CHAPTER 13.

LITERACY, PRAXIS AND PARTICIPATION IN ENVIRONMENTAL DELIBERATION

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This chapter considers the ways in which public participants deliberate about environmental risk in regards to high volume hydraulic fracturing for natural gas in their communities. I employ a feminist lens to examine literacies surrounding environmental risk representation. This research compares social constructs of official environmental risk reporting processes in three different states, then explores the ways in which activists counter these literacies through feminist interventionist technical networks that attend to notions of environmental justice and precaution through praxis. This investigation suggests that feminist and praxis-oriented turns within Writing Studies contributes to the complexities and uncertainties inherent in environmental deliberation.

Recent writing studies scholarship considers ways in which researchers can more fully engage with community activism to generate social change. Jeffrey Grabill (2007) argues for the importance of rhetorical invention through "information infrastructures that allow people that make things that matter to them," offering a praxis-oriented opportunity for scholarship within Writing Studies (p. 3). This attention to praxis intersects with feminist scholarship within writing studies to highlight the ways in which technological spaces might transform from top down prescriptive approaches to more clearly "foster identity construction" of those who might be engaging in these spaces (Blair, 2012, p. 63). This meeting point of praxis, technology and feminism informs my own research: What happens when public participants, particularly those who must navigate complex scientific and technical spaces, are able to more fully co-create knowledge about complex environmental risks in their communities? Might such literacies consider a more feminist, contextualized approach to knowledge making about environmental issues?

 This chapter focuses on the literacy practices citizens engage in when making

meaning about their material environments. Here, literacy practices are understood in terms of a social theory of literacy; they are "cultural ways of utilizing written language in which people draw upon in their lives" (Barton & Hamilton, 2000, p.7). By extension, my research explores community literacy practices, which, according to Elenore Long, investigates the rhetorical implications of "discursive sites where ordinary people go public" (2009, p. 15). My research includes document analysis, interviews and think aloud protocols in three adjacent states impacted by hydraulic fracturing: Ohio, Pennsylvania, and New York, each having varied state institutionalized responses to emerging industry.

In this chapter, I first make explicit the theories that intersect feminism and environmental deliberation. My work then interrogates the ways in which public participants attempt to engage in literacies surrounding public environmental risk deliberation as related to the increased practice of high volume hydraulic fracturing (HVHF) technologies and its attendant infrastructure[1]. While participants largely rejected risk participation mechanisms and representation through state and federal mechanisms, it is important to understand public participants' articulations as to *why* they did so, and how these critiques informed counter-literacies. Many participants felt that both materials and online processes, which included broad definitions of "risk" and "regulation" as defined by state and federal agencies routinely oriented users towards what participants noted was a "status quo" approach to industry and environmental risk that ignored local concerns.

In response to exclusions many public participants attempt to navigate, this chapter explores alternative, more inclusive ways by which public participants might deliberate complex environmental risks. Beverly Sauer (2003) suggests that communication scholars might look more deeply at ways varied participants might communicate about risk to "make visible those marginalized forms of representations" (p. 6). I explore how community participants, impacted or potentially impacted by the hydraulic fracturing industry, challenge traditional notions of authority and agency within environmental policy deliberation. Long's (2009) work with community action within rhetorics of environmentalism, community action literacies, and public engagement reveals situated, or contextualized local knowledges, which are uniquely positioned to "invent" ways of making meaning about the environment that is often lost in traditional risk reporting mechanisms sponsored by state and federal institutions. I look at patterns of public participants engaging in counter-literacies, found in material and digital networks, that reimagine knowledge making about environmental policy as informed by feminist interventions that might interrupt dominant pol-

1   The U.S. Geological Survey defines HVHF as a quickly emerging energy source in the United States.

icy and practices of environmental risk representation. Counter-literacies in my study are based in the notion of counter-public discourse—one that offers the opportunity for marginalized voices to offer expertise in public discourse. Localized and contextualized representations of environmental risks are increasingly shared through digital networks among activists, and show broader stakeholder concerns of environmental risk that include environmental justice and precaution ideologies.

THEORETICAL CONSIDERATIONS: WHO CAN ENGAGE AND HOW CAN THEY ENGAGE?

To foreground my study, some definitions and theoretical grounding are necessary to outline concerns about who can (or cannot) engage in public deliberations about environmental risk, and how feminist frameworks within writing studies contribute to this conversation. According to Beverly Sauer (2003), "A feminist analysis reveals both the hidden power structure that governs the construction of a text and the silent and salient privileging of one voice over another" (p. 64), suggesting a critical inspection might be made of what, exactly, is lost by such silencing. The terms *stakeholders, public participants,* and *citizens* are often used interchangeably in research about environmental communication; definitions generally point to the notion that actors should be able to understand or engage in some decision-making processes regarding their material environments (Cox, 2006; Rowe & Frewer, 2004). For the purposes of my study, I define stakeholders, public participants and citizens as actors who deliberate in any way about environmental issues that might impact them. I will use the term *public participants* through this portion of the chapter.

