ABSTRACT

Adapting Environmental Ethics and Behaviors: Toward a Posthuman Rhetoric of Community Engagement

by

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There is broad scientific consensus that the earth is warming faster than it has before, increasing the magnitude and frequency of natural disasters, yet in the United States, individuals have been slow to act on this science. Technical communicators are in a unique position to be able to effectively persuade individuals to adopt their behaviors and influence policy to be more environmentally progressive toward mitigating the human impact on global climate change. Much of the focus on climate science communication has been aimed at persuading the public to accept the science of climate change, but acceptance does not necessarily precede adoption of new behaviors (conserving energy, supporting solar and wind power, etc.), nor does denial of the science indicate a complete resistance to those same behaviors. This dissertation applies a posthuman virtue ethics lens to a methodology of audience analysis toward engaging communities in understanding the need to adopt new behaviors and persuading them to do so. This methodology is applied to three case studies of rural communities (Utah, Morocco, Ohio) and examines how their rhetorical ecologies are similar and different, and how those ecologies work to cultivate or inhibit a virtue of environmental care. This dissertation presents a method for technical communicators to find new ways of engaging unique communities in environmental science and adaptive behaviors by respecting and learning from local knowledges.

(252 pages)
Adapting Environmental Ethics and Behaviors: Toward a Posthuman Rhetoric of Community Engagement

Beth J. Shirley

What persuades people one way or another to accept or deny climate change? More importantly, what persuades people to act on, ignore, or even be defiant of climate change? We would like to think that people are motivated when they hear the science explained clearly and when they are presented with a clear understanding of how their actions have a lasting impact. Yet the science on climate change has been made clear for some time, and doubt in climate change science is rampant (at least in the United States).

This dissertation seeks to answer these questions and develop a new methodology for persuading people to change their behaviors to be more environmentally friendly. I discuss a rhetorical theory called new materialism (a branch of posthumanism) that looks at the impact that nonhuman factors have on an audience’s decision-making. I apply that theory to the study of technical communication in three case studies of rural communities in Utah, Morocco, and Ohio, learning from local knowledges and seeking to understand what persuades these audiences’ in a more complex way than we may have previously thought. I conclude by suggesting what approaches communicators might take with these communities in the future toward engaging them in making the behavior changes that are necessary to mitigate the human contribution to climate change.
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CHAPTER I

INTRODUCTION

In a world of vibrant matter, it is thus not enough to say that we are “embodied.” We are, rather, an array of bodies, many different kinds of them in a nested set of microbiomes. If more people marked this fact more of the time, if we were more attentive to the dispensable foreignness that we are, would we continue to produce and consume in the same violently reckless ways?

—Jane Bennett, Vibrant Matter, pp. 112–113

In February 2013, a Nor’easter known as Winter Storm Nemo hit the New England Coastal area with a gusto that had not been experienced in the area for at least 30 years. I happened to be living in Brookline, Massachusetts, at the time, in a neighborhood just outside of Boston proper. I watched out of my window as the snow piled up and drifted in huge dunes, enveloping cars, wrapping buildings, and hiding the streets completely. When we lost power, I used my smartphone’s internet capability to connect to social media to check in with friends who were also trapped. Many had used the platform to circulate images of the snow piled up to completely cover a door, so that a backdoor had become a refrigerator; some posted memes making jokes about the name “Nemo” and the Disney-Pixar clown fish character, or the captain from 20,000 Leagues Under the Sea; some used the site to check up on the safety of their other friends and posted statuses such as “We’re safe in Brookline, no power, though, so I can’t even work from home. Anyone wanna build a snowman?”

One friend’s check-in stuck out to me more than any other, and it has probably subtly driven much of my work ever since. It was direct, simple, and infuriating: “It’s cold enough to freeze boiling water, and the snow’s piled up to the top of my door!”
Global warming, my ass!” His denial was based on the assumption that “global warming” was a hoax theory that the planet was getting warmer and therefore we should be constantly experiencing warm temperatures, when of course, it is far more complicated than that. His experience in Boston (having moved there from Texas) was that things were getting colder not warmer, and wetter, not dryer. In an attempt to explain to him why he was wrong, I presented him with an article containing the headline, “Climate change and the blizzard: Nor’easters more fierce with global warming, scientists say” (Peeples, 2013). Within seconds of my posting, he replied, “I don’t buy it. It’s cold as fuck.” I think it is safe to assume that he had not bothered to read the article. Perhaps he had decided since it came from the Huffington Post, an admittedly poor choice for engaging climate deniers given its liberal slant, it was never going to align with his views anyway, or perhaps he did not want to fully engage someone he knew to be a lefty liberal.

I thought about this interaction as I watched my neighbors across the street, a couple of doctors, step into cross-country skis and glide to work at the nearby hospital. While some people were sitting in complete denial even in the face of (what to me appeared to be) overwhelming evidence, others were quietly adapting and getting on with their lives. My friend’s comment is not uncommon. In recent years, we have witnessed political leaders make similar comments on the floor of the Senate (Jim Inhofe, a Republican Senator from Oklahoma famously threw a snowball he had gathered outside in D.C. in February to demonstrate that climate change is a hoax; Bump, 2015). A sitting president has repeatedly referred to climate change as “fake news” and cited cold weather as evidence amid several new reports confirming disastrous projections of climate change (Pierre-Louis, 2017). A misunderstanding of anthropogenic climate change based on an
environmental disconnect from the impacts is made worse by the politicization of the issue, and attempts by the scientific community or those already perceived as environmentalists are easily rejected.

There is broad scientific consensus that the earth is warming faster than it has before, speeding the melting of ice caps, warming the oceans, and shifting weather patterns dramatically, leading to an increase in the magnitude and frequency of natural hazards such as hurricanes, floods, droughts, and dangerous heat waves; moreover, there is scientific consensus that this warming of the planet is caused largely by human activity (Cox et al., 2000; Dansgaard et al., 1993; IPCC, 2014, 2018; Melillo, Richmond, & Yohe, 2014; Parmesan & Yohe, 2003; USGCRP, 2017). In the Fall of 2018, the Intergovernmental Panel on Climate Change (IPCC) released a report at the behest of the United Nations concluding that humanity has about 12 years to make substantial and wide-sweeping changes to our energy usage and other consumption habits if we are to avoid the worst effects of climate change (IPCC, 2018). While there was a flurry of media attention around the report, we in the United States witnessed no change in the attitudes of most US policy makers or plans to construct legislation. In fact, we saw further rollbacks on environmental regulations and much of the same denial of human-caused climate change, even as hurricanes drove inland causing millions of dollars in damage and fatalities.

Because the causes of the problem vary (from air pollution to agricultural practices to deforestation to overpopulation to ocean acidification), solutions also vary (from organic food production to conservation to population control to ocean
protections). However, there is some consensus in the scientific community that the most important thing we can do is decrease our consumption of fossil fuels (coal, petroleum, natural gas), either by reducing overall energy consumption or switching to more sustainable sources (wind, solar, geothermal heat, etc.) (Cardona et al., 2012; USGCRP, 2017). Ideally, humans would take on adaptive behaviors to both switch to sustainable resources and reduce overall energy consumption. These behaviors would include collectively supporting wind and solar power instead of coal and natural gas and instituting stricter limitations on carbon emissions. There are other adaptive behaviors we know we can make on an even smaller scale to reduce fossil fuel use, such as biking or taking public transportation instead of driving, installing better insulation in our homes to make heating them more efficient, and turning off light switches when we leave a room and unplugging unused appliances. There are farming practices that can be adopted in rural areas to reduce the environmental impact of our food consumption. But humans—particularly in the United States—are hesitant to make these behavioral adaptations at best and are blatantly destructive at worst. Despite the wide availability of information on what needs to be done, little is being done. Though the communication has improved, other factors are preventing action. My research presented here intends to understand what those factors are and how a clearer understanding of those factors can improve communication with unique audiences. When the science has been done and has been translated for but not widely accepted by the public, climate change communication becomes a problem for technical communicators.

By engaging local stakeholders when possible and/or gathering data and conducting observations of communities to understand the complexity of their decision-
making processes, I aim to address issues of environmental justice. Environmental justice, in this case, means taking into consideration and finding the solution that best suits all actors in a situation, both human and nonhuman, but especially marginalized communities (Banerjee, 2018). Environmental justice often overlaps with social justice, as many environmental issues create socio-economic disparities (think Flint, Michigan’s water supply) and can be mitigated more easily by those of higher socio-economic status (think about who is able to rebuild after a fire or a flood destroys their home).

**Convenient denial**

Upon initial consideration, climate change communication would appear to be a simple issue of constructing clear science communication to the public and to policy makers. Many scientists have gotten involved in the communication side of climate change to do just that. Organizations such as the Yale Program on Climate Change Communication and high-profile academics such as Michael Mann have dedicated research and time into making the science more understandable and visible to the “general public.” Many in technical communication, rhetoric, and composition studies have been pondering this issue for some time (Blythe, Grabill, & Riley, 2008; Cagle & Tillery, 2015; Coppola & Karis, 2000; Herndl, 2014; Herndl & Cutlip, 2013; McGreavy et al., 2016; Palmer & Killingsworth, 1992). What is arguably the biggest issue of our time, and one that has been dubbed the “defining challenge of our age” (Rosenthal, 2007), is largely a technical communication problem.

The simplest solution to communicating global climate change, many models of science communication would tell us, would be to strip down reports such as the most
recent and most terrifying from the IPCC (cited above) and reconstruct them into easily digestible and accessible forms, to remove the jargon and make the information accessible to the public. However, there is already a wealth of readily available plain language information in the form of news articles, websites, government-issued climate reports, best-selling books, and films. Even with this evidence staring people in the face from the cover of *TIME* magazine (Stengel, 2006), or from major documentaries such as Al Gore’s *An Inconvenient Truth* (2006) and Leonardo DiCaprio’s *Before the Flood* (2016), anthropogenic climate change denial is rampant. Only 17% of Americans say they are “Alarmed” about climate change and say it is a top voting priority, while 10% say they are “Dismissive” and tend to politically oppose all climate-protective action (Roser-Renouf, Maibach, Leiserowitz, & Rosenthal, 2016). In the middle of these two extremes lies the rest of the population who remain concerned (34%), cautious (23%), disengaged (5%), and doubtful (11%). We have the evidence to demonstrate that a solution needs to be enacted by governments, corporations, and individuals; we even have the evidence of what behaviors we need to change, what adaptations we should most quickly make in order both to mitigate the effects of climate change and to reduce human impact on the planet. For example, we know that the burning of fossil fuels such as coal and petroleum is a major contributor to greenhouse gases and to not only air pollution but overall global warming; we also know that reducing our fossil fuel consumption by switching to renewable energy resources such as wind and solar is an increasingly available way to mitigate this problem (Cardona et al., 2012; USGCRP, 2017). Yet despite the wide availability of information on the problem and the solution, doubt and denial are rampant.
Moreover, even the 17% of Americans who say they are “Alarmed” about climate change are not necessarily going to do anything about it, either through altering their own behaviors or supporting policy that would curb the human causes of climate change. Many (even most) of those who are concerned and profess to be knowledgeable about climate change are not sufficiently motivated to change their behavior (Hornsey et al., 2016; Kellstedt, Zahran, & Vedlitz, 2008; Lazo, Kinnell, & Fisher, 2000; Rabinovich & Morton, 2012). The field of environmental psychology is already recognizing this and is working toward understanding how values and beliefs are perhaps even less significant when it comes to behaviors and decision-making than infrastructures (Amel, Manning, Scott, & Koger, 2017). Studies indicate that the factors that influence decision-making with regard to the environment are varied, ranging from childhood experiences to proximity to problematic environmental sites to accessibility or perceived accessibility of behavior changes (Gifford & Nilsson, 2014). People are more likely to adopt a new behavior based on how easy it is to implement and how visible the behavior is rather than whether or not they are concerned about the behavior’s impact on their carbon footprint. For example, people are more likely to ride their bike to work instead of drive if there is an accessible bike path on the route. Moral and social norms, even guilt, influenced by the actions of those in one’s community are also understood by the field of environmental psychology to be significant motivators in pro- or anti-environmental behaviors (Bamberg & Möser, 2007; Hines, Hungerford, & Tomera, 1986). For example, we are more likely to install solar panels if we see that our neighbors have solar panels and learn that they saved money in doing so because of the city infrastructure that supports it, regardless of our acceptance or denial of the need to reduce our reliance on fossil fuels.
So, acceptance of the science is not enough; awareness of the problem and the solutions and even an increased sense of urgency are not enough. What else, then, might persuade us to action? Perhaps it is worth considering that beyond the evidence supporting the concept of anthropogenic climate change that has been gathered, coded, and analyzed using the scientific method, nearly every community in the nation has some tangible evidence of the damage that human activity has had on the local environment, whether it is a chemical company poisoning water near waste disposal sites, drought caused by overuse of water for irrigation, or pollution from fossil fuels trapped in the air. In other words, there are other factors closer to our perceivable ecologies, the network of factors both human and nonhuman that we are a part of, that are connected to the larger issue.

Experiences with these factors within our perceivable ecologies, when paired with digestible framing of the larger issue of climate change, may in fact be more rhetorically persuasive than the science being made crystal clear and even more persuasive toward action than arguments made to those who accept the science. For example, on the coast of North Carolina, after getting hit by devastating hurricanes worse than they have ever experienced, residents who used to deny climate change are now changing their views. In September 2017, 41% of Republicans in the state believed it was “not at all likely” that climate change would harm the coastal communities; that number dropped 10 points in October 2018 to 31% (Jan, 2018). This effect is not necessarily witnessed universally when disaster strikes, and 10 percentage points of one political party in one state is hardly a wide-sweeping trend. But for that 10%, the factors in their perceivable ecologies were connected to science communication, whether that was through traditional media, social
media, or neighbor-to-neighbor conversation, and that connection to their experiences caused a dramatic shift in perspective. The next step that should follow, and can follow with the appropriate community engagement, is a shift toward an ethic of environmental care. Understanding how and why the change in public acceptance of climate change science happened as it did is crucial for technical communicators seeking to effect change with regard to climate change. In this dissertation, I take up this challenge of how to tailor climate change communication for unique ecologies and audiences within those ecologies toward motivating the adoption of new behaviors that are environmentally progressive, or that will reduce the human impact on climate change.

Motivating these new behaviors may even require dissociating them entirely from the concept of climate change science, since the acceptance of that science is almost irrelevant when it comes to decision-making. It is important for researchers and communicators to first understand what sources of information are trusted and utilized by a community while also engaging that community directly about environmental issues that concern them, as many sources have tainted terms like climate change, environmental, and even renewable energy. Persuading an audience to accept that climate change is real and that it is caused by human activity is a complex endeavor, especially when the key terms themselves have been changed by the audience’s rhetorical ecology. Further convincing that audience to act on the science they recently ignored or denied is even more challenging. But local knowledge can help us understand how to engage communities in actions that will be beneficial to them as well as to the environment. Conducting this research at the local level by engaging stakeholders is a vital component to this work.
Understanding the ecology that the audience perceives allows us to better understand where communicators will be able to draw connections to greater environmental issues, what factors are persuasive toward motivating behavior changes and in what complex network of ways. As I will discuss at greater length in Chapter 2, I will borrow the term rhetorical ecologies from Jenny Edbauer to denote these networks of human and nonhuman actors that play a rhetorical role in shaping opinions, beliefs, attitudes, and decision-making. The term need not apply exclusively to studying environmental issues, but the metaphor is apt for engaging with these issues.

A technical communication problem

The problem facing technical communicators who are concerned with environmental justice is not that the science is inaccessible or lacks clarity; the problem is that most climate science is easily (and conveniently) denied in order to maintain current consumer lifestyles in the US. Even when Americans accept climate change science, they do not necessarily see it affecting them directly, nor do they see a significant impact from their daily actions, so it takes another layer of motivation and persuasion to make the important changes to mitigate this problem. Even if our audience accepts climate change, how do we get them motivated to do anything about it when the risks seem so far away? This indicates that the solution(s) to climate change cannot rely upon changing our audience’s attitudes; we must work to persuade our audience to change their behaviors with the goal of this change in behavior leading to a change in attitude toward an ethic of environmental care. Technical communicators need to be researching ways to engage
people with the issue and to motivate them to action, to move beyond creating awareness to effecting change.

