born of a sense of particularity to jump scale into other, ostensibly larger socio-political networks.

The wider purpose of this project has been to expound on theories of nature and landscape as they apply to this case. In this regard, I hope that I have illuminated the landscape and social natures of the Marcellus region not as purely visual but rather as

networks that carry with them ethical, socio-political, and even legal implications. I believe that this is both a theoretically rich and politically potent way of imagining these concepts.

Drawing on the medieval German and Danish concepts of *landschaft* and *landskaber* Kenneth Olwig (1996) has attempted to re-imagine landscape as a “substantive” community concept predating the visual/imperial conception I outlined earlier. The *landschaft*, similar to what we know of as a township (and with the attendant legal circumstances) allowed landscape to be conceived of as “a nexus of community, justice, nature, and environmental equity,” rather than simply “territory or scenery” (Olwig 1996, 630-631). In this alternative definition Olwig hopes to revitalize landscape as something with social meaning and political, cultural, and legal importance. It is not enough, Olwig contends, to study landscape as merely a “scenic text” (645). I could not agree more. Adding ideas of nature and representations of space to this mission can help to break through theoretical impasses and provide insight into the forms that nature and activism take and the possibilities inherent to spaces of contestation and inter-scalar articulation.

Bibliography

- Allen, John and Allan Cochrane. 2010. "Assemblages of state power: topological shifts in the organization of government and politics." *Antipode* 42: 1071-1089.
- Althusser, Louis. "Ideology and Ideological State Apparatuses (Notes Toward an Investigation)." In *Lenin and Philosophy and Other Essays*, translated by Ben Brewster, 127-186. New York: Monthly Review Press, 1971.
- Auyero, Javier and Swistun, Debora Alejandra. *Flammable: Environmental Suffering in an Argentine Shantytown*. Oxford: Oxford University Press, 2009.
- Baldwin, Andrew. 2009. "Carbon Nullius and racial rule: race, nature, and the cultural politics of forest carbon in Canada." *Antipode* 41 (2): 231-255.
- Benediktsson, Karl. 2007. "Scenophobia", geography and the aesthetic politics of landscape. *Geografiska Annaler Series B: Human Geography* 89 (3) (09): 203-217.
- Butts, Charles. 1906. The Devonian section near Altoona, Pennsylvania. *The Journal of Geology* 14 (7): 618-630.
- Campbell, Harry, Samuel F. Harrick Jr., and Dale Squires. 2000. "The role of research in fisheries management: the conservation of dolphins in the eastern tropical Pacific and the exploitation of southern bluefin tuna in the southern ocean." *Ocean Development and International Law* 31: 347-375.
- "Cash in on the Shale Boom." 2011. *Kiplinger's Personal Finance* 65: 55-59.
- Castree, Noel. *Nature*. New York: Routledge, 2005.
- Cerulo, Karen A. 1997. Identity construction: New issues, new directions. *Annual Review of Sociology* 23son: 385-409.
- Cooper, Annabel. 2009. Point chev boys and the landscapes of suburban memory: Autobiographies of auckland childhoods. *Gender, Place & Culture: A Journal of Feminist Geography* 16 (2) (04): 121-38.
- Cosgrove, Denis. 1985. Prospect, perspective and the evolution of the landscape idea. *Transactions of the Institute of British Geographers* 10 (1): pp. 45-62.
- Cosgrove, Denis, Barbara Roscoe, and Simon Rycroft. 1996. Landscape and identity at ladybower reservoir and rutland water. *Transactions of the Institute of British Geographers* 21 (3): pp. 534-551.
- Costello, Lauren. 2007. Going bush: The implications of urban-rural migration. *Geographical Research* 45 (1) (03): 85-94.
- Crifasi, Robert R. 2007. A subspecies no more? A mouse, its unstable taxonomy, and western riparian resource conflict. *Cultural Geographies* 14: 511-535.
- Demeritt, David. 2002. What is the "social construction of nature"? A typology and sympathetic critique. *Progress in Human Geography* 26 (6): 767-790.
- Dewey, John. *The Public and its Problems*. Athens: The University of Ohio Press, 1927.
- Dewsbury, J.D. 2003. Witnessing space: 'Knowledge without contemplation.' *Environment and Planning A* 35: 1907-1932.
- Emery, Marla R., and Alan R. Pierce. 2005. Interrupting the telos: locating subsistence in contemporary US forests. *Environment and Planning A* 37: 981-993.
- Escobar, Arturo. 2001. Culture sits in places: reflections on globalism and subaltern strategies of localization. *Political Geography* 20: 139-174.
- Ferguson, James. *Expectations of Modernity*. Los Angeles: University of California Press, 1999.