Similarly, it is important to detail the activity of environmental risk deliberation. In this study, public participation and deliberation about environmental risk can happen in many ways, from little or partial public involvement (typical), to full public participation (rare) (Simmons, 2007, p. 38-39). Environmental risk participatory mechanisms, as defined by Rowe and Frewer (2004), are "processes, techniques, instruments" that enable citizens to participate in environmental risk deliberation (p. 252). These deliberations might include public hearings, public surveys, or public written comment processes (Fiorino, 1990).[2] These mechanisms may be spoken, print, or digital; they might require public participants to attend policy meetings in a particular place and time

2   It is important to note that many of these have moved online in the last decade, which causes both affordances and constraints for public participants.

(public hearing), or ask that participants engage in comment via writing (print or digital public comment). Increasingly, these mechanisms fall under scrutiny; Rowe and Frewer (2004) call for more scholarship to attend to imprecise definitions of these mechanisms, uncertainties in execution of mechanisms, and lack of evaluation of these mechanisms.

Environmental deliberation considerations can be informed by feminist approaches from writing studies. Patricia Sullivan's (2012) discussion of "reinterpretation" of composition scholarship involves a "metarhetorical" stance allowing for feminist critique of "methodological assumptions" within composition (p. 127). I extend such a critique to assumptions of literacies that public participants must navigate when attempting to voice an environmental concern. While environmental laws ensure a citizens' legal right to know, right to comment, and right of standing (legal status) about an environmental risk issue that might impact them (Cox, 2006), there are questions about how public participants read and write to navigate these processes and documents, particularly those that employ highly technical and scientific literacies. More importantly, in the case of new industries, such as HVHF, publics also attempt to represent risks within emerging industry; various federal environmental laws do not extend to perceived risk of HVHF due to the Energy Policy Act of 2005. In HVHF deliberation, public participants must navigate and represent complex scientific and technical knowledge to prove "extraordinary circumstances" should participants suspect environmental risk. As such, participants face an often unspoken assumption of having to find and represent "proof" of such loosely defined terms as "significant environmental effect" (Brady, 2011).

Both risk and feminist scholars discuss how public participation is explicitly and implicitly stymied during environmental risk communication; these exclusions are tied to notions of risk representations that are socially situated and socially contested (Beck, 1987; Sauer, 2003). Environmental risk assessment[3] is often linked to certain notions of science; scientific rhetoric reveals nuances of authority, ethos, and the way certain notions of "science" result in prescriptive, top-down approaches to environmental policy. However, several scholars suggest that good policy does not depend on traditional linear models of science expertise; instead, attention is paid to social constructs of science and environmental risk. Feminist science scholars, such as those in Keller and Longino's (1996) edited collection, *Feminism and Science*, have called for more situated studies of science and more complicated notions of "objectivity" and "reflexivity" in science (Haraway, 1996; Harding, 1996). Karen Warren's work (2000), *Ecofemi-*

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3   Bäckstrand notes "Risk assessment is still regarded as the exclusive domain for science experts" (2003, p. 34).

nist Philosophy, explores conceptual intersections between feminism, science and nature. Beverly Sauer's scholarship of risk rhetorics investigates rhetorical and feminist theory in an effort to understand, more deeply, those who participate in science and technology deliberations (2003). Similarly, several sustainability communications scholars call for a more complex notion of post-positive science that includes the use of extended peer communities to address complex, costly and potentially lethal uncertainties (Funtowicz & Ravetz, 1993; Goggin, 2009; McGreavy, Silka & Hart 2012; Wells, 2013; Herndl & Cutlip 2013).

In application to my own study, Royster and Kirsch's (2012) notion of strategic contemplation became salient in seeking patterns noted above within participant literacies. Strategic contemplation is "a space where we can see and hold contradictions without rushing to immediate closure, to neat resolutions, or to cozy hierarchies and binaries. The intent of such strategic contemplation is to render meaningfully, respectfully, honorably the words and works of those whom we study. . ." (p. 21-22). For example, to understand experiences of participants attempting to make meaning about risk in their environments, I took pointers from Selfe and Hawisher (2012) to contextualize the participant's literacy experiences by asking for "elaboration, encouraging them to reflection stories they tell, and, occasionally, telling stories of (our) own when we find points in common" (42). This contextualization yielded unexpected moments of insight into literacy practices participants were navigating. Similarly, as it was important for me to acknowledge the "contextual" and "situated" spaces where and why interventions were being composed, particularly in terms of online spaces, I attend to Haas, Takayoshi and Carr's (2012) suggestion that a researcher "employ the technology under study" to more clearly challenge my own assumptions about online literacy tools and processes used by participants . . . both tools that might alienate and empower them (p. 56). As a concerned citizen myself, I quickly learned that attempting to make meaning through various technological literacies might offer varying levels of affordances and constraints.

ARTICULATING CRITIQUE: INSTITUTIONAL ENVIRONMENTAL RISK PARTICIPATORY MECHANISMS

I begin an analysis of my data with an investigation of how participants in each state interacted with institutional participatory risk mechanisms. Through my research, participants felt that uncertainties about risk within the HVHF industrial activity was positioned as an issue that is managed by experts for profit; Dryzek (2005) refers to this orientation as administrative and economic rationalism. More specifically, while Ohio and Pennsylvania participants noted there has been more representation of "regulation" about hydraulic fracturing on the

institutional website pages or in public meetings, participants revealed that it is "regulation" as defined by expert authorities. Participants in my study were concerned that they had never had a space within public policy deliberation to approach precaution, or to question whether the industrial industry should occur at all. Instead, agencies repeatedly offered "expert" stance on the ability to regulate activities, according to participants, felt had uncertain outcomes in the communities in which they were living. Participants felt that "disclosure" of risks, such as well locators, spill locators, and chemical disclosure such as those found on FracFocus (an online chemical disclosure tool used in each of these states' institutional sites) were intentionally difficult to navigate, even for those who had extensive online technological expertise, did not account for the cumulative effects of chemicals, and had been added after the HVHF industry was widespread versus any deliberation about a precautionary approach to risks of hydraulic fracturing.