Scholars in the field of technical communication and rhetoric often point out that technical communicators are perfectly situated and even trained to be mediators among individuals, institutions, science, and governments and that we therefore have a moral exigence to be an effective bridge between knowledge producers and knowledge consumers across social, political, and institutional hierarchies (Coppola & Karis, 2000; Grabill, 2006; Hopton, 2013; Sauer, 2003; Simmons & Zoetewey, 2012; Sullivan & Porter, 1997). There is certainly a perceived hierarchy between scientists and the general public, reinforced by strong differences in beliefs about where there is and is not scientific consensus (Funk & Rainie, 2015), differences often manufactured intentionally by large corporate interests (Ceccarelli, 2011; Oreskes & Conway, 2010). Technical communicators are poised to work—through research, practice, pedagogy, and public engagement—to address the resulting differences in beliefs or even intentional miscommunications.

My research, then, applies rhetorical theories and methods to the field of technical communication in the following ways: (1) by informing technical communication practitioners and scholars who work closely with scientists of strategies for improving the effectiveness of science communication toward motivating specific behavior changes; (2) by building upon a tradition (and a more recent resurgence) of technical communication scholars seeking to find more effective means of using rhetoric to persuade the public not only to accept climate science but to act upon it. I seek to bridge gaps not just between science and the public, but between scientists and research that may be applicable and
useful to them when writing technical and nontechnical scientific content for the public, and then to work to use the combined forces of scientific and rhetorical means to motivate changes in behavior toward the environment.

As a technical communication problem, motivating policy change and individual adaptations with regard to the environment is more complex than a need to write clearly about the science of climate change. At the broadest level, the research I present in this dissertation focuses on addressing the problem of how to communicate about issues of environmental justice in such a way that a specific audience is motivated to take action on those issues, especially in light of compounding factors creating doubt in science and mistrust of environmentalists. (In many cases, this means dissociating the action from the problem altogether.) To that end, the problems I will be discussing negatively impact humans and nonhumans in the natural environment alike, and the solutions are likewise aimed at benefitting both.

This dissertation examines how anthropogenic climate change is a technical communication problem and how technical communicators can use our position as mediators between knowledge producers and knowledge consumers to effect positive change. The research that follows is focused on understanding environmental attitudes and behaviors in rural areas through a mixed-methods approach and on implementing that understanding when engaging communities in accepting and, far more importantly, acting upon environmental science. In this chapter, I will discuss how this is also a social justice issue, making it especially poignant for technical communicators to address (Dilger, 2006; Hopton, 2013; Rose & Walton, 2015; Walton & Jones, 2013). I will then outline the focus of my research on rural communities and discuss how the theories of
posthumanism and the lens of virtue ethics have guided the creation of a new methodology I call *mapping rhetorical ecologies*. I will close this introduction with a chapter overview.

The research questions that I seek to answer are:

**RQ1**: What strategies are currently being employed by technical communicators to engage these rural communities in understanding and, more importantly, acting upon environmental science? And what strategies are effective at motivating changes in behavior? (This includes examining through what sources the audience currently receives information about the environment and how those sources seek to motivate change or sow doubt about climate change and other environmental issues.)

**RQ2**: What aspects of a rural audience’s rhetorical ecologies (intersections of multiple human and nonhuman factors) have the capacity to alter technical communication, either toward or away from persuading the audience to make adaptations to their behaviors?

**RQ3**: How can technical communicators apply a new materialist lens (which I see as the most effective as I will describe later in this chapter) toward understanding rhetorical ecologies? How can this understanding be applied toward engaging unique communities in creating or adapting environmentally progressive behaviors and cultivating an ethic of environmental care?
A social justice problem

As a *wicked problem*, meaning complex and requiring collaboration between scholars across a spectrum of the humanities and sciences, global climate change is also a social justice problem, not just an environmental justice one. By *social justice problem*, I here mean that it is an issue that impacts marginalized populations disproportionately, a fact acknowledged by the 2014 IPCC report. At the more localized level, people with lower income and education will have fewer resources to remain resilient when impacts of climate change do impact them directly through natural disasters. For example, someone with a higher education level is more likely to be aware of the increased risks to their area due to climate change, and if they are also in a higher income bracket, they likely possess the means to relocate in anticipation of the risks, whereas someone with less education may not be aware of the risks and may not possess the means to mitigate those risks even if they were made aware. And those who have expensive homeowners’ insurance and a robust savings account will have less difficulty rebuilding and recovering from an intense hurricane wiping out their neighborhood should they choose to stay. In preparation, mitigation, and adaptation, those with less education and less income are at a significant disadvantage when it comes to the effects of climate change.

At the global level, the contrast between wealthy and marginalized communities is even starker. The IPCC report of 2014 found that people in many developing nations are going to be hit first and hardest by the effects of anthropogenic climate change, and because these nations do not possess the infrastructure of most developed nations that would allow them to recover quickly or adapt, their citizens will suffer more greatly. The disparity is made more infuriating when we consider that developed nations are
responsible, by and large, for far more of the human causes of climate change than developing nations (IPCC 2014, 2018). As an example of this, in Chapter 4 I will discuss my first-hand observations of how global climate change is impacting a women’s association in rural Morocco and how they are affected by those changes to their environment on a socioeconomic level, making it clear that global climate change is both an environmental justice issue and a social justice issue.

The field of technical communication has, historically, been less concerned with issues of social justice as it relates to our work and focused more on clarity and precision, and there has not always been much conversation around what can or should be done from our positions toward righting wrongs (Walton & Jones, 2013). In recent years, however, this has been challenged by several scholars who argue that because we are in such a position of mediation between fields, between creators and consumers of things, content, and knowledge, we have a moral obligation to be concerned with social justice (Agboka, 2013, 2014; Colton & Holmes, 2016; Hopton, 2013; Jones, 2016; Leydens & Lucina, 2014; Rose & Walton, 2015; Walton, 2013; Walton & Jones, 2013).

The role of rhetoric

Aristotle defined rhetoric “as an ability in each case to see the available means of persuasion” (1992, p. 36), meaning that rhetoric is more than simply word choice but that it involves careful audience and situational analysis, as well as consideration of what frames and arguments will be effectively persuasive. While the term *rhetoric* is often tossed around in the common vernacular to mean “empty words” or “hollow political speech,” rhetorical studies have much to offer with regards to a problem as complex and
socially intertwined as global climate change. Alan Gross (1994) discussed the important role of rhetoric on science communication, particularly on science communication with the public in both deficit and contextual models. For contextual models, Gross argued, “rhetoric and rhetorical analysis…supply the grounds for a rhetoric of reconstruction, one that reconstitutes the fact and facts of science in the public interest” (p. 5). In other words, rhetoric allows the communicator to reframe or translate science in a way that the public is not only educated, but also interested and engaged. When we break with the deficit model, or the assumption that the audience only needs to be presented with the missing information, rhetoric informs how that missing information can best be articulated to a unique audience. Applying such key rhetorical concepts to technical communication is vital for effective science communication.

Others have echoed the importance of rhetoric in science communication over the years (Ceccarelli, 2011; Druschke et al., 2018; Druschke & McGreavy, 2016; Ornatowski, 2007; Rivers, 2015; Walker & Walsh, 2012), and I seek to extend an awareness of that importance here. Given the current mistrust of science compounded with the lack of motivation from individuals to act even given an understanding of climate change science, the science community is primed to accept the study of rhetoric as vital to overcoming the issue of climate change by persuading people to act, by no longer being content with merely democratically dispersing clear and jargon-free science communication, and by actively working toward encouraging adaptive behaviors through stronger rhetorical models. The study of existing rhetoric and construction of new rhetorical strategies is poised to become a crucial part of acting within the IPCC’s timeline of 12 years (2018).
Approaching issues of environmental justice by considering how they are also issues of social justice allows us to connect human actions to human impacts when discussing even broad issues like climate change. Concepts of rhetoric help us to also understand why some (if not most) humans continue to act the same environmentally detrimental way in spite of the overwhelming evidence of anthropogenic climate change.

Environmental rhetoric, as defined by Nathaniel Rivers (2015), “addresses people and their relationships with both the humans and nonhumans who inhabit the global agora” (p. 425). In other words, environmental rhetoric is a way of considering the rhetorical effect of humans and nonhumans upon each other. A trend in the field of rhetoric is to consider these nonhuman actors as having a rhetorical role that we are not typically “attuned” to (Rickert, 2013), or that we have previously considered arhetorical or without rhetoric (Gries, 2015; Rivers, 2015).

Toward bringing rhetoric and environmental science together, and with the aim of engaging citizens in science, Caroline Gottschalk Druschke and Bridie McGreavy (2016) offered a transdisciplinary method in which scientists work closely with rhetoricians to produce information that the community actually wants, needs, and can use and to then make it available it in such a way that community members can understand it clearly. In their research and community work, they create workshops with scientists that “help people pay attention to context and develop approaches that allow participants to craft ‘words that work’ and that also respect and connect with audiences’ understanding and values” (p. 49). Through this process, the information is communicated in such a way that individuals not only see the reason to take action but are motivated and given the tools to do so. The key is civic engagement paired with scientific advocacy supported by
objective fact. This produces research that is beneficial to the community in such a way
that the community is empowered to make adaptive behaviors a reality.

The discussion of rhetoric and environmental issues is most notably discussed in
Palmer and Killingsworth’s *EcoSpeak* (1992). I will discuss this work and others at
greater length in Chapter 2, but it is worth noting here an essential problem illuminated
by the regard in which this book is still held. *EcoSpeak* approaches environmental
writing—from technical reports to policy to public communication—from what the
authors referred to as an *eco-humanist* perspective, meaning they believe change in
technology or policy will be ineffective “unless accompanied or preceded by free and
broad access to special knowledges and relevant information as well as by deep
psychological and social adjustments” (p. 2) a call for openness in the scientific process
reminiscent of Latour’s *Science in Action* (1987). While *EcoSpeak* offers important
contributions to audience analysis and other rhetorical strategies in environmental
communication, there are some updates that need to be made to the scholarship. For
example, one chapter analyzes the work of Rachel Carson in *Silent Spring* in drawing out
what it was that she did so effectively. Yet in 2018, the landscape (both literal and
figurative) is significantly different from what it was in 1992 and certainly different from
what it was in 1962. Even Rachel Carson, hailed still by many as a hero of science
communication, as her work effectively led to a public push for policy banning DDT, is
now considered a controversial figure, compared to Hitler, even, for putting the
environment over humans, since DDT was seen as a necessary strategy for eradicating
malaria in Africa (Oreskes & Conway, 2010, pp. 216–217). Though the allegations are
not only hyperbolic but outright false (the policy was to allow DDT use in foreign aid and
domestic emergencies, and the end to using DDT actually came four years before the ban), claims made public in 2007 linger still, and she is now painted as the enemy of the American farmer. Her rhetorical strategies of appealing to pathos and reason, building upon sound evidence, were certainly effective in the 1960s and 1970s, and in certain circles are effective still; but the political and cultural landscape has changed, and so with it must our approaches to scientific communication. Perhaps it is time for a new analysis of Carson’s work to pair with Palmer and Killingsworth’s, to examine what strategies she employs that are, in a modern rhetorical ecology, counter-effective and what can be adapted.

The case studies in this dissertation will conclude with work based on a new methodology that I have designed based on a heuristic presented by rhetorical scholar Jenny Edbauer (2005) called rhetorical ecologies. Edbauer points out that although “oversimplified sender-receiver models of public communication have been productively complicated by theories like Lloyd Bitzer’s notion of the rhetorical situation” as well as later takes on the rhetorical situation by other theorists, these theories still assume rigidity in the audience and in the text and in the author (p. 7). Bitzer introduced the concept of the rhetorical situation and propelled the task of audience analysis into the consciousness of rhetorical studies (1968). The idea is that the social context in which an individual receives rhetoric matters for how that individual will interpret that rhetoric.

While other scholars have applied the rhetorical situation in more recent years and expanded it (Grant-Davie, 1997), Edbauer critiques the model for being limited in scope and insufficient for considering the complexity of how rhetoric is interpreted. In other words, rhetoricians relying upon the rhetorical situation model assume an audience is a
static and measurable entity. A rhetorical ecology perspective instead builds upon object-oriented ontology (Harman, 2015) to attribute rhetorical agency to nonhuman agents; this perspective then examines where each of the factors that might get taken into account overlaps with other factors and changes the rhetoric. A rhetorical ecology perspective does away with binaries and static connections, examining instead where and how those connections are kinetic, how they are active and how that activity changes the rhetoric.

**Rural communities**

Unsurprisingly, but supported by extensive research nonetheless, different groups interpret scientific information in different ways (Feinstein, Allen, & Jenkins, 2013), so we have to begin by understanding that there is no “general public” to whom science needs to be more clearly communicated. In this dissertation, I will examine three different populations in rural communities and the effect of climate change communication, environmental rhetoric, and other factors on their decision making; this will culminate in a discussion of how an understanding of these factors might structure future climate change communication within these rural communities as well as communities reached by other technical communicators. I believe it is important to engage rural communities in particular as they are often overlooked by the academic community, and that has led to much of the mistrust in science and in institutions in particular that we are witnessing on a national scale (Funk & Rainie, 2015).

While rural communities are certainly not homogenous, as will be clear through the variety of community descriptions included in the three case studies I present in this dissertation, there are unifying factors that make them worth studying together.
Donehower, Hogg, and Schell (2007) argue that “rural should not be seen in opposition to urban but as part of a complex global economic and social network” (p. xi). One common factor among the three communities I discuss in this dissertation is that institutions of science have been dismissive (or at least have been perceived as being dismissive) of many of the values held by these communities, such as religion and “family values.” This (perceived) dismissal paired with the limited access to resources in these communities has allowed a significant campaign of doubt and misinformation to take root, especially in the United States. In order to counter this trend, it is critical that researchers invested in knowledge-producing institutions engage directly with these communities. If we hope to communicate the important findings of research with them and to encourage them to adjust behaviors in light of this research, as we must with regards to climate change, then engaging them in understanding their complex networks is an extremely important step to regaining trust.

Not only is acknowledging rural literacies and establishing reciprocity in our research important for engaging communities in science, but these communities have much to offer researchers in the way of local knowledge, especially technical communication and rhetoric scholars seeking to work toward environmental and social justice. A humble appreciation for local knowledge and rural literacies can inform us not only on what is needed to improve the lives of rural communities, but how best those communities can be engaged. Embedded community research and collaborations with community partners can lend insight into the complexity of these communities to see factors that (as I will discuss in Chapter 5) are overlooked even by locally based communicators. This works toward seeing what Chambers (1983) referred to as
“invisible dimensions: international influences on rural deprivation; social relations…and trends over time” (p. 25). Working with communities to help understand what their goals and challenges are can improve communications with those communities, and in doing so can improve their situations. The reciprocity is not simply data from the community and knowledge produced by the researcher; reciprocity must also include knowledge from the community and usable knowledge from the researcher.

A factor these three communities have in common is their limited access to resources. While this is most notably the case in rural Morocco, even areas in rural Utah and Ohio are often limited in their Internet access, either due to infrastructure or voluntary rejection of technology. Since the Internet is the primary source for information in the digital age, leading to what is commonly referred to as the increasing “digital divide.” While it may be difficult for researchers in the 21st century to imagine anyone not having reliable access to the Internet, this was certainly a barrier I observed in rural Ohio and is supported by other research. This issue of engaging outside of the Internet is particularly of concern to technical communicators invested in social justice, as much of the reason for lack of internet access is not just geography. Studies have shown that people living alone and people with disabilities are less likely to have Internet access, as are people with lower education levels (Hodge, Carson, Carson, Newman, & Garrett, 2017; Whitacre & Mills, 2007). The lack of access to information is cyclical and needs to be addressed. The lower the education level, the less likely the individual is to have Internet access and thereby access to most of the world’s most up-to-date information.