- Gibson-Graham, J.K. 2003. An ethics of the local. *Rethinking Marxism* 15 (1): 49-74.
- Gibson-Graham, J.K. 1996. *The End of Capitalism (As We Knew It)*. Minneapolis: The University of Minnesota Press, 2006.
- Goldman, Michael, and Rachel A. Schurman. 2000. Closing the "great divide": New social theory on society and nature. *Annual Review of Sociology* 26 : 563-584.
- Haarstad, Ha and Arnt Floysand. 2007. Globalization and the power of rescaled narratives: a case of opposition to mining in Tambogrande, Peru. *Political Geography* 26: 289-308.
- Halperin, Alex. 2010. Drill, maybe drill? *American Prospect* 21 (4) (05): 16-21.
- Hobson, Margaret Kriz. 2010. The pennsylvania gas rush. *National Journal* (07/31): 8-.
- Howarth, Robert W., Renee Santoro, and Anthony Ingraffea. 2010. Methane and the greenhouse gas footprint of natural gas from shale formations. *Climatic Change*: published with open access at springerlink.com.
- Ivakhiv, Adrian. 2008. Social nature: Collapsing dichotomies without unraveling the fabric of things. *Journal for the Study of Religion, Nature & Culture* 2 (2) (06): 258-268.
- Johnson, Melissa A., and Niemeyer, Emily D. 2008. Ambivalent landscapes: environmental justice in the US-Mexico borderlands. *Human Ecology Online Journal* 36: 371-382.
- Kitchin, Rob and Dodge, Martin. 2007. Rethinking Maps. *Progress in Human Geography* 31 (3): 331-344.
- Kitchin, Rob and Robert Wilton. 2003. Disability activism and the politics of scale. *Canadian Political Geographer* 47: 97-115.
- Kosek, Jake. *Understories: The Political Life of Forests in Northern New Mexico*. Durham: Duke University Press, 2006.
- Krauss, Clifford, and Tom Zeller Jr. 2010. "When a rig moves in next door." *New York Times* (11/07): 1.
- Latour, Bruno. *We Have Never Been Modern*. Cambridge, MA: Harvard University Press, 1997.
- Latour, Bruno. *Reassembling the Social: an Introduction to Actor-Network Theory*. Oxford: Oxford University Press, 2007.
- Latour, Bruno. Visualization and Cognition: Drawing Things Together.
- Lebron, Michael, and Joel Kupferman. 2009. The marcellus shale: A paradigm moment in the struggle for environmental justice? *Guild Notes* 34 (1) (Spring 2009): 6-7.
- Lefebvre, Henri. *The Production of Space*. Malden, MA: Blackwell, 1991.
- Lustgarten, Abraham. April 2009. "Does Natural Gas Drilling Make Water Burn," *Scientific American*. Accessed at www.scientificamerican.com.
- Marx, Karl. *Das Capital: Volume One*. New York: Penguin, 1990.
- Marx, Karl. *Grundrisse: Notebook IV*. Originally published 1858. Accessed at Marxists.org/archive/marx/works/1857/grundrisse/ch08.htm.
- Maloney, Katie. 2010. 'Fracking' has a friend in pennsylvania. *Newsweek* 156 (24) (12/13): 8-.
- Macpherson, C.B. *Property: Mainstream and Critical Positions*. Toronto: University of Toronto Press, 1978.
- Marston, Sallie A., John Paul Jones III, and Keith Woodward. 2005. Human geography without scale. *Transactions of the Institute of British Geographers* 30: 416-432.