When precaution was at times considered, participants often reported that public comment about precaution deliberation was in name only—public participants repeatedly found they often had no agency, even though, at times, there was an opportunity within institutionalized environmental risk participatory mechanisms, to submit a comment. Many times, participants reported meetings for public comment were deliberately designed so that it was difficult for them to attend: meetings were held on short notice with little advertising to local communities, public officials purposefully left little time for public comment, meetings were held during working hours, or required public participants to walk through police barracks to find a meeting room. Even if public comment might be collected, public participants widely noted that such comment was not used in any significant way in expert deliberations. It is at this point that I consciously shift to from referring to actors as "public participants" to "activists" in this chapter. Activists moved to "counter-literacies" because existing institutionalized literacies marginalized their experiences, moving participants to self-identified as "activists."

With the exception of some deliberations of some processes of the HVHF industry in New York, activists felt that institutionalized environmental risk participatory mechanisms did not offer deliberation about the lack of long-term situated studies of the uncertainties of the entire process: drilling, storage, disposal of waste, and transportation before or when widespread hydraulic fracturing practices commenced. Activists, who became so because they not only witnessed, but felt spills, air quality issues, and earthquakes, were frustrated by the minimization of unforeseen issues that could not be regulated (despite assurances). Activists pointed out that the few industry studies that had been completed before the industry commenced were often short term; they did not account

for cumulative and long-term exposure to varied industrial contaminants, or emerging concerns about the effects of this industry on global climate change. Similarly, regulations to known risks applied to short-term industrial activities. Activists had an ethos of belonging to "place" and time that often did not line up with what they saw represented on expert institutional sites or during public meetings. Local inhabitants would live with the disposal of short-term industrial process for a much longer time frame but living with the residual effects of this industry was routinely not acknowledged in HVHF deliberation.

Also, activists found a lack of discussion of cumulative effects of the industrial practices within institutionalized environmental risk participatory mechanisms; scientific air, water, soil studies might be conducted separately (and, again, after the industry has already begun), avoiding a broader tale of what might happen to those living near industrial sites. The practice of hydraulic fracturing, activists pointed out, was deemed "safe" through decontextualized and divided studies of extraction or disposal practices that did not take into account compounded risks to air, water and soil over time. And activists were frustrated by a lack of social inquiry into regulatory guidelines; what happens when industries do not follow recommended regulations which is the case documented in several locations across the three states? While absent corporations might pay a fine for a lapse in regulation, it would be the local people who live for years with the results.

ACTIVIST TECHNICAL NETWORKS: INVENTION AND ENVIRONMENTAL PRAXIS

As a response to the marginalization felt by participants, I explore texts and procedures that participants[4] create in their effort to "rewrite" institutional literate practice. I suggest that such texts and processes are rich places to explore in an effort to provide more inclusive processes for public participation about environmental risks, and suggest that such a feminist approach offers insights into possibilities of praxis as related to environmental risk deliberation.

Simmons and Grabill (2007) note the opportunity for a more inclusive position of citizens in a rhetorical situation, one that is capable of creating knowledge that offers alternatives to dominant environmental risk discourses. This possibility occurs through invention in which "citizens as themselves producers—of knowledge, of values, of communities" (p. 437). This public participant knowledge might inform institutional knowledge making "by creating the institutional space within which risk can be collectively constructed and more effectively communicated" (p. 437). As such, my research extends to some public

4   I make the point of referring to participants as activists to highlight the performative praxis of counter-literacies.

participants whose situated literacies *include* complex networked technologies. One important strand of this discussion is the way in which "technology" and "expertise" need not be separated from public participants. With this said, access to technology is always a concern, so there should be no essentialist assumptions that all participants can and want to access complex technologies, though some do. Judy Wajcman's work articulating the concept of technofeminism is important in my study as it explores the social constructions questioning who might feel comfortable (or not) navigating various technical spaces, and considers a feminist approach to reconsidering those spaces: "Feminist research has been at the forefront of moves to deconstruct the designer/user divide, and that between production and consumption, emphasizing the connectedness of all phases of technological development (Cockburn & Ormrod, 1993)" (as cited in Wajcman, 2007 p. 293). The literacies used by public participants navigating environmental risk are increasingly digital, technical and networked; Herndl and Cutlip (2013) and Grabill (2007) point specifically to environmental activist engagement through technology that situates scientific rhetorical studies towards praxis.

In my data, activists engaged in clear patterns of networks and activities to "counter" the marginalization they feel when working with institutionalized participatory mechanisms. The activist activity often occurs in what Simmons and Grabill (2007) refer to as "distributive activities" (p. 436). Here, individuals within groups represent complex technical information to networked community groups that are "connected to larger rhetorical situations and communication practices" (p. 437).