Finally, because of the difficult access, both physical and digital, these communities are often overlooked by researchers at institutions, resulting in the “urban
bias” in published research (Chambers, 1983). It is important that in conducting research in technical communication, we not overlook rural communities or ignore their expertise. As discussed by Robert Chambers, there is a tendency for researchers to succumb to the urban bias, because urban areas are more readily accessible and more readily confirm the hypotheses of the researcher dwelling in an urban area. I seek to avoid that bias and address ways we can engage members of this sector of the population, not as a savior, but from the perspective that they possess knowledge traditionally overlooked by academia and that rural communities are on the front lines of the battle against climate change. We cannot ignore or undervalue rural literacies when we seek to communicate with members of rural communities (Donehower, Hogg, & Schell, 2007, 2012). In other words, it is important to remember that environmental justice is as much about protecting marginalized humans’ lives and sustaining livelihoods as it is about protecting nonhuman factors.

In these communities, we can no longer assume identity politics as usual. While it is still largely true that those who identify as Republican tend to disbelieve climate change science far more than those who identify as Democrat (Funk & Rainie, 2017), and that those in rural communities tend to vote more Republican than Democrat (witnessed most recently and prominently in the 2018 mid-term elections; Wilson, 2018), this does not mean that these are the only deciding factors that go into decision-making. If they were, we would hardly be seeing trends like small Texas towns adopting solar and wind as their sole energy source, and distinctly conservative towns across the US adopting plans to become more carbon-neutral in the next 50–100 years (Shapiro, 2017). So what else is motivating these changes in behavior if not factors outside of clear party lines?
The case studies in this dissertation reveal that in rural areas, there may be a unique ethic of environmental care, or stewardship. Because there is so much more nature to be seen, and because forces of nature are more heavily relied upon for livelihood (farming, ranching, etc.), there is often a clearer perspective of the connection between humans and nature. Reconnecting lines across the perceived divisions between human and nature, or society and nature, allows us to find potential connections to existing values. Understanding and utilizing those connections may lead to rhetoric that is more persuasive toward motivating adaptive behaviors by engaging rural communities. In understanding perceived connections and creating new ones, we may more appropriately tailor communication efforts in particular communities. A new materialist framework for understanding rhetoric can help technical communicators find those connections.

**Posthumansim and new materialisms**

I will be using posthumanism and new materialisms as a theoretical framework because these theories open the door to weighing the importance of both human and nonhuman factors in a given rhetorical ecology and to study the complex ways in which these factors are connected in human decision-making processes. It is worth noting that posthumanism and new materialisms are often criticized for attributing too much agency to nonhuman actors and straying into attributing equal rights to those actors. More often than not, these critiques create straw-man or hyperbolized versions of new materialism or are altogether based on a misunderstood reading of the theories (for more, see Bryant, 2013).
While some new materialists do raise questions of the rights of animals, plants, and even rocks and mountains, that is not the goal here. New materialism requires the acknowledgement of connectedness and interdependence upon these nonhuman actors (Barad, 2011), but not necessarily the equal rights. When we recognize that interdependence, we cultivate a greater respect for those actors, but not to the degree of putting their rights on an equal par with those of humans. In fact, attributing equal rights to nonhuman actors becomes unnecessary when we simply recognize how important those actors are to maintaining equal rights among humans (how complex it is to maintain clean air and water systems, for example). It is worth noting that some scholars identify a clear distinction between soft agency and hard agency, where soft agency is not necessarily intentional and hard agency is intentional. A future project might be looking more clearly at that distinction and applying it to the method presented in this dissertation. For the purposes of this work, however, an agent does not have to have intent, in the same way that it does not matter whether people believe in climate change science and adapt their behaviors accordingly or they deny climate change science and adapt their behaviors similarly for other reasons.

Approaching rural communication practices through a new materialist lens in this way may afford more engaging avenues between science and the public. New materialism, the term first coined in the 1990s, is a set of interdisciplinary theories found within posthumanism, but it has more recently been gaining ground in the study of rhetoric. The central theory is that matter matters, that nonhuman subjects, previously considered passive objects, have persuasive power or agency exceeding human intentions that influences human perceptions and understandings of the world. Laurie Gries (2015)
frames new materialism as “an ontological project in that it challenges scholars to rethink our underlying beliefs about existence and particularly our attitudes toward and our relationships with matter” (p. 5). Diana Coole (2010) asks if we might “imagine matter quite differently, as perhaps a lively materiality that is self-transformative and already saturated with the agentic capacities and existential significance that are typically located in a separate, ideal, and subjectivist, realm” (p. 92). This is essentially the task set forth by new materialist theory for scholars across fields, but especially in technical communication and rhetoric, where the way we talk about, frame, represent, and communicate information regarding matter is important for revealing and presenting our perceptions of our relationship to matter. What is needed is a rhetoric that re-envision the relationships between humans and nonhumans that would reconsider the roles involved in that dichotomy, the ensuing hierarchies, and the impacts of these nonhuman actors, both perceived and invisible (Barad, 2011; Coole, 2010; Grosz, 2010; Rivers, 2015).

Technical communication and the study of rhetoric may naturally turn toward posthumanism in their consideration of audience and of networks. As a field, we have long understood that communication is mediated, that the medium matters, and that the audience’s rhetorical situation matters (Bitzer, 1968; Grant-Davie, 1997). Noting that there are factors aside from human agents in creating these rhetorical situations (or the more complex rhetorical ecologies, 2005) is an important next step for researchers in improving technical communication practices. My goal with applying this posthuman, new materialist lens to environmental communication is to bring to the field a greater “attunement” to the effects of environmental rhetoric and the agency of nonhuman actors.
This idea comes from Thomas Rickert’s (2013) book *Ambient rhetoric*, in which Rickert discusses the rhetorical agency of nonhuman actors, both natural and technological, and the impact on decision-making they have, whether it was intentional and whether we recognize it or not.

Jane Bennett (2010) proposes a slightly different approach to new materialism through what she refers to as *vital materialism* in her book *Vibrant Matter*. According to her theory, the major barrier to environmental justice is that politics is considered exclusively a realm for the betterment of citizens, human citizens, while nonhuman environmental agents have no voice or consideration, echoing Latour’s *Politics of nature* (2004). The agency of environmental actors remains invisible unless we choose to see it, and we may only choose to see it when it tangibly and directly impacts us, such as in natural disasters. Bennett proposes that we consider agency “beyond human bodies and intersubjective fields to vital materialities and the human–nonhuman assemblages they form” (30). We must consider all factors that contribute to a situation together and are continually acting on a situation collectively, not just as separate entities. While the term *agency* may, to some, seem too strong to be applied to nonhuman entities, the term is not as important as accepting the idea of reexamining our relationships to nonhuman actors and what role the perception of those relationships plays. I will discuss Rickert and Bennett at greater length in Chapter 2.

In applying this posthuman lens, technical communication and rhetorical theory ought to also acknowledge the rhetorical impact of nonhuman actors that complicate these models. In some ways, we have been considering this impact of nonhuman actors for quite some time. Rhetoricians and communicators have often recognized that there is
a traditional disconnect between knowledge producers and knowledge consumers that restricts the effectiveness of their words, particularly in communicating the sciences (DeLaurier & Salvador, 2016; Druschke & McGreavy, 2016; Gross, 1994; Latour, 1987; Oreskes & Conway, 2011; Palmer & Killingsworth, 1992). As a field, we tend to acknowledge now that we should be using models of communication that are more contextualized and less focused on the sender–receiver model (Slack, Miller, & Doak, 1993), but we still struggle to point to and name exactly what it is about those contexts that is causing the disruptions in rhetoric. Even more complex models such as Holsti’s (1969) six basic components or Craig Waddell’s description of the Social Constructionist model in Coppola and Karis’ edited collection (2000) are centered on human rhetorical agency.

Part of the trouble may be that foundational works on research and theory in our field continue to consider rhetorical agency as purely a human capability. Foss (2008) asserts in the introduction to her rhetorical analysis research text that humans are the sole creators and receivers of rhetoric (p. 3). All the forms of rhetorical analysis she presents then, are built on this human-centric concept that rhetoric must be purposeful (cannot be accidental) and that it must be done by humans. It shuts out the possibility that anything other than human could be considered when conducting rhetorical research and analysis, because nothing other than human is capable of rhetoric. Theories of new materialism and posthumanism can help us understand more clearly what is causing this disconnect to occur. They can help us re-envision relationships between humans and nonhumans (Barad, 2011) in order to better understand our audience.
Chapter 2 will go into more detail on the current applications of new materialism to technical communication and environmental justice work. But what I seek to make clear is a way to apply this new understanding of more complex rhetorical ecologies to how we design communication in an actionable way. In this same chapter, I will present a methodology based on this idea of considering the nonhuman actors in a given situation. Rooted in Jenny Edbauer’s notion of *rhetorical ecologies*, this will go beyond the rhetorical situation to understand the vibrancy of these actors. This new methodology is the primary contribution of the work in this dissertation. My goal is to make it applicable and accessible not just for researchers but also for practitioners of technical communication.

Several scholars are already applying posthumanism to the specific problem of climate change communication and science communication in general. Carl G. Herndl and Lauren Leigh Cutlip (2013) argued that we are already seeing a slight shift away from humanism across the rhetoric of science, and that the new foci need to be on building new relationships with scientists and audiences alike, as well as looking beyond traditional realms of rhetoric. Caroline Gottschalk Druschke and Bridie McGreavy (2016) made a case for looking at what rhetoric has to offer the field of ecology and vice versa; ecology can offer rhetoric an understanding of how everything in a delicate ecosystem is connected and reciprocally impactful, while rhetorical applications of this concept can improve communication efforts in the sciences. Nathaniel Rivers (2015) has done extensive work using new materialism to break down the barriers between what is human and what is nonhuman when we discuss environmental problems. In just the past two years and in works forthcoming this year, several technical communication and rhetoric
scholars are addressing this ontological approach to environmental rhetoric (Druschke, Booth, & Lundberg, 2019; Pezullo & de Onís, 2017; Stormer & McGreavy, 2017; Tillery, 2017) even applying it to pedagogy (McGreavy et al., 2016; Yu & Northcut, 2018) and motivating the public to action (Lerner & Gehrke, 2018; Mabon & Shih, 2018; Tangney, 2017). Addressing scientific communication more complexly is a growing trend in the fields of rhetoric and technical communication. For example, POROI produced a special issue in 2017 focused on an “Engaged rhetoric of science, technology, engineering, and medicine,” with many of the articles referencing Latour’s actor-network theory and applications in a posthuman approach to science communication in a post-fact era (Druschke, 2017); Communication Design Quarterly has a forthcoming special issue on “Environmental communication in the age of un-reason,” (Hopton, 2019); and the field of technical communication’s flagship journal, Technical Communication Quarterly, is producing a special issue on making our research applicable specifically to the sciences (Graham & St. Amant, 2019). It is clear that this application of posthumanism to environmental communication is a growing trend in the field of technical communication, and my work adds to this movement.

**Virtue Ethics**

I will also be approaching my research from a virtue ethics standpoint, meaning that I will be seeking ways that technical communicators working in these communities can understand and create conditions that will encourage adaptive behaviors (virtuous habits) that will ultimately create a stronger virtue of environmental ethics. Virtue ethics dates back to, and even before, Aristotle, who considered virtues to be “character or agent
based and focus[ed] on the concept of hexis, or the disposition, state, or bodily
comportment of a person brought about by the development of habits (1105b25)” (Colton
& Holmes, 2018, p. 32). Hexeis is the root word for habit, and for Aristotelian virtue
ethicists, habits are key. Habits are formed through interactions with both human and
nonhuman factors in our environments and experiences, and habits form virtues. Colton
and Holmes (2018) note “the hexeis emerge from the body and the social/material
environments rather than purely through reason or rationality” (p. 32). Virtue ethics is a
perfect philosophical pairing for new materialism, as it acknowledges that humans are
persuaded by more than facts and that nonhuman agents can be as rhetorically significant
as humans on the decision-making process.

Virtue ethics has, in the last couple of decades, parted ways with the Aristotle in
favor of a broader and more inclusive view on morality, and many virtue ethics scholars
examine how virtues are formed. According to Rosalind Hursthouse, a prominent
contemporary virtue ethics philosopher, a virtue is “the concept of something that makes
its possessor good; a virtuous person is a morally good, excellent, or admirable person
who acts and reacts well, rightly, as she should—she gets things right” (1999, p. 13).
Virtues are formed by experiences, values, societies, and various external and internal
factors and influence how decisions are made. In short, virtue ethics accepts that reason
(logos) is not enough to make a person behave ethically and that there are other factors
that influence these virtues and how strongly they are held. Thus, virtue ethics is being
applied across our field to ethics in technology (Colton & Holmes, 2018), composition
studies (Duffy, 2017), and socio-environmental studies (Bina & Vaz, 2011) to help
explain how humans make decisions and how to use that information toward improved communication.

An easy next step for the field from these applications is applying virtue ethics to environmental communication efforts by considering what factors, human and nonhuman, create the conditions for individuals to make choices and how those might be altered to create conditions that would encourage individuals to make what might be considered more virtuous choices. Virtue ethics is the branch of philosophy that is more concerned with moral philosophy and understanding “ethical dispositions” (Duffy, 2014) than with actions that are done out of a sense of duty or aiming for the right outcome (Colton & Holmes, 2018). John Duffy argues that writing is an inherently ethical act and that in writing, we engage our audience on an ethical level, either by assuming they share our ethics or trying to convince them to share our ethics. Taking a virtue ethics lens to communicating about the environment means that while we cannot assume that our audience shares our ethical standpoint, we can seek to communicate this ethic by finding a shared or compatible ethic. Technical communicators can apply this by first examining their own ethics (“What good do I want to come out of this? Is this a good act?”) and then by seeking to understand what virtues their audience holds to be good (self-preservation, family preservation, environmental protections, etc.). This will also involve looking at what conditions have cultivated what virtues, whether that is an existing ethic of environmental care (see Chapter 4 of this dissertation) or a lack thereof (see Chapter 3 of this dissertation) and understanding how those conditions might still be utilized in engaging communities with environmental stewardship. The goal is not to manipulate conditions or to “manipulate” individuals into taking action, but to understand their
virtues and the conditions that create them in order to find new avenues or connections for communicating science and then to utilize those connections to persuade the audience to make behavior changes: to make science understandable and actionable.

We cannot accept or assume that our audience holds the same virtue of care for the environment or even other humans, or that they even hold the value that science is good. If the last three years of watching American publics has taught us anything, it should be that we need to completely reexamine what ethics we can assume our audience shares.

What traditions, norms, values, and physical conditions are forming these ethics? How does our audience determine what actions will make them virtuous, or what a virtuous person looks like? We may think we know, and in fact it may seem simple enough to assume that because an audience is liberal or conservative, registered Democrat or Republican, that we can know a lot about their values. But there are sufficient anomalies to reject this assumption, such as the example cited above of Republican-dominated, rural towns in the heart of Texas oil country switching to solar and wind energy (Shapiro, 2017). Are we seeing the results of an ethic of environmental care, and in any case, how were these behaviors cultivated and by connection to what virtues? A posthumanist lens takes the best of humanism in assuming there is some rationale at work in forming virtues, but this lens also opens the door for researchers to look beyond humans to understand how those virtues are being formed within complex ecologies.