- Massey, Doreen. *For Space*. Washington DC: Sage Publications, 2005 (reprinted 2007, 2008, 2009, 2010).
- McCarthy, James. 2002. First world political ecology: lessons from the Wise Use movement. *Environment and Planning A* 34: 1281-1302.
- Merk, Jeroen. 2009. Jumping scale and bridging space in the era of corporate social responsibility: Cross-border labour struggles in the global garment industry. *Third World Quarterly* 30 (3) (04): 599-615.
- Mikesell, Marvin W. 1978. Tradition and innovation in cultural geography. *Annals of the Association of American Geographers* 68 (1) (Mar.): pp. 1-16.
- Mitchell, Don. 1995. There's no such thing as culture: Towards a reconceptualization of the idea of culture in geography. *Transactions of the Institute of British Geographers* 20 (1): pp. 102-116.
- Montgomery, Carl T.; Smith, Michael B. (December 2010). Hydraulic Fracturing: history of an enduring technology. *Journal of Petroleum Technology* 62 (12): 26-32.
- Morris, David. *Frack! The Movie*. Film. Directed by David Morris, 2011.
- Muir, Richard. 1998. Geography and the history of landscape: Half a century of development as recorded in the geographical journal. *The Geographical Journal* 164 (2) (Jul.): pp. 148-154.
- Nash, Catherine. 1996. Reclaiming vision: Looking at landscape and the body. *Gender, Place & Culture: A Journal of Feminist Geography* 3 (2) (07): 149-170.
- Naughton-Treves, Lisa and Steven Sanderson. 1995. Property, politics, and wildlife preservation. *World Development* 23: 1265-1275.
- Olwig, Kenneth R. 2003. Landscape: The lowenthal legacy. *Annals of the Association of American Geographers* 93 (4) (Dec.): pp. 871-877.
- Olwig, Kenneth R. 1996. Recovering the substantive nature of landscape. *Annals of the Association of American Geographers* 86 (4) (Dec.): pp. 630-653.
- Price, Marie, and Martin Lewis. 1993. The reinvention of cultural geography. *Annals of the Association of American Geographers* 83 (1) (Mar.): pp. 1-17.
- Polletta, Francesca, and James M. Jasper. 2001. Collective identity and social movements. *Annual Review of Sociology* 27: pp. 283-305.
- Robbins, Paul. *Lawn People: How Grasses, Weeds, and Chemicals Make Us Who We Are*. Philadelphia: Temple University Press, 2007.
- Rose, Gillian. *Feminism and Geography: the Limits of Geographical Knowledge*. Cambridge: Polity Press, 1993.
- Sahlins, Marshall. "Cosmologies of Capitalism: The Trans-Pacific Sector of 'The World System.'" In *Culture/Power/History: A Reader in Contemporary Social Theory*. Edited by Nicholas B. Dirks, Geoff Eley, and Sherry B. Ortner, 413-455. Princeton: Princeton University Press, 1994.
- Schein, Richard H. 1997. The place of landscape: A conceptual framework for interpreting an american scene. *Annals of the Association of American Geographers* 87 (4) (Dec.): pp. 660-680.
- Small, Mario. 2009. 'How many cases do I need?': On science and the logic of case selection in field-based research." *Ethnography* 10 (5): 5-38.
- Smith, Burnett. 1912. Observations on the structure of some coral beds in the Hamilton Shale. *Proceedings in the Academy of Natural Sciences of Philadelphia* 64: 446-454.

- Smith, Burnett. 1910. Notes on some little-known fishes from the New York Devonian. *Proceedings in the Academy of Natural Sciences of Philadelphia* 62: 656-663.
- Smith, Burnett. 1909. On some Dinichthyid armor plates from the Marcellus Shale. *The American Naturalist* 43 (514): 588-597.
- Smith-Heavenrich, Sue. 1 September 2011. "How Much Gas is Really in the Marcellus Shale," Broader View Weekly.
- Soeder, Daniel. "Preliminary Analysis of the Weathering Potential of Marcellus Shale Drill Cuttings, U.S. Department of Energy, National Energy Technology Laboratory, 2011.
- St Martin, Kevin. 2007. The difference that class makes: Neoliberalization and non-capitalism in the fishing industry of New England. *Antipode* 30 (3): 583-606.
- St Martin, Kevin. 2009. Toward a Cartography of the Commons: Constituting the Political and Economic Possibilities of Place. *The Professional Geographer* 61(4) (Nov.): 493-507.
- Thrift, Nigel. *Non-representational theory: Space, politics, affect*. New York: Routledge, 2007.
- Tilly, Charles. *Stories, Identities, and Political Change*. New York: Rowman and Littlefield, 2003.
- Van Schendel, Willem. 2002. "Geographies of knowing, geographies of ignorance: jumping scale in southeast Asia." *Environment and Planning D: Society and Space* 20: 647.
- Walker, Peter, and Louise Fortmann. 2003. Whose landscape? A political ecology of the 'exurban' sierra. *Cultural Geographies* 10 (4) (10): 469-491.