Research about literate practices of environmental risk reveals publics as active participants in building technological networks accessing and responding to highly technical knowledge vs. passive recipients of technical knowledge from experts. Most activists in my study attended various local, and sometimes state, national and international events as concerned citizens, but reported a fair bit of networking occurred online to inform what was verbalized in a public setting or a publically shared text. In this collection, Ouellette discusses possibilities of digital circulation, invention, and social action: "Moving beyond the notion that rhetorics are individual speech acts, or occasion-bound events, I consider rhetoric as a larger, circulating, affective network of arguments, and thus propose that we rethink our understanding of social action on the web, and see it in terms of circulation" (2018, this collection). Similarly, Royster and Kirsch (2012) refer to the concept of "social circulation" to situate circulation more firmly within a social context: "we wanted a useful metaphor for re-anchoring in a more generative way the convergence of both the values added by the use of feminist ideologies in rhetoric and analyses and the use of rhetorical theories and criti-

cism in feminist analyses, all well considered within a thickly rendered social, political economic, cultural context" (p. 23). Social circulation, then, attends to the many complexities of socially-situated environmental risk representation. Additionally, Royster and Kirsch (2012) note the need for contextualizing complexities of such circulating rhetorical practices: "Noticing. . .rather than ignoring—ecological conditions, or the ethical, political, cultural dimensions of rhetorical enterprises, or the materiality of ideas, arguments, sites, and situations, we come to *rhetoric* as an embodied polylogical social practice that needs to be understood symphonically and in high definition" (p. 94). Understanding the ways in which alternatives to institutional risk circulate within social constructs becomes important in terms of how activists engage in counter literacies to enact praxis within their communities.

SOCIAL MEDIA AND TECHNICAL NETWORKS

Social media sites like Facebook were cited by many activists as a gateway for networks for other, more technical investigations. As a community member in an area impacted by hydraulic fracturing I turned to area activist group sites on Facebook after a seismic event to attempt to find groups that might share information that was not available on Ohio state institutional sites, including local meetings not published on state environmental sites. I also found groups who organized initiatives to invite publics to write letters to pressure the state to disclose earthquake data, which led to my discovering other groups pressuring the state to force companies to disclose chemical make up of HVHF. Many other activists sought social media to seek individuals or groups who were sympathetic to similar environmental risk marginalization experiences.

Others found that social media was an important space to direct activists to forums to share technical risk information not yet represented on institutional sites, and to find activists that might question, or conduct citizen's audits, critiquing the risk information that was on the sites. While there is no way to measure specific levels of "agency" through social media sites like Facebook and activist blogs or websites, these activists began to engage in groups who regularly posted updates about local, state and federal laws, ways to gather information or critique what was represented on institutionalized sites, to find sites and processes that might represent environmental risk in more complexity than on institutionalized sites, to find emerging scientific studies about risks about the production of, storage, and transport of hydraulic fracturing materials, to understand emerging public health studies about varied risks, to find and engage in citizen science opportunities, and to find and engage with professionals (toxicologists, radiation specialists, health experts, etc.) not represented on institutionalized sites who

were willing to work with activists about localized issues related to the hydraulic fracturing industry. Social media oriented activists towards spaces where activists might engage in critical discussion, at with local higher education institutions, to question academic alignment of pro-industry research agendas, to allow activists to about how academic institutions might engage communities in critical conversations about the uncertainties of the complex hydraulic fracturing industry, and to suggest and even demand that universities might invest in research exploring alternative energy technologies and divest from fossil fuel investments. Social media allowed activists to learn about and participate in activist events, including coordinating public comment sponsored by local, state and federal institutions, and, events opposing the limitations of such institutions.

As such, activists began to form identities bolstered by these findings. Again, in this collection, Ouellette points to the following in terms of social circulation: ". . . the emotional reactions and the circulation that results from those reactions determines, in large part, which amplified messages gain velocity and the kinds of social relations that emerge. Such affective circulation further determines what messages/rhetorics endure" (2018)**.** In the case of my study, activists routinely cited that social media was often the "entry" into other, networked sites and activities that allowed for the formation of "counter" representation of risk with varying agency in each state. Activists noted the extensive time spent understanding complexity of risk inherent in hydraulic fracturing by exploring legal documents, mapping (paper and digital), local, state and federal environmental policy, impacts of chemicals in a variety of contextualized scenarios, air quality, and hazardous waste through all parts of production, including transportation and disposal.

NARRATIVE AND MULTI-MODAL REPRESENTATIONS OF ENVIRONMENTAL RISK

Activist interviews revealed patterns of narratives that became socially circulated. Narratives offer important spaces for environmental risk deliberation scholarship, and composition studies are helpful to understand both the limitations, and agency narratives might provide. As writing studies scholar Debra Journet notes, "narratives are still being written against the grain of academic discourse." Journet asks us to consider personal narrative, but to also consider, more clearly, "genred narratives" and how historically, the validity of narratives that "correspond to the reality of the phenomena under discussion" (2012, p.19). At issue with hydraulic fracturing are the competing narratives of risk, and how agency is given to particular narratives. While public comment (if offered) might allow activists to discuss personal, anecdotal experiences in a public setting, scholarship suggests these narratives, even if revealing localized phenomena of risk, often do

not have much agency in the traditional top-down approach to environmental risk decision making.