Some scholars are already applying virtue ethics to socio-environmental studies. Bina and Vaz (2011) re-envision ethics of environmentalism in terms of basic human
virtues of needing to belong to a collective group and needing to exist in a healthy place. They conclude that this virtue allows us to care for the environment and to act on that care because we see the connection between our existing virtues and the virtue of caring for the planet, and that this virtue explains why some take this responsibility to heart. I agree, but I would add to this argument that there needs to be a connection formed more clearly and less politically between an audience’s existing virtues and the virtue of environmental care. An environmental ethic of care is often attached to other, more dichotomous ethics, such as a trust in science over religion or putting animal rights on equal par with human rights. This connection clouds any potential connection between self- and community-preservation and the ethic of environmental care.

While the approach I discuss in this chapter seems to be more aligned with utilitarianism than virtue ethics, concerned more with actions and consequences of actions than underlying virtues, the ultimate goal of my approach is to cultivate habits (hexeis) that create the conditions to adjust virtues. The idea is to realign environmentally conscious behaviors with pre-existing virtues and in doing so, align an environmental ethic of care with those virtues.

In identifying nonhuman actors that are significant and how those actors play an active role in shaping rhetoric, we can understand what rhetorical pathways may work toward cultivating this ethic, or (and perhaps equally significant) what pathways may work against that ethic and should be avoided. We must also begin to question if there may be other nonhuman agents that have a role in how virtue ethics are formed. Might humans in areas that are experiencing desertification where there is no infrastructure to adapt to resulting droughts have less difficulty accepting the concept of anthropogenic
climate change than humans in an area experiencing minor environmental changes and with infrastructure to make temporary adaptations (rural Utah versus rural Morocco versus rural Ohio)? We must consider how we can apply rhetoric to technical communication to cultivate the conditions under which these virtuous habits will be formed and to consider these conditions when constructing rhetorical strategies. This dissertation will seek to explicate the overlap of virtue ethics and posthumanism. How do we communicate environmental issues by considering nonhuman agents and their impact on the conditions that form underlying virtues that impact decision-making?

A posthuman virtue ethics lens, then, as I will take on in this research, will mean examining what factors impact the decision-making of humans when it comes to their behaviors that impact the environment. What factors and habits create a virtue of environmental stewardship, and is that necessary for environmentalist action?

**Applying new materialism and virtue ethics to technical communication**

In the next chapter, I will discuss the theories I have alluded to here in more detail, including new materialism and virtue ethics, and I will draw upon the existing literature in science communication over the last 20 years, from the fields of technical communication and rhetoric to scientists themselves to examples of science communication in the mainstream media. This chapter will also outline my methodology, *mapping rhetorical ecologies*, more clearly so that it can be followed in the case studies and so that it can be replicated outside of my work.

The three chapters that follow are case studies of environmental communication in rural communities. They will move from a distant, rhetorical analysis of existing texts
designed for engaging members of communities in rural Utah, to a more intimate and community-based set of interviews and observations in rural Morocco, to a survey and set of interviews of members of a statewide community of farmers in rural Ohio. While each case study involves a unique population and different methods of data collection and analysis, presenting them serially in this way allows me to examine three different ways of looking at nonhuman agency and to compare the cases in the final chapter and draw conclusions about applying these methods and this posthuman virtue ethics lens to my future research. Each case study will look at how a rural community views environmental ethics and how nonhuman agents may play a role in the formation of those ethics.

Chapter 3 is an analysis of two fact sheets from Utah State University’s extension. Fact sheets produced through university extension programs have a unique opportunity to reach underserved, typically rural communities that tend to have less access to the scientific and otherwise useful information produced by those universities. However, in an era of such rampant mistrust and even doubt of science, authors writing in limited genres whose goal is to encourage action may benefit from an ecological rhetorical model (Edbauer, 2005; Gries, 2015). This article examines two fact sheets for their current strategies and suggests what such a new approach would mean for engaging members of rural Utah’s communities in cultivating adaptive behaviors with regards to climate change.

I will then turn to a close examination of a rural community and the non-human factors in that community that shape attitudes and behaviors. Chapter 4 presents reflections based on original empirical research conducted through qualitative interviews with women in rural Morocco in May 2017, examining the intersection of community
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and environmental resilience-building efforts. Morocco is at great risk of both
desertification and religious extremism infiltration, and its government has instituted
several initiatives to combat both issues with an emphasis on empowering women. From
our interviews and observations, I learned that a rhetoric of unity and resilience opens
doors for community engagement with environmental science and can even encourage
adaptive behaviors. The nonhuman agents play a clear role in human decision-making
and in cultivating an environmental ethic of care. Examining a case study of a region that
is so different from the other two case studies offers me a chance to consider what factors
such as culture, topography, and other nonhuman agents are unique to each situation, and
what factors may be similar, to get a sense of how virtues are formed differently.

Chapter 5 is based on data gathered through mixed methods research in
partnership with the Ohio Farmers Union. This includes 1) a survey of members’
attitudes toward nature and science, where they get their science information, and how
that impacts their behaviors; 2) in-depth interviews with members of the Ohio Farmers
Union; and 3) observations from attending their annual convention in Lima, Ohio. Data
from these methods will demonstrate clearly what attitudes there are in this community of
rural American citizens who have an apparent investment in the sustainability of the land,
and this chapter suggests what communication efforts might be successful in motivating
them toward adaptive behaviors. The research going into this chapter has also been a
practice in engaging rural literacies and rural communities as co-producers of knowledge.

The concluding chapter will theorize and project about next steps in light of this
research. It will address how technical communicators and rhetoricians who operate
through a posthumanist virtue ethics lens can move beyond Latourian lists to assessing
ecologies. This chapter will discuss examples of what it might look like if efforts of community engagement in science communication were more concerned with cultivating environmental conditions that encourage virtuous habits, such as reducing energy consumption or supporting renewable energy development. This chapter will address how to bridge the gap between science and the communities that would benefit from the science.

Through my research and analysis applying a new materialist virtue ethics lens to environmental communication, I aim to provide a clear and usable tool for technical communicators working on these kinds of complex problems of community engagement. Through the case studies themselves, I aim to demonstrate the exigence for such a tool as well as examples of how it can be used to work toward motivating adaptive behaviors. When we understand what conditions have created the attitudes we encounter in a given community, we can better understand how best to approach communications with that community. In doing so, we can better know how to communicate and confront challenges of environmental and social justice.
CHAPTER II

LITERATURE REVIEW

Before some audiences, not even the possession of the exactest knowledge will make it easy for what we say to produce conviction.

—Aristotle, *On Rhetoric*

Before discussing the new methodology, mapping rhetorical ecologies and describing my case studies, it is important that I give some background on environmental communication within the field of technical communication and rhetoric and define the theories that have inspired the work I am presenting here. In this chapter, I will describe the current state of environmental communication, as well as the theories I will be using to form my methodology. First, I will discuss the tradition of humanism leading to a focus on clarity of language, then how this tradition has been reflected throughout rhetorical scholarship and how recent scholars have called attention to the division of what is human from nature and why that division is a problem. Second, I will define and distinguish theories of posthumanism and new materialism and explain how these theories address the problems in science communication that are presented by a strict humanist approach, primarily by calling attention to the rhetorical agency of nonhuman beings. I will go into detail on two of these theorists, Thomas Rickert and his concept of “ambient rhetoric” and Jane Bennett and her concept of an “agency of assemblages,” explaining how they are similar, different, and complementary. Third, I will describe the work of researchers in rhetoric who are beginning to develop applications for new materialism, primarily focusing on the work of Jenny Edbauer and Laurie Gries, whose
research strategies for tracing and de-scribing rhetorical actors (Gries, 2015) will form the foundation of my own methodology. Finally, I will describe the idea of virtue ethics and how applying this lens to an environmental communication approach can help the communicator find new avenues for information and new points of identification with the audience. Understanding how an audience’s rhetorical ecology informs and cultivates their virtues (or ethical habits) can help us understand how to better align environmentally favorable behaviors with those virtues, and thus we can better understand how to encourage an audience to adopt those behaviors toward mitigating anthropogenic climate change.

The scientific approach to science communication

As discussed briefly in Chapter 1, scholars outside of technical communication (in the hard sciences as well as the social sciences) are aware that this problem of resolving climate change involves major changes to human behavior. These changes must include wide-sweeping policy changes, but in a capitalistic democracy, that also means communicating the science and the necessary solutions clearly to the public. Communication needs to be clear and motivating both so that people make small-scale (household-level) changes and so that the collective belief in the need for larger changes can influence policy-makers (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009). In recent years, climate change communication has become a recurring topic in top peer-reviewed science journals (including Science and Nature) from letters expressing concern and opinion from scholars (Gould & Maibach, 2014; van der Linden et al, Maibach, Cook, Leiserowitz, & Lewandowsky, 2017) to research articles on studies conducted by
science groups trying to understand what communication tactics might be effective (Amel et al., 2017; Feinstein et al., 2013; Korte, 2016); climate change communication has become an increased focus at scientific conferences with directed panels, themes, and speakers, such as at the 2018 Fall meeting of the American Geographers Union, which featured Katherine Hayhoe, the notable evangelical Christian, climatologist, and crusader for climate change communication as the keynote speaker. There is much discussion of getting to the heart of the troubling doubt in science, often considered the result of cognitive bias (Brulle, Carmichael, & Jenkins, 2012; Kahan et al., 2011), as this may be considered key to motivating action on climate change. Even more troubling, however, is the discovery that even those who are concerned about climate change are not likely to alter their behaviors (Hornsey et al., 2016) or even engage in political action (Roser-Renouf et al., 2016).

There is also some degree of despair in the sciences about the potential for communication to be the key to solving climate change. For example, an article published in *Nature* examined various policy explanations to learn how policy can be communicated without partisanship to give constituents a clear idea of how it will impact them (Brick et al., 2018). The data studied included policy on climate change. The conclusion was that there are many challenges (uncertainty of findings, multiple outcomes of scenarios, etc.) and diverging factors with each audience (demographics, different impacts on different regions, etc.) and it is essentially impossible to write about policy without revealing partisan bias; the study also concluded without any empirical evidence for how to communicate policy options effectively, but with the “hope that identifying these challenges will stimulate the development of
effective, non-partisan communications and their evaluation” (p. 1). It is important to note that this study was focused on analyzing existing policy communication through a conceptual review of current communication, a review of an array of organizational guidelines on policy communication, and a review of empirical evaluations. No humans were contacted, and no one audience was examined. In conducting such a large-scale study, the authors were attempting to find a one-size-fits-all approach to policy communication, so it stands to reason that they were unable to find conclusive evidence of the effectiveness of any particular method for policy communication.

Often, science communication is discussed in broad terms of communicating science to “the public,” whoever that vaguely refers to, and as a result unfortunately boils down to “dumbing down” science for a “general audience.” Of course, there is no “general audience”—science communication is far more complex than stripping jargon, simplifying concepts, and applying metaphors.

In the field of technical communication, Cagle and Tillery’s 2015 review of climate change communication research across multiple disciplines revealed that much of the literature, especially in risk research, is still reliant on a one-way communication model, and some of it even suggests that the “knowledge deficit” model still has something to offer climate change communication studies. This model, also referred to as the “banking model,” in which we first assume that the audience is simply missing some knowledge and it needs to be given to them, fails to recognize that, as discussed in the previous chapter, information on climate change is abundantly available. And, as also discussed in the previous chapter and in Cagle and Tillery’s literature review, studies have found that there is either little-to-no correlation between self-reported knowledge of
climate change and concern about it, or that increased knowledge of climate change can actually create apathy (Kellstedt et al., 2008; Bord, O’connor, & Fisher, 2000). The literature review does include studies indicating that higher personal risk perceptions connected with feelings of self-efficacy may lead to stronger motivation toward acting on climate change (Heath & Gifford, 2006; Safi, Smith Jr., & Liu, 2012). In other words, if people perceive that they are personally at risk of harmful impacts of climate change and they also feel that they are able to do something about it, they may be more likely to act. Cagle and Tillery conclude their review of the literature by calling for technical communicators to act as advocates in risk communication (and climate change is certainly posing an increased number of risks year after year) and for more targeted forms of audience analysis. Responding to this call is a complex challenge, and using the information gathered from social sciences may be vital in understanding how we can best communicate the risks and motivate our audiences toward action on climate change. But there are other barriers besides short-term self-interest and long-term lack of efficacy.

Several scholars have addressed why convincing the public of the scientific consensus on global warming has become such an uphill battle for scientists and science communicators. In their bestselling book, Merchants of doubt, science historians Naomi Oreskes and Erik M. Conway outline how issues from the effects of tobacco to the hole in the ozone layer to global warming have been muddled by a few “scientists” in order to disrupt policy that should be clear and easily supported by the public (2010). Counternarratives to global warming have been produced across a spectrum of bogus notions; from blaming it simply on the sun’s natural warming and cooling cycles (Jastrow, Nierenberg, & Seitz, 1989) to arguing that it will simply cause a lot of human
migration and adaptation and that’s a natural part of our history to arguing that from an economic perspective, things would work themselves out, as fuel prices would go up and consumption go down, and the problems were far enough away that they should be discounted and would be easily dealt with by future generations (National Research Council, 1983), which is not at all what has happened and was based on politically motivated and twisted data that has since been debunked (Oreskes & Conway, 2010; Nierenberg, Tschinkel, & Tschinkel, 2010). The rhetoric of these narratives is rooted in the values of the free market, freedom of speech, and consumer freedoms—scaring people away from consuming so much fossil fuel impairs the free market, freedom of choice, and freedom of speech (of the fossil fuel industries), as does implementing policy to clean up our air and waterways.

Oreskes and Conway meticulously expose that there is a well-oiled (as in, well-funded by oil and other fossil fuel interests) doubt machine that pushes back against any scientific consensus that does not suit the fossil fuel industry. By appealing to the American value of fairness in the press, these doubters and deniers claim that they have an equal right to air time and should be considered with equal weight in the debate about whether climate change is real and/or anthropogenic. Yet the scientific community is not divided half and half as it appears to be so often in news articles and arguments from political pundits. The issue, for most scientists, is settled: The climate is changing, and humans are largely responsible. The challenge then, for technical communication and rhetoric scholars is how do we communicate past doubt when we cannot rely on scientific consensus?
In her 2011 article, “Manufactured scientific controversy: Science, rhetoric, and public debate,” rhetoric scholar Leah Ceccarelli argues through rhetorical analysis of three case studies of what she dubs “manufactured scientific controversy,” including global warming, that even and especially when scientists double-down on the reliance of peer-reviewed data, that data is more deeply questioned and rejected. This is because, as she argues, the peers are viewed as part of an insular group of scientists, who, while they may not be outright conspiring against the average person, are seen as trying to fit their work into the mainstream—a mainstream that has been constructed not by careful and repeated evaluation of data, but by a left-wing agenda. So the more someone repeats how mainstream it is to accept anthropogenic climate change, for those who are inclined to reject it, the more they create a further reason to reject it.

As Ceccarelli further describes, one of the major barriers to breaking through doubt in science is that in the global West, “We assume that there are always two sides to a debate, and we structure our institutional discursive forums around this belief with balancing norms that ensure both sides are given equal representation and equal time” (p. 205). The problem with how we approach science in the Western world is that we assume two sides, and that assumption applies to even the most complex ideas. Science is, of course, far more complex than a binary system of right or wrong, acceptance or rejection of a hypothesis. Approaching science communication from a sense of a complex ecology, as I will describe below, allows us as communicators to not fall prey to what we are accusing our audience of: assuming there are two sides, right and wrong, and assuming that our side is right and their side is wrong or even that we have the answers and the
audience is misinformed. Instead, we can examine where all participants are viewing the information from and better understand how it will be interpreted.

Ceccarelli concludes that we should “engage the debate, but after refuting the most damning charges, shift the focus of discussion away from the conjectural stasis, recognizing that manufactured scientific controversy is really ‘a political controversy over values masquerading as a scientific dispute’” (p. 212). She is arguing that engaging in this debate and then shifting it to policy might allow for points of contact to be found and for progress to be made. I would argue that while the goal should be to seek out those points of contact by moving away from “conjectural stasis,” the issues are so deeply entrenched in values that the points are impossible to extrapolate if we begin by situating ourselves on one “side” or the other of this debate. Not to mention that, rarely, if ever, does debate result in anything other than further entrenchment. Engaging the debate at all forces the conjectural stasis; to think we could move on to policy after engaging this debate seems to ignore this.