However, among activists, narratives propel new ways of considering environmental risk, challenging the positioning of "regulation" of an industry by experts without widespread scientific studies. Journet challenges writing studies scholars to think more critically about *how* personal narratives might or might not be privileged in a particular situation. In my study, narratives allowed activists to share personal experiences about HVHF risk among themselves that were not being represented by regulatory institutions. Shared narratives such as those in *Shalefield Stories: A Project of Friends of the Harmed* allowed activists to respond with support, in immediate ways, to those who could not afford, in terms of money and time, for the institutional regulatory to make reparations about possible material environmental damage—to the living organisms in ecological systems which activists contend were affected by HVHF. Narratives allowed activists to contextualize highly technical risk information, such as the information represented on the *FracTracker Alliance* site, which combines data from institutional sites with narrative within multimodal digital storytelling formats.

Similarly, counter-literacy narratives allowed for multi-modal, sophisticated representations of risk shared on community-based risk reporting sites such as the *FracTracker Alliance* site, which re-represents data from state institutional sites, but also sites like Google mapping, to reveal disclosures of wells sites, accidents, spills and proposed pipelines that is not found on easily on state and federal institutional sites. Interfaces on *FracTracker* maps consider feminist geographies[5] to provide risk exploration beyond "permitting" and "regulation" and to more critically interrogate how geographic spacialities of risk are being represented. Activists found that the crowd-sourced images and video clips of all parts of the industry process shared online tell a more contextualized tale of risk, again, a narrative of the industry that institutional sites did not share. The *Frac-Tracker Alliance* site organizes and categorizes risks beyond what institutional sites represented as risks at all, for example, the inclusion of an "environmental justice" tool as a mapping layer allows users to investigate hydraulic fracking more critically.

Also, multi-modality allows for the representation of what material feminist and ecofeminist scholars recognize as the relationship of the flux between the human body and material surroundings; Stacy Alaimo (2007) refers to "trans-corporeal feminism," which suggests that bodies in space become marginalized through toxins created from socio-cultural constructions. "As a particularly vivid

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5   Feminist geography, according to Moss and Falconer Al-Hindi (2000) attends to issues of authority (both claiming and contesting authority) and power in terms of representing spatial phenomena.

example of trans-corporeal space, toxic bodies insist that environmentalism, human health and social justice cannot be severed. They encourage us to imagine ourselves in constant interchange with the 'environment'" (262). Alaimo points to varied, but connected, inquires into the sources and consequences of such toxicity: "the traffic in toxins reveals interconnections between various movements, such as those of environmental health, occupational health, labor movements, environmental justice, environmentalism, ecological medicine, disability rights, green living, anti-globalization, consumer rights, and child welfare" (260).

Material feminist theory underscores how, in my study, activists found ways to represent complex fracking industry results on and within organisms: land, and human bodies and the human social systems that promote such industrial activities. Often, these photos or videos of material risks were shared between activists in cyberspace, but through images, notions of powerful material risk circulated. The results of earthquakes on properties (cracked foundations) was shared among activists long before the Department of Natural Resources in Ohio formally made a formal and official link between injection wells (that store hydraulic fracturing waster) and earthquakes. Maps of trains carrying hazardous materials through densely populated neighborhoods and schools shifted conversations about what officials claimed was the "safe" transport and disposal of fracking waste. Images of children with nosebleeds by those living near hydraulic fracturing compressor stations in several states were widely shared to advance networks of inquiry into possible connections between public health and hydraulic fracturing.

Post-positivist Notions of Science: Environmental Justice and Precaution—Representing Public Health

Several of the activists I have met in my study are involved in persuasive performances in highly technically complex rhetorical spaces; for example, some shared highly technical information about solar or wind technologies that might act as alternative infrastructures for communities. Other stakeholders involved in "citizen science" initiatives are taking active roles in complex, technical, but often localized, scientific studies (Conrad and Hilchey, 2011) to study air or water. But what was noteworthy was the way in which networks of agency invoked when activists investigated issues of public health. These notions of localized sciences within shared networks created knowledge in proactive ways. As noted earlier in this chapter, post-normal notions of science expand notions of uncertainty and risk. Within these systems, powerful new ideologies can be brought to light, with which activists engaged: in this case, environmental justice and decisions based on the precautionary principle are feminist in terms of

a call for ecological democracy, situated in a critique of cultural constructs that lead to marginalization of ecologies and organisms, including people, in them (Dryzek, 2005). Frameworks of environmental justice explore discursive possibilities attending to expanded notions of citizen risk reporting in space and time (Holifield, Porter, & Walker, 2010). Environmental justice attends to resituating discourse about environmental risks due to "the legacy of a disproportionate burden imposed on poor and minority communities by environmental harmful conditions, [and calls for] more inclusive opportunities for those who are most affected to be heard in the decisions made by public agencies" (p. 290, 2006, Cox). Environmental justice frameworks seek more complex ideas about how places are labeled for industrial practices, and how those living in geographically stigmatized spaces, as defined by dominant discourses, might find agency in re-defining place, and, by extension, personal identity. In this collection, Schiappa discusses "intersectionality" as a more complex representation of oppressions: "the fact that many social groups experience oppression along *multiple* planes, and second, that those planes are conceptually and materially *inseparable*" (2018, this collection). This acknowledgement of layers of oppression through time and space is crucial to understand in terms of the silencing of activists through largely ineffective institutional public comment that does not consider the complex marginalization activists feel: there are cumulative issues of air quality, water quality, soil quality, seismic issues, long term economic quality that are not often included in deliberations. Added to this, these fracking activities often occur near locations of economic poverty from past industrial cycles, often in communities that do not have resources or agency to represent these varied risks.

Ideologies of precautionary politics suggest that in complex and uncertain environmental issues, where scientific consensus cannot or has not been reached, the public should not bear the burden of "proving" risks as is currently the case; publics, instead, should be protected if a reasonable risk has been found (Whiteside, 2006). By adopting environmental justice and precautionary ideologies, both feminist in nature, activists were able challenge normate views of the environment as a "resource" to be "managed" or "regulated" that fulfills a dominant economic narrative, and to call of more rigorous and expanded scientific studies.

Environmental justice and precautionary frames are useful for spurring new knowledge making, which was widely represented and shared in the technical reading and writing practices of activists. Activists networked outside of localities to represent risks not sanctioned by institutional environmental in their own states. In Pennsylvania and Ohio, activists were frustrated that there are no statewide spaces to explore issues of human health effects as a result of the hydraulic fracturing industry. Neither Pennsylvania nor Ohio Departments of Health listed any part of the hydraulic fracturing industry (extraction, storage,

or transport) exposure as a concern on their state environmental health data systems. Also, there were no institutionally state-sponsored base-line studies about health and fracking. However, activists pointed to community groups, like the Center for Coalfield Justice, that linked risk of known risks (the coal industry), with other extractive practices which was helpful in networking, particularly along environmental justice argument in Appalachia in both Pennsylvania and Ohio, for positioning legislation for laws to protect ecosystems and people in them. It should be noted that such an approach, though compelling, often not successful as laws regulating hydraulic fracturing simply have yet to be written, and further studies about various impacts of hydraulic fracturing have yet to be funded and executed.

However, in each state, expert/activists in the medical field worked to provide such information to the public, and these works were widely shared among activists. For example, in Pennsylvania, the Southwest Pennsylvania Environmental Health Project provides online resources and health services and monitoring of human bodies and equipment to monitor air quality to those living near gas wells. In Ohio, the Center for Health, Environment and Justice, again, not affiliated with a state agency provides a "Prevent Fracking Harms" page with links to resources about health effects, including a database about emerging health studies, grounded in a recognition of possible embodied risks of this industry, and contextualizing risk in local environments and in local bodies.

Interventions: Counter-Literacies Leading to a New York Ban on HVHF

Simmons and Grabill's (2007) research on communities accessing technology to "invent" and "perform persuasively" valued knowledge given a complex rhetorical situation related to environmental deliberation dovetails nicely with the New York activists I encountered in my study (2007, p. 422). Interestingly, one resource included on the Ohio site Center for Health, Environment and Justice page links to several of New York's deliberations about the decisions to ban fracking in New York State, highlighting the networking that occurs among activists that I observed during my interviews and think aloud protocols across states. The New York State ban on high volume hydraulic fracturing acts as a literate artifact; in many ways is the end result of interactions between grassroots activists and experts in many states sharing and compiling information challenging an industrial "norm" of hydraulic fracturing.

Many activists in my study contributed to knowledge building that resulted in a state-wide ban: sharing studies about emerging health issues in places like Pennsylvania and Ohio and building political and legal cases for bans in various

communities, then networking successes to statewide discussions of the practice. It is important to note that prior to the ban that activists were assured by officials from the New York Department of Conservation that the fracking industry could be regulated and that spills and accidents were extremely rare. However, activists in New York traveled to neighboring states of Ohio and Pennsylvania and witnessed results of explosions, water contamination, and methane leaks. Their "felt" sense of risk, and conversations with their neighbors' perceptions of risk did not match up to the "institutionalized" representations of risk. The Dimock, PA water case (easily accessible to New York), in which industry denied that fracking caused widespread water contamination in the Dimock area, generated investigations by activists into both "knowledge making" about HVHF risk and bans.

Across the state of New York, anti-fracking activists attended public meetings, and flooded local and state public comment. The New York activists I spoke to discussed networks of knowledge that supported this grassroots movement: how to write letters to local, state and federal representatives, how to navigate legal issues to impose industry bans in local areas, (culminating in a "home-rule" orientation which allowed local governments, not the state, to control how drilling might occur, if it occurred at all), and how to read and represent highly technical information from emerging scholarly studies about environmental and public health risks.

In response to the perceived lack of true deliberation about potential risks, many New York activists turned to the "body" as a form of speech. Their "bodies" spoke through marches, blockades and arrests, and these experiences and rationales for them were widely shared online. Several activists I interviewed shared information about how to commit acts of civil disobedience, using literate networks to plan who and how to be arrested; groups also coordinated fundraising to pay fines and legal representation for arrested activists. While activists in Ohio and Pennsylvania employed similar tactics, it was the reaction in New York to what had happened in the nearby states that created a large community-based outcry against what activists felt were very real risks in the fracking industry.