Ceccarelli later draws upon the humanistic assumption that identifying sponsors (or merchants, to borrow Oreskes’ and Conway’s term) of doubt in science will clear things up: “Defenders of the scientific mainstream should not hesitate to offer rebuttals that reveal a manufactured scientific controversy for what it is, pointing to the ‘smoking gun’ memos that expose the political machinations behind organized campaigns to defeat inconvenient scientific knowledge in the public forum” (p. 216). But this strategy, too, opens the door for dissenters to argue that there is money in climate science research because that is where the mainstream consensus lies and that those who oppose climate research are champions of the free market. Despite Ceccarelli’s earlier argument that we
should seek points of contact in shared values, this strategy ignores the entrenched values that are inherent in dissent from mainstream science, those of the free market, individual choice, and freedom of speech and the press. Ceccarelli’s rhetorical analysis of three “manufactured controversies” offers important insight into the state of misinformation and the ways in which scientists have failed by dismissing dissenters and deniers. Yet her recommendations require further research and in fact seem to ignore the research that has been done in environmental psychology.

**Humanist rhetorics of environmental communication**

Ceccarelli is not alone in making this rhetorical move toward more open acknowledgement of the scientific process as part of science communication. Within the fields of technical communication and rhetoric, the issue of environmental communication has been addressed primarily through the lens of humanism, rooted in the idea that clearly communicating how climate change might impact people will drive change. This lens may at first glance appear to remedy the problems presented in many science-driven studies on climate change communication by addressing the human audience more specifically, but it may also be an overcorrection. The major works in technical communication scholarship on environmental communication tend to focus on stakeholder engagement, having clear communication, and tapping into how the audience views nature (Blythe et al., 2008; Coppola & Karis, 2000; Herndl, 2014; Mabon & Shih, 2018; Palmer & Killingsworth, 1992; Simmons, 2008; Simmons & Zoetewey, 2012; Wickman, 2014; Yu & Northcut, 2017). These are important steps for the field, and certainly engaging the audience in these ways is necessary. Yet there are still some
problems with approaching science communication from a purely humanist perspective. Posthumanist and new materialist theories may help in addressing those problems.

The study of environmental science communication in the field of technical communication and rhetoric really took off with Palmer and Killingsworth’s 1992 book *EcoSpeak: Rhetoric and environmental politics in America*, comprised largely of an extensive rhetorical analysis of technical documents such as environmental impact statements and environmental policies, as well as a thorough history of environmentalist arguments in the United States from John Muir to Earth First! writings. The authors anchor their theory in what they refer to as *eco-humanism*, the idea that access to clear information for humans must precede any major environmental improvements. They conclude first that one large barrier to changing attitudes about the environment is a reliance on *ecospeak*, or specialized language stemming from scientific objectivity. Second, they suggest that writers need to shift from trying to communicate through these documents alone to using tactics more like what we saw from Rachel Carson and Aldo Leopold in their respective environmental writings. *Silent spring* (1962) and *Sand County almanac* (1949), Palmer and Killingsworth argue, were effective because they used plain language and spoke to the human imagination. What we need, according to Palmer and Killingsworth, is an intelligible rhetoric of sustainability that invokes pathos, not a purely and objectively scientific or political approach. In a way, this focus on pathos may not be so completely humanist, as it concedes that there are other factors beyond human rhetoric that have a rhetorical effect (hence, why they refer to themselves as “*eco-humanists*”). It begs the question of why descriptions of a spring with no chirping birds was an impactful image for Carson’s audience, and why descriptions of pond life resonated with
Leopold’s. Palmer and Killingsworth come very close to introducing this idea that nonhumans have rhetorical agency as well. The authors frame the significance of these written works as human rhetors utilizing human relationships to nonhumans (Carson and Leopold invoking a pathos appeal in appreciation for natural beauty in the environment). A posthuman approach, which I will discuss at length below, would argue that the nonhumans are not only objects to which humans relate, but that they are themselves agents upon the human audience. While Palmer and Killingsworth do not quite go that far, they set the stage in acknowledging that human relationships to the nonhuman environments are significant in establishing effective environmental communication models.

*EcoSpeak* asks environmental communicators to consider their audience in terms of where they fall on a three-point, horseshoe-shaped continuum of views of their relationship to nature (Nature as Object, Resource, and/or Spirit). From that audience awareness, we can understand what tensions lie underneath conversations about the natural environment. If you understand an audience’s view of nature and their state of knowledge, Palmer and Killingsworth argue, you can find a way to communicate the science to them in a way that they will care about, and then they will be motivated to act. Through this perspective, knowing what our audience thinks of nature and then clarifying the science while invoking pathos through their connection to nature allows us to connect people to a global philosophy. While the focus on pathos is a good move, the humanist emphasis on explaining the science more clearly, even for a specific audience leads to essentially a deficit model in which the simple solution to environmental issues is to first understand the void of knowledge, then figure out how best to fill it.
This idea of eco-humanism has largely dominated environmental communication efforts in technical communication and rhetoric ever since. Following this theory, Coppola and Karis produced an edited collection, *Technical communication: Deliberative rhetoric, and environmental discourse* (2000), that repeatedly applies this same humanistic principle: engaging community members and increasing access to straightforward scientific information will produce increased scientific literacy and community engagement. Adhering to Kenneth Burke’s theories in *A rhetoric of motives* (1969), the chapters push for a focus on changing attitudes about the environment through various means of clear communication. Many of the authors present case studies in which they rely heavily on the *EcoSpeak* continuum of human relationships to nature for understanding how individual actors are approaching socio-environmental issues, thereby engaging stakeholders by hearing them out and working toward a compromise\(^1\) (Cooren & Taylor; Karis; Schlenz; Trumbo; Waddell). Others argue that simply exposing humans to the very tangible wonders of nature without the distraction of science will create a change in attitude and an increase in interest in protecting the environment (Frost; Ingham). While this approach does seem to acknowledge agency of nature, it neglects how complex that agency is and how complexly it interacts with humans. Not all humans have positive experiences camping or hiking, for example, and a day spent outside getting eaten alive by mosquitoes is not likely to make an environmentalist out of anyone (consider how many comedians have made an easy target of camping, hiking, or

\(^1\) I will discuss this at length in Chapter 4 and alluded to it in Chapter 1, but it is worth noting here that because anthropogenic climate change is a global problem, it is not possible to bring all stakeholders to the table. Therefore, attempting to engage stakeholders inevitably privileges those stakeholders who are accessible to community leaders and researchers, resulting in the “urban bias” and often leaving out rural communities and especially rural communities in developing nations.
other outdoor recreation, or popular t-shirts that boast “I’m Indoorsy”!). Moreover, much human interaction with nature leads to greater destruction of those areas—consider the aftermath of a large family picnic; or the tourists who put a baby bison in their car because they thought it looked cold, resulting in the park rangers having to euthanize the bison (Brulliard, 2016).

The underlying humanism of the Coppola and Karis chapters assumes that if people are exposed to the facts or at least the existence of nature and given a chance to express their opinion, we can reach the best outcome for the most people, increasing scientific literacy and efficacy; unfortunately, we are starting to see more and more that this assumption simply is not true, especially if we include nonhuman agents in that “everyone.” With a dramatic increase in venues for expressing opinions (social media, town hall meetings, special elections, etc.), and an increase in accessibility of science information, we also have an apparently increased polarization of attitudes toward nature, science, and subsequently climate change. Nancy Waters Coppola acknowledges this polarization in a way: “Some language features often used in environmental discourse can prompt mindless responses. For example, use of oppositional pairs such as ‘logger/tree-hugger’ or ‘environmentalist/developer’ triggers a predetermined bias” (p. 23). In this example, Coppola starts to get at the problem with binaries, or that the audience may have categorized certain terms as correlative to a positive or negative thing. The recommendation she makes is to “go beyond a simple observation of archetypal dissociative relations to an understanding of environmental behavior as a resulting artifact of attitude to nature” (p. 25). This is a great step toward getting rid of binary thinking when it comes to audience analysis and environmental communication
and thinking of our audience as more complex. This approach still limits us to considering the attitude of human to nature when we could also be considering what interconnections there may be between the human and various factors within nature. The focus is still on listening to and prioritizing humans in the hopes that doing so will encourage them to see their responsibility to nature.

**Addressing problems with humanism**

While humanism is a workable lens for viewing environmental issues that allows for the researcher to engage the stakeholder, there are some facets of humanism that, when applied too directly and without caution, can lead to the assumption that humans are the only actors at work rhetorically, and more frustratingly, that we only need to find a way to make human actors understand the issue, and then they will be motivated to change. While much traditional science communication held fast to the sender-receiver model of communication, the complete focus on humanism is perhaps an overcorrection. While it is important to keep humans in focus, in particular our audience and those impacted by environmental issues (see Chapter 3 for more), the humanist model assumes that full rhetorical agency resides with humans and leads to the assumption that behavioral changes can come from the science being explained clearly and comprehensibly. But as discussed above, this is turning out to not be the case with climate change science.

Social scientists seem to be pointing toward this focus on clear communication as a problem and that there may be alternate and more effective ways of expediting behavioral changes. For example, in an international sociology study, Bain et al. (2016)
found that participants were as motivated by the potential for economic and scientific development as they were motivated by belief in climate change when it came to public, private, and financial actions toward climate change mitigation. In other words, belief in the grim science was only as motivating as the hope in the progresses of science and the economy in light of that grim science. Such studies in the social sciences point to a need to consider the positive benefits of making these behavioral changes rather than focus on the negative consequences of not making them.

Because we in technical communication are in a position to act as mediators between the scientists who are studying and discovering what needs to be done and the communities who need to act quickly, we need to be seeking out ways to motivate that action. The first step toward effecting change is recognizing that simple and clear communication and even belief in the science is insufficient in cultivating behavioral changes. In other words, humanism must first be recognized as limiting in its scope for communicating about and mitigating the effects of climate change.

A potential shift in the field of technical communication

With posthumanist and new materialist theories gaining ground in recent decades, approaches to research in the field of technical communication has broadened. Many scholars are now addressing the ethical implications of considering technologies and spaces in conducting rhetorical audience analysis, asking how those technologies and spaces play a significant rhetorical role (Britt & Douglas, 2006; Brooke, 2009; Creswell, 2013; Dilger, 2006; Slack, et al., 1993). Henry (2000) and Spinuzzi (2003) argue for a shift in the field of workplace writing research toward new theories to ground researchers
in thinking about the more complex forms and ways of understanding writing beyond efficiency and transmission through genres. Henry argues for researchers to use social constructionist theory to consider the workplace as a culture that shapes writing, and Spinuzzi argues for technical communication researchers to use the Latourian activity network theory to consider factors within the workplace that have an active impact on writing. Spinuzzi argues that to adapt to the workplace, discourse workers need to create genres that are flexible and can be made effective in different settings. Though it is important to note that both of these authors still consider humans the sole constructors and receivers of rhetoric, they push the field forward toward acknowledging the influence of factors other than humans in the construction of rhetoric. Spinuzzi in particular is acknowledging the vibrancy and malleability of the networks across which these genres move.

But technical communication and rhetorical theory ought to also acknowledge the rhetorical agency of nonhuman actors that complicate these models. Recall that Aristotle’s definition of rhetoric is “the available means of persuasion,” which, as discussed above, has been narrowed by the field to mean only means of persuasion that are available to humans. This human-centric definition of agency neglects to consider the more complex systems through which rhetoric acts. Including nonhuman rhetorical agency in the field of study allows for a more comprehensive examination in both research and practice.

In some ways, we have been considering this agency of nonhuman actors for quite some time. Rhetoricians and other theorists have often recognized that there is a traditional disconnect between knowledge producers and knowledge consumers that
restricts the effectiveness of knowledge producers’ words, particularly in communicating the sciences (Ceccarelli, 2011; DeLaurier & Salvador, 2016; Druschke & McGreavy, 2016; Gross, 1994; Latour, 1987; Oreskes & Conway, 2010; Palmer & Killingsworth, 1992). We as technical communication scholars tend to acknowledge that we should be using models of communication that are more contextualized and less focused on the sender–receiver model (Slack et al., 1993), but we still struggle to point to and name exactly what it is about those contexts that is causing the disruptions in rhetoric. Even more complicating models such as the social constructionist model, which seeks more contextualized communication and addresses ideologies of both audience and rhetor, are centered on human rhetorical agency.

Recall from Chapter 1 that many of the critical works on research and theory in our field continue to consider rhetorical agency as purely a human capability. For example, recall that Foss (2008) asserts in the introduction to her rhetorical analysis research text that humans are the sole creators and receivers of rhetoric (p. 3). All the forms of rhetorical analysis and research that she presents then, are built on this human-centric concept that rhetoric must be intentional (cannot be accidental) and that it must be done by humans. This definition of rhetoric shuts out the possibility that we ought to consider anything other than human in conducting rhetorical research and analysis, because nothing other than human is capable of rhetoric. Even Palmer and Killingsworth’s critical work is rooted in eco-humanism and is strictly focused on human attitudes shaped by rhetorical symbols in human language. As I note above, these authors present a way to consider the audience’s relationship to nature, a big step forward in environmental communication, but the next big step is to consider the actual rhetorical
agency of nonhuman entities, both natural and technological, on humans. Despite over two decades of work that uses Palmer and Killingsworth as groundwork for communicating about adapting behaviors in light of climate change and other environmental destruction, technical communicators still struggle to reach the public. We still run into disruptions in the rhetoric that defy this model.

There seems to be a more recent shift, however, in how we are approaching environmental communication, toward considering forces outside of humans and human-driven rhetoric and their impact on the audience. In composition studies, Weisser and Dobrin (2012) put together a collection of essays, *EcoComposition*, on ways to bring environmental dialogues and even scientific concepts of ecology into the rhetoric and composition classroom. The essays each present actionable projects for pedagogy that incorporate an understanding of rhetoric as more complex than we or our students tend to think and emphasize the importance of community engagement.

Many scholars both in and outside the field of rhetorical studies are even moving away from Foss’ assumption that rhetoric can only come from humans and must arise out of intent to persuade. Among the new materialists I will discuss below, both in rhetorical studies (Edbauer, Gries, Rickert, Rivers) and in political theory (Bennett, Coole & Frost), rhetoric scholars Debra Hawhee (2016) and Diane Davis (2010) also counter this human-centric narrative in their work on the rhetorical capacity of animals.

Rhetoric is even stretching outside the field to engage with this idea across disciplines. Druschke and McGreavy (2016) published in the prominent environmental studies journal *Frontiers in Ecology* on the exigence for what rhetoric has to offer ecology, going all the way back to Aristotle, but also referencing Kenneth Burke and
Other more recent rhetorical theorists, pressing for scientists to use these noted rhetoricians’ established strategies to engage audiences outside of academia and bring more public relevance to research in the sciences. The bigger of a problem climate change becomes, it seems, the more scholarly work in technical communication and rhetoric focuses on it. As a whole, the field of technical communication and rhetoric is becoming aware that this issue of how to effectively motivate the public to act on anthropogenic climate change is largely in our hands, and increasingly, we are recognizing it to be an issue of understanding our audience as more complex.

Reintroducing humans to the wild

One major factor that has made an easier case for humanism is a division between what we perceive as “nature” and what we perceive as “human” or “civilized.” This division has remained prevalent throughout literature and rhetoric in Western society. This notion extends back to the Ancient Greeks and the nomos/physis or culture/nature split (Aristotle, 1992) and can be seen in even some of the most well-known and well-loved environmentalist rhetoric. John Muir, for example, often makes this clear distinction between human and nature in his writings, seeing this excursion into the wild as necessary for the human psyche, praying that these areas will always be kept safe from civilization. This falls into the pristine myth, or the pervading assumption that nature without humans is perfect, untarnished by the destructive forces of civilization, as if those forces do not stem from the same origin or obey the same laws as the destructive forces of nature. The separation has been critiqued most famously, perhaps, by William Cronon in his 1996 essay, “The trouble with wilderness; or, getting back to the wrong nature,” in
which Cronon argues that seeing a distinction between what is “wild” or “natural” and what is “tamed” or “civilized” is actually detrimental to environmentalist agendas. The distinction misses the point of how closely humans and their environments are connected, how much nature impacts humans and vice versa, and how impacting one area not seen as “natural” has ripples of impacts on other areas.