The ban on the extractive practice of hydraulic fracking occurred in December of 2014. In June of 2015, the New York Department of Environmental Conservation (DEC) announced the following: "The SEQR Findings Statement for high-volume hydraulic fracturing (HVHF) was issued on June 29, 2015. This concluded DEC's comprehensive, seven-year review and officially prohibits HVHF in New York." This page, as earlier noted, is situated within the DEC site, and takes some navigating to find, but does offer acknowledgment of the public comments that helped to shape the way risks were investigated, including

a prioritization on public health not represented in the Ohio or Pennsylvania institutional sites, where HVHF is still legal. While the New York Department of Environmental Conservation puts some authority for this decision in the hands of the New York State Department of Health, a longer statement refers to a rare meaningful interaction between the public and a state agency to create knowledge about risk. It is clear here that questions of contestation of the "value" of HVHF have been represented, at the insistence of citizens, beyond the expertise of regulation of an industry. Expertise in public health is represented in this decision. While activists in New York were pleased with these successes, they noted the opposition they faced in attempting to articulate this aspect of risk. The entire deliberation centered on citizens and experts proving that there was enough risk to warrant the state-wide ban. The activists still currently face deliberations about transport and storage of gas, which are still hotly contested throughout the state as transportation infrastructure for HVHF continues in light of gas exports.

IMPLICATIONS FOR FURTHER STUDY

While the New York ban is important to explore, it is also important to understand that public participants who are not part of regulatory institutions may not have agency to offer technical knowledge if state or local laws do not "value" that kind of knowledge. Indeed, in Pennsylvania and Ohio, health officials have not been able to make a case to restrict fracking activity based on health concerns. Even highly technically-literate public stakeholders might find that certain "sciences," "technologies" or types of expertise are not valued or even represented in risk reporting documents or processes (indeed, as energy risk assessment currently varies by state, state policies vary widely). Simmons critiques the lack of reflection of what it means to fail to acknowledge socially constructed nature of risk communication and public participation, "This failure to see risk and environmental policy as socially constructed leads to unethical and oppressive risk communication practices because the public is denied democratic participation in the decision-making process" (2007, p. 2).

Here I turn again to Royster and Kirsch's (2012) concept of strategic contemplation, this time, to encourage research that attends more to complexities of environmental deliberation: "this process of paying attention, of being mindful, of attending to the subtle, intuitive, not-so-obvious parts of research has the capacity to yield rich rewards. It allows scholars to observe and notice, to listen and hear voices often neglected and silenced, and to notice more overtly their own responses to what they are seeing, reading, reflecting on, and encountering during their research process" (p. 85). In this sense, I found compelling patterns by which

activists make meaning of their physical surroundings, finding that activist-driven representations of risk invented *outside* of institutional reporting that have shown some success in advancing agency to influence some environmental risk assessment policy). My research, which is informed by feminist approaches, points to moments where participants invent beyond top-down "objective" models to consider ways in which a larger deliberation about environmental risk might occur, and how to communicate and create praxis about these concerns. I find this to be increasingly compelling as it is acknowledged that local inventions and interventions have environmental impacts on a global scale.

REFERENCES

Alaimo, S. (2008). Trans-corporeal feminisms and the ethical space of nature. In S. Alaimo & S. Heckman (Eds.), *Material Feminisms* (pp. 237-264). Bloomington: Indiana University Press.

Bäckstrand, K. (2003). Civic science for sustainability: Reframing the role of experts, policy-makers and citizens in environmental governance. *Global Environmental Ethics, 3*(4), 24-3.

Barton, D., & Hamilton, M. (2000). Literacy practices. In D. Barton, M. Hamilton, & R. Ivanic (Eds.), *Situated literacies: Reading and writing in context* (pp. 7-15). London, England: Routledge.

Beck, U. (1996): Risk society and the provident state. In S. Lash, B. Szerszynski, & B. Wynne (Eds.), *Risk, environment, & modernity: Towards a new ecology* (pp. 27-43). London, England: Sage.

Blair, K. (2012). A complicated geometry: Triangulating feminism, activism, and Technological literacy. In L. Nickoson & M. Sheridan (Eds.), *Writing Studies Research in Practice: Methods and Methodologies* (pp. 63-72). Carbondale, IL: Southern Illinois University Press.

Brady, W. (2011). Hydraulic fracturing regulation in the United States: The laissez-faire approach of the federal government and varying state regulations. University of Denver, Sterm College of Law.

Center for Health, Environment and Justice. (2015). *The Prevent Harms Campaign; Resources*. Retrieved from https://web.archive.org/web/20150809143707/http://chej.org/campaigns/nofracking/

Coalfield Justice. (2015). *Issues: Fracking*. Retrieved from https://www.coalfieldjustice.org/issues/

Conrad, C. C., & Hilchey, K. G. (2011). A review of citizen science and community-based environmental monitoring: issues and opportunities. *Environmental Monitoring and Assessment, 176*(1-4), 273-291.

Cox, J. R. (2006). *Environmental communication and the public sphere.* Thousand Oaks, CA: Sage**.**

Dryzek, J. S. (2005) *The politics of the earth: Environmental discourses*. Oxford, England: Oxford University Press.

Fiorino, D. J. (1990). Citizen participation and environmental risk: A survey of institutional mechanisms. *Science, Technology, & Human Values, 15*(2), 226-243.

FracTracker Alliance. (2015). *Fractracker oil and gas photos*. Retrieved from https://www.fractracker.org/resources/photos/

Funtowicz, S. O., & Ravetz, J. R. (1993). Science for the post-normal age. *Futures, 25*(7), 739-755.

Grabill, J. (2007). *Writing community change: Designing technologies for citizen action.* New York, NY: Hampton Press.

Goggin, P. (2009). *Rhetorics, literacies, and narratives of sustainability*. New York, NY: Routledge.

Haas, C., Takayoshi, P., & Carr, B. (2012). Analytic strategies, competent inquiries, and methodological tensions in the study of writing. In L. Nickoson & M. Sheridan (Eds.), *Writing Studies Research in Practice: Methods and Methodologies* (pp. 51-62). Carbondale, IL: Southern Illinois University Press.

Haraway, D. (1996). Situated knowledges: The science question in feminism and the privilege of a partial perspective. In E. Fox Keller & H. Longino (Eds.), *Feminism and Science* (pp. 249-263). New York, NY: Oxford.

Harding, S. (1996). Rethinking standpoint epistemology: What is "strong objectivity"? In E. Fox Keller & H. Longino (Eds.), *Feminism and Science* (pp. 239-248). New York, NY: Oxford.

Herndl, C., & Cutlip, L. (2013). "How can we act?" A praxiographical program for the rhetoric of technology, science, and medicine. *Poroi, 9*(1)*,* 1-13.

Holifield, M., Porter, R., & Walker, G. (2010). *Spaces of Environmental Justice.* Malden, MA: Wiley-Blackwell.

Journet, D. (2012). Narrative turns in writing studies research. In L. Nickoson & M. P. Sheridan. (Eds.), *Writing Studies Research in Practice: Methods and Methodologies* (pp. 13-24). Carbondale, IL: Southern Illinois University Press.

Long, E. (2009) Rhetorical techne, local knowledge, and challenges in contemporary activism. In P. Goggin (Ed.), *Rhetorics, Literacies, and Narratives of Sustainability* (pp. 11-38). New York, NY: Routledge.

McGreavy, D., Silka, B., & Hart, D. (2012). Creating a place for environmental communication research in sustainability science. *Environmental Communication, 6*(1), 23-43.

Moss, P., & Falconer Al-Hindi, K. (2008). An introduction: Feminisms, geographies, knowledges. In P. Moss & K. Falconer Al-Hindi (Eds.), *Feminisms in Geography: Rethinking Place and Knowledges* (pp. 1-29). Lanham, MD: Rowman & Littlefield Publishers.

New York State Department of Health. (2015). *High-volume hydraulic fracturing in New York state*. Retrieved from https://www.dec.ny.gov/energy/75370.html

Ouellette, J. (2018). The viability of digital spaces as sites for transnational feminist action and engagement: Why we need to look at digital dirculation. In K. L. Blair & L. Nickoson (Eds.), *Composing feminist interventions*: *Activism, engagement, praxis*. Fort Collins, CO: The WAC Clearinghouse / Louisville, CO: University Press of Colorado. Retrieved from https://wac.colostate.edu/books/perspectives/feminist/

Rowe, G., & Frewer, L.J. (2004). Evaluating public-participation exercises: a research agenda. *Science, Technology, & Human Values, 29*(4), 512-556.

Royster, J., & Kirsch, G. (2012). *Feminist rhetorical practices: New horizons for rhetoric, composition, and literacy studies.* Carbondale, IL: Southern Illinois University Press.

Sauer, B. (2003). *The rhetoric of risk: technical documentation in hazardous environments.* Mahwah, NJ: Erlbaum.

Schiappa, J. (2018). Advocating "active" intersectionality through a comparison of two Slutwalks. In K. L. Blair & L. Nickoson (Eds.), *Composing feminist interventions*: *Activism, engagement, praxis.* Fort Collins, CO: The WAC Clearinghouse / Louisville, CO: University Press of Colorado. Retrieved from https://wac.colostate.edu/books/perspectives/feminist/

Selfe, C., & Hawisher, G.(2012). Exceeding the bounds of the interview: Feminism, mediation, narrative, and conversations about digital literacy. In L. Nickoson, & M. Sheridan (Eds.), *Writing Studies Research in Practice: Methods and Methodologies* (pp. 36-50). Carbondale, IL: Southern Illinois University Press.

Simmons, W. M. (2007). *Participation and power: Civic discourse in environmental policy decisions.* Albany, NY: SUNY Press.

Simmons, W. M., & Grabill, J. T. (2007). Towards a civic rhetoric for technologically and scientifically complex places: Invention, performance and participation. *College Composition and Communication, 58*(3), 419-448.

Shalefield Stories: A project of Friends of the Harmed. (2014). *Shalefield Stories vol. 1.* Retrieved from http://www.shalefieldstories.org/

Southwest Pennsylvania Environmental Health Project. (2015). Residential environmental screening tool. Retrieved from https://web.archive.org/web/20150914112529/http://www.environmentalhealthproject.org/wp-content/uploads/2014/05/EHP-Residential-Environmental-Screening-Tool-May-14.pdf

Sullivan, P. (2003). Feminism and methodology in composition studies. In G. Kirsch, F. Spencer Maor, L. Massey, L. Nickoson-Massey & M. Sheridan-Rabideau (Eds.), *Feminism and Composition: A Critical Sourcebook* (pp. 124-139). Urbana, IL: Bedford/St. Martin's.

Wajcman, J. (2007). From women and technology to gendered technoscience. *Information, Communication & Society, 10*(3), 287-298.

Warren, K. (2000). *Ecofeminist philosophy: A Western perspective on what it is and why it matters.* United States: Rowman and Littelfield.

Wells, J. (2014). *Complexity and sustainability.* Cambridge, MA: Routledge.

Whiteside, K. (2006). *Precautionary politics.* Cambridge, MA: Routledge.