More recently, Emma Marris in her best-selling book *Rambunctious garden* (2013), points out that humans have had such a strong impact on nature already, an impact extending even deep into areas we still consider to be wild and pure, that a rhetoric of “conservation” and “sustainability” is misplaced and a rhetoric of “resilience” is more appropriate. In other words, our language should focus on preparing the natural world to withstand the inevitable impacts of human development. Marris makes the case that policy regarding the environment happens to benefit only humans. In particular, we only choose to protect wilderness areas that are aesthetically pleasing to the human eye and we primarily choose to protect endangered species that we find “cute” or that we clearly perceive to serve a purpose to our ecosystem. This policy both reflects and is reflected in the research that ecologists choose to conduct. For example, researchers may be more drawn to study wolves because they resemble dogs, in which humans find great value both aesthetically and in terms of utility, and policy makers are more likely to pass legislation to protect these popular animals and to fund research institutions that study them than other species. Consequently, recent policy that attempts to strip protections on what are known as *charismatic megafauna* gets more attention and public outrage than policy that attempts to strip protections from smaller and less interesting creatures, such as endangered species of beetles or frogs. By pointing out that politics cares about the
environment only through a paradigm of human aesthetic and use, Marris draws attention to an issue with traditional conservation efforts: environmentalists are still considering human civilization to be separate and above nature.²

As discussed by Bruno Latour (2004) in his book *Politics of nature*, this is an ontological issue of a perceived separation between nature and politics, or between nature and society, even nature and human. Latour argues that political groups, even political groups designed to be about nature, have never been about protecting the environment and still consider the environment as something outside of or even beneath human civilization. Moreover, and more problematically, politics as the realm of humans has shielded civilization from considering itself part of the natural environment, and therefore, politics need not consider the natural environment as having agency or rights in politics. Latour does not offer a clear solution to this problem but he does point to problems and possibilities with political ecology and its theoretical potential to push what he calls *philosopher-scientists* to bring the environment into policy, to attribute agency to nonhuman actors beyond their inert ability to sustain our human lives and human civilization.

Political ecology, as Latour describes it, is not about believing in the pristine myth or living in some utopian peaceful harmony with nature, but about recognizing that there is no distinction between nature and civilization, that nature itself is even political and has a role in politics and the formation of our civilizations whether we intend it to or not.

² It is important to note that Marris’ work is often used to support policies of deregulation, such as rollbacks on the Endangered Species Act and the Wilderness Act of 1964, policies designed to protect specific aspects of nature because, at their core, they recognize the importance of even small aspects to the greater good of humanity. Marris is certainly not arguing for this, as she recognizes the value of all agents within a complex ecology and that these policies are designed to protect those agents from damaging human activities.
For example, the source of a community’s drinking and irrigation water, be it a river, lake, or snowpack, is an important agent in how policy around water rights are formed; when the water is high, that community may not even be aware of the political nature of water, but when water from that source becomes more scarce and must be regulated, its political efficacy becomes more apparent. Those of us who work in technical communication and rhetoric, often including scientists who may not normally think of themselves as discourse workers, are perfectly situated to reintroduce nature into politics, to advocate for the otherwise unheard (though not silent) forces in nature.

The hesitance to engage in political ecology thus far has been because “it shifts from certainty about the production of risk-free objects...to uncertainty about the relations whose unintended consequences threaten to disrupt all orderings, all plans, all impacts” (Latour, 2004, p. 25). Latour is arguing here that accepting that there is no real divide between the natural world and the human world is frightening for some, because this reveals implications both for human activity that is responsible for impacts on the natural environment as well as implications that what happens in the natural environment must be better understood and taken into account when constructing human civilization policies. Accepting this complex interwovenness between humans, society, and nature and breaking down these barriers between what is human and what is nature are key to the methodology for environmental communication that I will present here.

Nathaniel Rivers (2015) echoes Latour’s concern with the disconnection of human and nonhuman and describes “the current environmental crisis: the assumption that humans are separate from nature and that our chief ethical, environmental task is to remove ourselves as much as possible” (p. 421). This is what a humanistic rationale
assumes about environmentalism. Posthumanism rectifies this by assuming that humans and nonhumans have always co-existed, and that humans are a part of nature. The solution is not to separate ourselves (an impossible task), but to be cognizant of our connections and find a way to coexist harmoniously. The disconnect between science and the general public, Latour argues, is a result of the perceived disconnect between nature (perceived to be the object of science) and the public, or politics (perceived to be the subject of science). Nature does not need to be brought into politics, because it is already acting upon politics, but we do need to become aware of this agency. Theories of posthumanism and, more specifically, new materialism may be able to help us understand more clearly what is causing this disconnect to occur and how we may begin to repair that disconnect.

**Posthumanism: Beyond the human**

Materialism, as a theory focused on the effects of the materiality surrounding humans, fell into disfavor in the 1970s due in large part to the rise in popularity of philosophical approaches “associated with a cultural turn that privileges language, discourse, culture, and values” (Coole & Frost, 2010, p. 3). As a result, theories that appeared to detract from that which was human-centric or could be measured through language and clear rhetorical structure were deemed “naively representational or naturalistic.” Nonhuman agents were relegated to relatable metaphor at best and insignificant objects at worst.

Posthumanism in philosophy, rhetoric, and political studies may have risen as a response to this over-corrective emphasis on the human by making the argument that
because humans are so fully submerged in information networks and media (from the way we communicate with one another to the way we conduct research to the way we know what time it is and where we are in space), that we no longer live in the realm of the purely human, but in that of the posthuman (Clark, 2004; Farman, 2013; Haraway, 1991; Hayles, 2008; Meloncon, 2013; Miller, 2007). N. Katherine Hayles’ work in particular is rooted in science philosophy and the study of technological developments that have expanded our neural networks. Donna Haraway even argues that humans have constructed ourselves to be cyborgs, or hybrids of humans and machines, with distinct intentionality: “We actively determined our design through tools that mediate the human exchange with nature” (p. 22). Again, a problem with the humanist lens is that it tends to assume this distinction from nature. Haraway and Hayles each argue that much of technological development in the past century has been with this division in mind, intending to create further mediations, to prevent humans from being required to interact with nature.

As discussed above, however, this is hubristic and a false binary. Humans are part of nature. Both authors also discuss that technology is merely an extension of the human, therefore technology that mediates our interactions with nature does not fully separate us from it. In fact, many technologies can actually enhance an individual’s relationship to nature. For example, a pair of binoculars can increase appreciation for wildlife without the need to get close enough to disturb it,3 or a GPS unit can allow someone to explore wilderness without getting lost. We may think of technology as dividing us from nature,

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3 I am thinking of a recent trip to Yellowstone National Park during which I was able to observe twin grizzly bears in a meadow from a safe 600 meters away, close enough to develop a healthy appreciation and respect for them and to not desire to get any closer.
as the complex shelters and transportation systems we develop seem to take us farther away from our “natural” state; yet these systems become part of the complex ecosystems, sometimes destructive, but entirely integrated.

There is no way to divide us from nature, no matter how much we mediate our experience with it. While posthumanism identifies that the definition of what is human cannot be contained nor can it be separated from its environment, new materialism emphasizes the agency of the nonhuman agents within and without our environments. If we ask the old adage: “If a tree falls in the forest and no one is around to hear it, does it make a sound?” posthumanism says, “It does if there was some kind of recording device so a human could hear it at some point;” new materialism simply says, “Obviously.”

**New materialism: Agency beyond the human**

As introduced in the previous chapter, new materialism is a set of interdisciplinary theories found within posthumanism, but it has more recently been gaining ground in the study of rhetoric and technical communication. The central theory is that matter matters, that nonhuman subjects, previously considered objects, have agency that influences human perceptions and understandings of the world. Laurie Gries (2015) frames new materialism as “an ontological project in that it challenges scholars to rethink our underlying beliefs about existence and particularly our attitudes toward and our relationships with matter” (p. 5). This is essentially the task set forth by new materialist theory for scholars across fields, but especially in technical communication and rhetoric, where the way we talk about, frame, represent, and communicate information regarding matter is important for revealing and presenting our perceptions of
our relationship to matter. New materialism is a re-envisioning of the relationships between humans and nonhumans that would reconsider the roles involved in that dichotomy, the ensuing hierarchies, and the impacts of these nonhuman actors, both perceived and invisible (Barad, 2011; Coole, 2010; Grosz, 2010).

Scholars are already seeing applications for posthumanism and new materialism in social justice, a distinctly human-focused work. Rose and Walton (2015) constructed a posthuman view of the roles nonhuman agents play in human lives and recommended that an examination of the impact of those agents could lead to a better understanding of how to improve the lives of those humans. Coole and Frost in their edited collection on new materialisms (2010) argued that the implications for social justice are boundless, as examining nonhuman actors’ impacts on humans reveals social injustice and ways to rectify it. The authors give the example of the correlation between air pollution, high school drop-out rates, and crime in impoverished areas and suggest that examining the root cause of high crime rates to include these nonhuman agents might lead to better results than increasing the police force or doling out harsher penalties.

In this way, I see posthumanism and new materialism creating space for social justice to overlap with environmental justice to reveal important new areas for research. Take, for another example, the water crisis in the city of Flint, Michigan. The pollutants in the water are (as of this writing in 2019) still poisoning people, in particular people of color who live in an impoverished area. While the most blatantly devastating part of this is the innocent lives that are being destroyed, the impact on the water itself will carry a much longer detriment to the environment, one far more difficult to rectify. A new materialist lens opens the door to considering these impacts and how they are deeply
connected, not just how human actions impact humans, but how those actions impact the water, the soil, and the plants and wildlife that rely upon them for health, and come back around to impact humans in the long term. In other words, a new materialist lens allows us to closely consider the nonhuman without losing sight of humanity. In drawing these close connections between environment and society, new materialist theories can close the perceived gap of politics and nature (Latour, 2004) and allow for us to see the clear overlaps in environmental and social justice, reintroducing humans to the natural realm and nature to politics.

It is important that we consider the rhetorical agency of nonhuman beings, but also that we consider that humans are not separated from their environments, though their perceptions may be that they are.

**Ambient rhetoric and the agency of assemblages**

My goal with applying new materialist theories here is to bring to the field of technical communication a greater “attunement” to the effects of environmental rhetoric and the agency of nonhuman actors. This idea comes from Thomas Rickert’s (2013) book *Ambient rhetoric*, in which Rickert discusses the rhetorical agency of nonhuman actors, both natural and technological, and the impact they have—whether we recognize it or not. For example, Rickert points out a speed limit sign has what we might consider traditional rhetoric, in that it has recognizable symbols to communicate the human law requires we drive at a certain speed through an area, say 15 miles per hour through a

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4 I realize it appears that I have here separated the human from the nonhuman, but I do this only to demonstrate that we are in fact deeply connected to these elements we perceive to be separate from humanity and our civilization.
particular residential area (p. 206). This would be largely effective, assuming the humans who encounter the sign are literate and care about adhering to the law. A speed bump, however, would have a rhetorical effect on nearly every human driving a vehicle in causing them to slow down. Because “The bump is an agent, and its force is not solely symbolic” (p. 206), someone conducting a rhetorical analysis of the situation may neglect to consider this bump to have any rhetorical agency, but it most certainly has a “means of persuasion” (Aristotle, 1992), demonstrated by the slowing down of most if not all humans driving cars across it. So what if the object is instead a large branch that has fallen into the road? There can be no human agency or intent attributed here, yet the effect is still there.

Rickert presents these new materialist values as not being misanthropic or antihumanist, as they are sometimes thought of, but as simply lacking in the hubris that humans are the primary actors in the world; these values are posthuman, not antihuman, looking beyond the human without neglecting human concerns. Rickert points out that the environmental movement focusing on changing our habits (that seem to us to be efficient and create convenience) and placing importance on human choice and rhetorical discourse. Drawing extensively on Martin Heidegger’s work, Rickert argues that this focus is a problem because it “neglects how efficiency already permeates everything: our knowledge and sense of the world, our discourses, our everyday practices, and even the built environment” (p. 261). In other words, the environment we have created for ourselves is built on efficiency, so a pathos appeal that asks us to set aside efficiency in favor of the long term overlooks the fact that our habits are central to our decision-making. Humans have built our habits for short-term efficiency, so a long-term emotional
appeal is not likely to be effective. Rickert is, essentially, calling into question the banking model, or the knowledge deficit model for communication. The humanist assumption at work in much environmental rhetoric is that by simply being informed about the impact of our actions (the information gap that needs to be filled), we will be motivated to change our behaviors. For example, we may be informed that riding the bus or a bicycle to work saves fossil fuels and reduces our carbon footprint; but driving a personal vehicle to work every day is far more convenient and efficient for us, personally. With the availability of the automobile, humans have constructed an environment in which it is more efficient for us to continue the behavior of driving every day, and asking us to give that up neglects to consider that this efficiency has been built into our lives. Nonhuman agents, including agents that determine roads, bike paths, and bus routes, have also played a role in this construction, and continue to evolve the situation.

Our habits, then, (in this example the habit of driving to work every day) are formed in part by this ambient rhetoric of nonhuman agents, so an attunement to the nonhuman, then, can lead to a greater understanding of our own values, values which include efficiency. The current environmental movement, with its focus on human actions’ impact on nature, is itself human-centric and overlooks the continual impact of nature and “natural” nonhuman agents on humans and their decision-making. An attunement to the ambient rhetoric of our audience, then, could lead to an understanding of how our own rhetoric will move through the audience and how it may alter meaning in different contexts.

Political ecologist Jane Bennett’s adaptation of new materialist theories suggests beyond ambience, nonhuman agents have active, alive, and moving agency. She proposes
a radically new consideration of **vital materialism** in her book *Vibrant Matter* (2010), an idea that matter is not inert in the way we have traditionally considered it to be. According to Bennett, the issue that we have been repeatedly running into when considering issues like environmental justice is that politics is considered exclusively a realm for the betterment of citizens, human citizens, again echoing Latour’s concerns that we have divorced nature from politics (2004). The agency of actors within the environment cannot be seen unless we choose to see it, and we may only choose to see it when it directly impacts us. Bennett’s suggestion is that knowledge workers “need to cultivate a bit of anthropomorphism...to counter the narcissism of humans in charge of the world” (p. xvi). In one of the most striking chapters, “Agency of assemblages,” she proposes that we consider agency “beyond human bodies and intersubjective fields to vital materialities and the human–nonhuman assemblages they form” (p. 30). We must consider all factors that led to a situation together and are continually acting on a situation collectively, not just as separate entities.

Bennett’s theories differ from Rickert’s in that Rickert is concerned with revealing the rhetorical agency already found within our environment and attuning ourselves to the impact of such ambience, while Bennett is more concerned with the active ways in which matter impacts us in a variety of direct ways, from the cause of power outages to the microbes in our food. But both authors recognize the implications their theories have for environmental rhetorics. Each spends an entire chapter elucidating what this means for human relationships with nature and how a theoretical approach such as theirs may help environmental movements. For Rickert, an attunement to or understanding of how we are impacted by agents in the natural world should make us
more conscious of wanting to preserve an environment that is desirable and beneficial for humans for the long term. While it calls attention to the nonhuman, it is still human-centered. For Bennett, an understanding of the agency of nonhuman actors means that we must consider that agency and humble ourselves in light of how interconnected we are to nonhumans. Her call to her readers:

Admit that humans have crawled or secreted themselves into every part of the environment; admit that the environment is actually inside human bodies and minds, and then proceed politically, technologically, scientifically, in everyday life, with careful forebearance...Give up the futile attempt to disentangle the human from the nonhuman. (p. 116)

Bennett’s focus is on what this attunement means for our relationship to nature. How should a perception of our actions’ impact on nature and vice versa alter our decision-making?

We often only notice the rhetoric of these nonhuman actors when they interact and shift the situation as an assemblage. Bennett and Rickert both call for us to be more aware of them in everyday life. Attunement to and explication of these nonhuman rhetorical actors and their agencies can strengthen the case of environmental technical communication work, as it helps researchers and practitioners develop a richer contextual model of the context in which rhetoric is likely to occur. In other words, as discussed above, technical communicators need to work to reintroduce nature into politics, or rather, to reveal how nature already is present as a rhetorical force in politics and why human perceptions of our relationships to those rhetorical forces matter.

In order to apply new materialist methodologies to research toward more effective communication about the environment, we must bring both Bennett and Rickert together.

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5 The case studies that follow in Chapters 3, 4, and 5 will present examples of how this kind of research and practice can work.
Though I may take issue with it, I will not abandon the human-centricity to Rickert’s theory, as it is still vital to applying these methodologies to areas in which environmental and social justice overlap; but in this dissertation, I will focus more strongly on Bennett’s concept of the vibrancy of material as I construct my methodology in order to better understand how complexly nonhuman agents act together with humans in impacting the meaning of rhetoric. Perhaps the clearest metaphorical term for this impact, and one that has been used for some time now, is ecology.

**Applications in rhetoric: Rhetorical ecologies and iconographic tracking**

While new materialism remains largely in the realm of abstract theory, there are rhetorical scholars who have already been working on applying it, whether explicitly or not, to construct clear research methodologies for the field of rhetoric. Here I will discuss two of them that I find most compelling and useful for my purposes: The first is Jenny Edbauer and her concept of *rhetorical ecologies* (2005) toward examining how a piece of human rhetoric moves through various contexts and changes meaning and the context itself; the second is Laurie Gries and her methodology of *iconographic tracking* (2015), designed to trace a piece of visual rhetoric and how it moves through the complex network of the internet and beyond. Each scholar presents a case study in which they put the theories of new materialism and nonhuman agency to the test to better understand rhetoric as contributing to a fluid, interconnected web (ecology) rather than originating from one static place and being received at another, and that this web includes the rhetorical agency of nonhuman agents. I will discuss both of their foundational theories here, but I will discuss Gries’ methodology in more detail in the next chapter, as it
provides solid groundwork upon which I will build my own method for mapping rhetorical ecologies.

The concept of a rhetorical ecology, again, comes from Jenny Edbauer’s work in studying how rhetoric changes as it moves through various contexts. She concludes that the traditional composition method of examining an audience’s rhetorical situation, while an important step forward from the sender-receiver model, does not allow for the shifts that happen through interactions between human and nonhuman actors in an audience’s environment, or what impact those shifts have on the reception of the rhetoric. Edbauer points out that although “oversimplified sender-receiver models of public communication have been productively complicated by theories like Lloyd Bitzer’s notion of the rhetorical situation” (p. 6), these theories “tend to be rooted in the views of rhetorics as elemental conglomerations” (p. 7). In other words, even postmodern rhetorical theories that pushed forward this notion of considering context as a factor in the creation of content as well as its reception revolved around a list of factors.6

Latour, among other postmodernists, certainly complicated the sender-receiver model with his Actor-Network Theory (ANT) (2005), arguing for what have become known (perhaps pejoratively) as Latourian lists, a way of taking into account nonhuman agents. In this method, the rhetor writes down a list of the nonhuman and human agents in a given context and considers the complexity of that context. The goal is to recognize that nonhuman agents, what we tend to think of as objects, are subjects and play important roles in local networks. Essentially, ANT asserts that social structures do not

6 Though I think the recent new materialist scholars owe a debt to philosophers and rhetoricians before them: Diane Davis (Levinas); Victor Vitanza (Deleuze and Guattari; Lyotard); John Mucklebauer (Foucault); Barbara Biesecker (postmodernizing Burke), Ulmer (Derrida), Slack et al. (Fouacult).
form out of thin air or even purely through human constructs, but that nonhuman agents also play a significant role in the construction of those social structures. Latour’s work in this area moved posthuman theories toward understanding how nonhuman factors shape human actions. Though ANT has been engaged within the fields of technical communication and rhetoric, the theory has been widely criticized in science and technology studies. There is new work being done in the field of technical communication toward what is called “ANT 2.0” and looks at competing factors (Kessler & Graham, 2018). Edbauer wants us to look more at the intersections of those factors than at the factors themselves.

Drawing on the work of Biesecker and Phelps, Edbauer questions the effectiveness of looking at distinct objects (factors) as being separate from one another. Her rhetorical ecology perspective instead examines where each of the factors that might get taken into account overlaps with other factors and changes the rhetoric. This is a model “that reads rhetoric both as a process of distributed emergence and as an ongoing circulation process” (p. 13). It does away with binaries and static connections, examining instead where and how those connections are kinetic, how they are active and how that activity changes the rhetoric.

This theory comes from her work in studying how rhetoric changes as it moves through various contexts, specifically, she examines the movement of the phrase “Keep Austin Weird,” a call to locals and visitors of Austin, Texas to shop local and avoid big chains. The phrase was never copyrighted, so it was repurposed on t-shirts, bumper stickers, and coffee mugs, taking on new meanings in new contexts, moving even out of Austin as tourists took the rhetoric home with them on souvenirs. The phrase could even
be twisted to reflect the antithesis in the context of a group or individual in favor of bringing in bigger chain stores. It is important to examine these instances, Edbauer asserts, because while “these counter-rhetorics directly respond to and resist the original exigence, they also expand the lived experience of the original rhetorics by adding to them—even while changing and expanding their shape” (p. 19). I would add to this that it is important for us to examine how rhetoric may be changed to reflect its antithesis in order to anticipate resistance to its message. For example, the term global warming is often used in sarcasm during times of cold weather in order to discredit the concept altogether (see the example in the opening to this dissertation). In this ecology, the audience’s experience with nonhuman agents (wind, snow, ice, etc.) contradicts the rhetorical phrase global warming, and therefore the term changes meaning. Not only does the phrase change meaning in this ecology, it actually alters the ecology itself. Here, it serves to further demonstrate to the audience that the science is “bad,” to serve the purpose of those who would purport that anthropogenic climate change is a hoax.

Edbauer’s rhetorical ecology model does away with dichotomies and static connections, drawing upon the work of Shaviro (2003) in studying communities as not just place, but kinetic connections between things—human and non—within that place. Considering these connections and how they shape and create meaning is important for technical communicators working to engage communities in complex scientific information, communicating not just how it informs the audience’s ecology, but how the audience might use that information to make necessary behavioral changes to create a more harmonious relationship with other actors. In other words, considering a rhetorical ecology allows us to think of new ways to engage the public in a better understanding and
re-envisioning of our connection to nonhuman actors. The ultimate aim is for the betterment of both human and nonhuman actors in their environments; for rhetoric scholars, that means by better understanding how those humans and nonhumans interact to create new meaning.

Though Jenny Edbauer does not outright invoke new materialist theories, Laurie Gries’ 2015 book, *Still life with rhetoric: A new materialist approach for visual rhetorics*, explicitly draws upon new materialism’s central concept of the agency of nonhuman agents and applies it to a research method for analyzing visual rhetoric. She refers to this new methodology as *iconographic tracking* and presents a case study of the “Obama Hope” image, designed by artist Shepard Fairey from a photograph. Gries begins with how the iconic image became iconic by examining the contexts in which it was conceived, as it was developed, and as it was transferred into new contexts, considering what new meaning the image took on and what meaning it conveyed. Like Edbauer, Gries examines instances in which the image was altered to mean its antithesis; where the original Shepard Fairey image was designed to promote Barack Obama as an icon of hope and change and forward thinking, it could easily be altered through digital networks and other media to connect him to negative concepts and values. For example, one artist added headphones and an “s” to the “Yes We Can” motto to read “Yes We Scan,” tying him to the revelation that the National Security Administration had a habit of tapping into American civilians’ phone lines.

Through a process of following, tracing, embracing uncertainty, and de-scribing, Gries considers how the nonhuman agents play a role in altering the meaning of the visual rhetoric, as well as the impact of the visual rhetoric on those agents. She
particularly considers the tools humans use to shape rhetoric and the impact those tools have on the rhetoric itself: “Too often, we miss the opportunity to acknowledge the force of things because we assume they are inert tools used by human agents whom we typically credit with full-blown agency” (p. 12). New materialism, she argues, offers a lens through which we can promote an egalitarian view of agency, not to the extent that we grant equal rights, but to the extent that we get a better sense of why and how rhetoric changes meaning across space and time. Gries calls upon rhetorical scholars to “give things their due in rhetorical study,” (emphasis mine) which involves “acknowledging the multiplicity of active and diverse rhetorical contributions things make to collective life” (p. 56). In applying new materialism, we need not go so far as to assert the equality of plants, animals, mountains, computers, the Internet, etc. to humans in rights or even equality of agency, but we can acknowledge that agency nonetheless and in doing so appreciate how deeply interconnected we are with things we used to consider inert. In doing so, we may come to be attuned to how our rhetoric moves through and across things and is even formed by things without our conscious thought, and we may even be able to attune ourselves to how our rhetoric may be altered in a context other than that in which it was formed.

The important thing is not just to note that nonhuman agents have a rhetorical impact, but that together, as rhetoric pushes through, around, and over these factors, they change the rhetoric itself, not just how it is received or perceived, but what it means. Nonhuman agents, agents, factors, whatever the theorist calls them, are not isolated or inert, but they work together to form ecologies through which rhetoric moves, pushes, and is moved and pushed; rhetoric has an impact on these ecologies, but it is also
impacted by the various factors within these ecologies, so that before it is formed and as it reaches an audience, it has the potential to alter in meaning. Understanding this and analyzing these rhetorical ecologies can help technical communicators better tailor environmental science communication to different audiences in ways that will work with their rhetorical ecology to motivate important behavioral adaptations. Edbauer and Gries both apply this understanding retrospectively, meaning both scholars look at how rhetoric has already impacted and been impacted by rhetorical ecologies by adopting this new materialist lens. What is still needed is an adaptation of this retrospective method toward a proactive method for understanding our audience and engaging them through a clearer understanding of their rhetorical ecologies. This will form the basis of my methodology, discussed at greater length in the next chapter.

**Virtue ethics**

Finally, the framework for my methodology will include a layered lens of virtue ethics, a theory in the rhetorical tradition. Virtue ethics dates back to, and even before, Aristotle, but has in the last couple of decades parted ways with the Greek philosopher in favor of a broader and more inclusive view on morality and examining how virtues are formed. Recall that according to Rosalind Hursthouse, a prominent contemporary virtue ethics philosopher, a virtue is “the concept of something that makes its possessor good; a virtuous person is a morally good, excellent, or admirable person who acts and reacts well, rightly, as she should—she gets things right” (1999, p. 13). Virtues are formed by experiences, values, societies, and various external and internal factors. In short, virtue
ethics accepts that the facts are not enough to make a person behave ethically and that there are other factors that influence these virtues and how strongly they are held.

Colton and Holmes (2018) actually apply this virtue ethics lens to the work of Jane Bennett (2010) in new materialism with regard to the environment. Bennett, the authors contend, “updates Aristotle by acknowledging patience can emerge out of our attempts to account for the multiple social and environmental relations that cultivate our various dispositions” (p. 123). Bennett, along with other new materialists, has presented a way for us to carefully consider that there is more than just verbal rhetoric at work in persuading human agents to act certain ways and cultivate certain dispositions and habits. With each case study and in the concluding chapter, I will recommend ways that technical communicators working in various communities can identify and utilize social and environmental conditions and actors that will encourage adaptive behaviors (virtuous habits) that will ultimately create a stronger virtue of environmental ethics. The aim is not to manipulate the environments in which certain virtues are being cultivated (doing so could take far longer and require cooperation with powers beyond those technical communicators have access to), but to recognize how agents within different environments are already being persuasive, and to create verbal rhetoric that will work with, not against, those virtues in those specific environments.

Applying a virtue ethics lens offers a way of approaching environmental communication to move past motivating acceptance of climate science to motivating action. As discussed in the introduction, we simply do not have time to convince people first to accept climate change and then to convince them to do something sufficient about it. We need to act faster than that, and, as discussed above, there is not even significant
correlation between belief in climate change and behavior changes; it is important that we convince people that they need to change their behavior by understanding their pre-existing virtues. We can better tailor climate change communication toward encouraging these changes in behavior by first identifying what virtues our audience holds as well as what factors contribute to those virtues, and then aligning the intended behavior with those virtues. For example, contributing to the virtue of economy, factors such as drought, dry land, etc. may encourage individuals to save water because it contributes to the environmental response to the drought, but we can also encourage saving water because it saves money, especially if the drought causes local policy makers to institute fines or additional taxes on excess water usage. If we learn that our audience does not value the environment, though, or has not had an encounter with the drought (water still flows from the faucet, the grass stays green, etc.), they may still be motivated by tapping into the virtue of economy, or the desire to save money. In fact, if they do not yet possess an ethic of environmental care, attempting to persuade them to save water for the sake of the environment may have an opposite effect.

There have, of course, been approaches to environmental communication similar to virtue ethics, such as a 2016 sociology study examining the five moral foundations (originally theorized by Jonathan Haidt) and how they impact willingness to change behaviors with regard to the environment (Dickinson, McLeod, Bloomfield, & Allred, 2016). This study applied the moral foundations theory to understanding divergence in climate change acceptance and found that those participants who valued compassion and fairness were more likely to state a willingness to change behavior; the other three foundations—purity, ingroup loyalty, and authority—were not determined to be
significant predictors. This is likely because it is difficult to determine in a simple moral foundations test what is viewed as pure, to whom the participant feels loyal, and which authorities are prioritized. It is also worth noting that this study measured only the participants’ stated willingness to alter their behaviors, and not whether any of them had or planned to. There are plenty of other factors that impact decision-making, and understanding how these factors work together in an assemblage would make the task of encouraging behavior changes much more efficient.

The goal is first to understand what virtues are held by an audience and how these virtues are cultivated through the impact of human and nonhuman agents, and then to use that understanding to communicate an alignment of environmentally adaptive behaviors with those virtues. In doing so, we can encourage the changes that need to take place immediately while changing the rhetorical ecology to more positively cultivate a virtue of environmental care in the future. This dissertation will apply this virtue ethics lens to mapping rhetorical ecologies as a way to more effectively communicate environmental issues to a posthuman audience.

Mapping Rhetorical Ecologies

As discussed above, while new materialism has been around for some time as a theory, only recently have scholars begun to apply the ideas toward developing strategies for conducting rhetorical research. While many have recently argued that such applicable strategies rooted in new materialism need to be developed toward advancing social justice platforms (Coole 2010; Herndl & Cutlip, 2013; Gries, 2015; Grosz, 2010; McNely, Spinuzzi, & Teston, 2015; Rivers, 2015; Simmons, Moore, & Sullivan, 2015),
few such strategies have been clearly and applicably presented, and those that have tend to be analytical, meaning they may help us understand how rhetoric and rhetorical situations *have been* impacted by nonhuman agents, which is important for applying these theories. Rose and Walton (2015) for example, present a compelling case for what new materialism might offer in the way of more clearly understanding a situation in terms of social justice work, and Gries (2015) and Edbauer (2005) each present case studies in which they study the rhetorics of nonhuman and human agents and how these agents have altered given rhetoric through networks. These works each make significant contributions toward applying new materialist theories to rhetorical analysis. But what is still needed is a forward-facing, applicable methodology that shifts the focus of analysis from understanding what has happened toward considering how we might use this theoretical lens to improve future communication.

In this section, I will present my methodology for using the theories of new materialism to improve communication, specifically communication about environmental issues and climate change with the end goal of persuading the audience to act. The aim of this new methodology is to apply existing new materialist research and analysis strategies to better understand an audience’s rhetorical ecology and to find previously overlooked avenues of communication for encouraging behavioral adaptations. This methodology should give the researcher(s) a better understanding of the virtues held by the audience and how the alignment of those virtues is influenced by nonhuman agents. I intend for this methodology to be applicable to researchers within the fields of technical communication and rhetoric, researchers working directly in the sciences and seeking to engage their communities, as well as practitioners of science communication, such as
individuals working with nonprofit organizations seeking to engage their communities in making behavioral changes related to the environment.

Recall from above that Edbauer (2005) introduced this concept of *rhetorical ecologies*, meaning the interconnected assemblages of human and nonhuman agents or agents that impact a piece of rhetoric as it moves through and around them, and that are impacted by that piece of rhetoric as well. This model, as Edbauer describes it, “reads rhetoric both as a process of distributed emergence and as an ongoing circulation process” (p. 13). In the methodology I will present here, I apply this concept by examining an audience’s perspective not just as a static point but as a system of values formed in part by a vibrant series of interactions with human and nonhuman agents, both impacting and being impacted as they move. I will then continue to consider rhetoric as fluid and vibrant itself, able to change and be changed by various rhetorical ecologies.

Recall also that Gries (2015) established a new materialist research strategy called *iconographic tracking*, which is tailored to examining how visual rhetoric has already moved and changed and changed its audience. But in the same work, she puts forth that “the research actions of following, tracing, embracing uncertainty, and de-scribing can help empirically account for rhetorical transformation” (p. 88). I will be applying these steps in order to answer the call Gries makes to rhetorical scholars: “By acknowledging distributed agency and mutual transformation, researchers ought to try to account for the complex network of agents that intra-act in any given rhetorical encounter” (p. 75). Here, I will adapt Gries’ methodology to my own ends with regard to environmental communication. I will be taking Gries’ and Edbauer’s methods of tracking a piece of rhetoric as it moves through various assemblages and applying it to how we prepare
rhetoric for public consumption, toward anticipating how it *might move and be moved* through various assemblages. In other words, I want to turn this retrospective analysis method into a proactive analysis method for deliberative rhetorical purposes rather than forensic (critiquing). This proactive method will be usable in creating more effective communication, in this case, in communicating about environmental issues with the goal being creating behavioral changes in the audience.

**Understanding and engaging with rhetorical ecologies**

Because my methodology seeks to be proactive rather than retrospective, I am reversing Gries’ first two steps. The first step in Gries’ proposed methodology is *following*. For Gries, this means “to track how a single image transforms across form, genre, media, and function as it actualizes in divergent versions” (p. 90). In her case study of the Obama Hope image, Gries does this by looking back at the origin of the image, what the context was in which it was originally taken and created, then engaging the community of artists and meme producers to see the different interpretations of the image that arose in unique contexts, and producing alternate new meanings.

But for Gries, following the path is not enough: “the collectives that come to be studied … appear to researchers only when the researchers have followed a thing’s transformations long enough for traces of collective engagement to become evident through empirical investigation” (p. 94). *Tracing*, her next step, involves closely examining the paths the image went through as it changed and examining what the collectives or groupings of human and nonhuman agents were that influenced and changed the image itself and its meaning. *Following*, then, is seeing how a piece of
rhetoric changed whereas *tracing* is seeing what changed it. In order to make this methodology work proactively, these steps must be done in reverse order. Thus, the first step in a proactive mapping of rhetorical ecologies is *tracing*.

**Step 1: Tracing**

The first step is to trace what potential factors may have an impact on a rhetorical artifact, which could be a brochure about a new farming policy, a fact sheet on how to save energy, or a newscast about climate science. This involves examining the audience’s rhetorical ecology closely and observing what factors and assemblages (collectives) have rhetorical agency and may impact the way rhetoric on environmental issues is received. This step is anticipating what might interact with the rhetorical artifact as it moves through the audience. In my methodology, though not in Gries’, it also involves understanding how those agents have worked to form virtues and what associations are held with those virtues.

Of course, it is impossible to anticipate every single factor, and when dealing with an audience of more than one, the factors and connections between factors will vary. However, this method can be applied to larger audiences by considering what we can know (or extrapolate from existing data or data we compile ourselves) that they will have in common (The US Census Bureau and information from the Yale Program on Climate Change Communication have been extremely useful resources for Chapters 3 and 5 in this dissertation).

This first step may begin at any stage of the research or communication project, though if the researcher is implementing the methodology in order to improve
communications, it should be done at the beginning of a project. In Chapter 3, I will discuss a case study in which I begin this step after initial rhetorical analysis of a document by using observational and statistical data on the locations of some of the anticipated audience for two pieces of rhetoric. In Chapter 4, I will discuss a case study in which the tracing truly began in the middle of the research process, as I observed what human and nonhuman agents have an impact on how members of a rural Moroccan community interact with their environment and upon what actions they take. In Chapter 5, I will discuss how this can be done at the beginning of a communication project through a case study with the Ohio Farmers Union in which I conducted a survey and interviews of members’ concerns and views on environmental issues and combined that with observations and spatially relevant information to inform future communication strategies.

To trace, simply put, is to observe, to notice, and to document human and nonhuman agents, and note what virtues emerge or have emerged as a result of particular human and nonhuman assemblages. Is the landscape full of trees or barren? What is the local climate? What is the weather like typically and has it been changing recently? What are the local political issues that everyone is talking about? Through what channels is information accessed most often? What shops and stores are accessible? Do people walk or drive most often? What I am describing may appear much like a Latour Litany, a term coined by Ian Bogost (2012) to refer to a long list of seemingly random or disconnected objects in a given scenario that litter Latour’s prose. If that were the case, I would call this a network, not an ecology. However, tracing extends beyond the Latourian list, because—as will become clear in the next step, following—assessing the significance of
the kinetic connections between objects and our audience is also important (Edbauer, 2005). Tracing is not assembling a simple list, because what we are examining with this methodology is multi-dimensional and vibrant. Tracing does not simply identify objects as present; this methodology step attributes rhetorical agency to the nonhuman agents.

Step 2: Following

The next step, and one that should be done close on the heels of the first, is following. Once a researcher has the working list of agents and virtues that may impact rhetoric in a given rhetorical ecology, they should next anticipate how those things and virtues will have an impact. What new meaning, for example, does the term global warming take on in an area that has mostly experienced the phenomenon through increased extreme weather such as blizzards and freak June snowstorms? What sort of impact might a forested landscape have? What about a creek and the salamanders in it? How does that creek intersect with a local radical environmentalist group to create a new message, and how is that message impacted by coal mines?

It may be helpful at this stage to create a map of sorts to begin to explain the agency of the agents. I start broadly with the largest and most obvious factors; these may include dominance of political parties or religious affiliation, geography and topography, sources of income. I then begin literally drawing connections on a piece of paper to visualize how things are intersecting and having a rhetorical impact that may be different than what I had anticipated (see Figure 2-1).
Figure 2-1 An example of an early map of factors in the rhetorical ecology of members of the Ohio Farmers Union

I continue to narrow the scope by considering things that may not have occurred to me initially. For this, I may need to conduct additional research.

It is at this stage that I may seek out extra information, either from US Census data or other organizations with research in the area. For Chapter 5, this is the point at which I put together a survey to ask questions of my target audience and followed up with a series of interviews. I included questions that asked about the environment to understand what sort of nonhuman agents might have an impact and in which direction (positively or negatively) with regard to changing behaviors. As I will discuss in that case study, I learned that there were several agents I had not considered, but that my audience informed me were of extreme importance to them, and there were some agents I had
assumed would have great agency that my audience was less concerned with. Adding this information allowed me to strengthen my rhetorical ecology map greatly.

This is where it should become clear why it is important to look at the kinetic connections between agents and humans and not just at a list of the agents themselves. For example, an audience may subscribe to a Christian faith, but how does that faith intersect/interact with their proximity to a stream that is interacting with algal bloom caused by run-off of excess fertilizer that is interacting with other complex factors on that audience’s farm? Does this intersection tell them that they are commanded by their faith to be stewards of the land and are therefore responsible to improve the quality of the soil and water? Or does the intersection relieve them of responsibility by believing that a higher power is in control of everything? Or is it more complex still? Understanding their value system and how that system takes part in cultivating their ethical habits or virtues, helps us understand these connections. Their faith is important, so how does it play out when intersecting other, nonhuman, agents?

Where Gries first measures how a thing changes through following and then examines agents through tracing, in conducting this research in reverse (or rather, thinking forward rather than looking back), it is only logical to first consider the elements at work and only then consider what impact they might have. In fact, going in this order will help also with the third step, necessary for all new materialist endeavors: embracing uncertainty.
Step 3: Embracing Uncertainty

Gries asserts that in order to work with new materialist research methods, the researcher must embrace the uncertainty of what they will find. They must accept that the process may reveal factors that were unexpected and appear to derail the original design or intent of the research. In a traditional “rhetorical study, when we interpret the rhetorical meanings of fixed, stable objects, we attempt to give certainty to an event that has yet to completely unfold” (p. 97). Though assessing objects or documents as fixed points and audiences as fixed participants makes our work easier, it delivers misleading results that also become irrelevant quickly. To counter this problem, the new materialist “acknowledges and embraces a thing’s ‘unwillingness’ to be captured by suspending interpretation and belief for as long as possible during the research process” (Gries, p. 97). For the methodology I am developing here, this certainly means suspending interpretation of nonhuman agents’ impact on an audience until the last possible moment. Until I have a full line-up of agents, or as full as possible, I cannot draw clear conclusions. Similar to what Walton, Zraly, and Mugengana (2015) refer to as messiness that can occur in community-based research, these complications and uncertainties can actually present opportunities, in this case, to form connections between concepts and values that may have been overlooked.

Gries discusses that it is important that boundaries be established, otherwise the research could literally extend into the infinite (and ever-expanding) expanses of the universe, but also that researchers must allow the things under study to define those boundaries where they emerge. Where one researcher draws the line reveals a great deal about that researcher’s motives, and it allows for too much bias to enter the equation.
This is indeed a limitation to most new materialist methodologies. A common critique of this process is “Where does it end, and how can you possibly draw that line without bias?”

While this appears to be a weakness of the theory and the methodology of tracing the impacts of a surely un-ending litany of agents, Simmons, Moore, and Sullivan (2015) argue that it is in fact a strength: “Because stability is exclusionary, Latour-like unstable portraits likely reveal connections otherwise obscured” (p. 278). Revealing those obscured connections is the primary goal of this methodology; while we can know that many people get their opinions from standard tribalisms (Republican/Democrat, Religious/Atheist, etc.), those delineations are not all-encompassing and do not determine all actions. They do not explain, for example, why a community in rural Texas might embrace solar power. The less measurable factors that create uncertainties are often far more interesting and can lead to an understanding of what rhetorical strategies may be more engaging for this audience. For example, the answer to why a community might react this way is not simple and measurable age or race demographics or average income; it is more likely a reaction to kinetic connections between changes in income and rhetoric, or the intersection of local economic shifts and rhetorical artifacts from a solar company that frame an investment in solar to result in a positive interpretation. It is impossible to know for certain. Yet through this kind of research, we can piece the factors together to better understand how they interact to create these kinds of opportunities for engagement with new science.

However, having this end goal also makes embracing uncertainty complicated. In the case of this dissertation, the end goal is to find communication avenues through
which we may be able to persuade our audience to make behavioral adaptations with regard to the environment. I want to be able to find a kinetic connection between these factors and environmentally friendly behaviors that can be utilized. This is certainly what Creswell (2003) refers to as “intentionally transformative research,” in that the motivation for conducting the research is to find results that lead to a potential change in the population studied.

This step must come directly after tracing and following, because this is the point at which our research instincts tell us to start drawing hard and fast conclusions. As Simmons et al. note, adopting “Latour’s disposition to construct rather than find or accept context helps articulate a methodological need for both action and simultaneous reflection-upon-action rather than calcified procedures” (2015, p. 282).

Embracing uncertainty is about allowing the research to go where the agents lead. Observing the agents before looking at the change they may make allows us to look at these agents without bias. We may want to believe and assume that having a creek in the back yard of some participants would make those participants more likely to hold environmental care to be an important virtue, but we have to continue observing the agents to see what other things may intersect and impact the creek, and only then can we observe what that intersection does to the rhetorical ecology. In this step, we take a moment to reflect on what we have observed and become comfortable with the limitations and uncertainties that this method brings, recognizing that if we have been successful, we may have revealed unforeseen connections that can open up new avenues of communication and at the very least, we may have produced an explanation for correlations otherwise overlooked as outliers. Once we have taken this moment, we can
move on to the final step of this process, in which we construct rich explanations of what we have observed.

**Step 4: De-scribing**

Gries adapts this last research action from Bruno Latour’s *Reassembling the social* (2005) in which he argues that exposing the content reveals the context; describing the network and all agents fully reveals the significance and the setting through which rhetoric is moving, has moved, or will move. This final step is the researcher putting into words what they have observed through the first three steps, using the maps sketched or complex lists of agents as a guide for detailing the ecologies that have had an impact and been impacted by the rhetoric as it moves through them.

For my proactive research, this entails fully embracing that uncertainty and constructing predictive, hypothetical descriptions of how these ecologies will impact a rhetorical artifact. In the first case study in Chapter 3, I will demonstrate how this can be used to anticipate how a piece of writing about environmental behaviors may alter meaning as it reaches a potential audience in a way that could help an extension office adjust communication efforts and strategies toward encouraging the adoption of those environmental behaviors. To demonstrate how this process can also work somewhat retroactively toward understanding future approaches, I will present an example of this in Chapter 4, in which I will look at an action that was taken and reconstruct the ecology through which rhetoric moved and the agents within that ecology that had an impact on an individual, as well as what reverberating impact that action had on an entire community. I will demonstrate the proactive possibilities for this methodology most
clearly in Chapter 5, in which I will construct detailed descriptions in order to anticipate how a message of environmental stewardship might be received by an audience of Ohio Farmers Union members and how I worked with community partners to tailor a message so that it can be accepted positively toward creating adaptive behaviors.

Whether proactive, retrospective, or otherwise, new materialist research, as Gries puts it, “must rely heavily on descriptions that do not belie their rhetorical complexity” (p. 101). In other words, we cannot shy away from how intricately and complexly interwoven these factors are. Rich, detailed descriptions may seem tedious and overwhelming, but as I have stated above, this process actually opens up possibilities for communication by revealing previously unseen connections and pathways.

The four actions of tracing, following, embracing uncertainty, and de-scribing, are an important practice and can create a solid foundation for any new materialist research strategy. The methodology I have presented here, mapping rhetorical ecologies, can be applied alongside any number of mixed-methods research approaches, as I will demonstrate in the following chapters. Chapter 3 will demonstrate how this method can be used quickly when composing short genres to encourage adaptive behaviors. Chapter 4 will demonstrate how it can be used to better understand data that has been collected by immersive observational research along with interviews; and Chapter 5 will examine how this can be used when there is ample time and a strong connection to the audience to build trust and establish long-term goals.
Conclusion

Not only does new materialism help to explain the influence of the material world on our communications, it also emboldens an egalitarian view of humans and matter in terms of agency, that is, the new materialist writing of science must consider the nonhuman elements to have a rhetorical agency that is equal to that of a human and to see how our relationships are far more connected and integrated than hierarchical. Again, this is not to assert the equal rights of nonhumans but the equal role they play in human life. We can choose to see hierarchy in our relationship to nonhuman entities, but to do so creates a dangerous lens that forces us to miss the significance of our actions toward those entities; the consequences extend beyond the immediate effects to the nonhuman; because of our interconnectedness, the laws of science as described through new materialism dictate that those actions will ultimately have a negative impact on us. This is also why it is not as necessary to change intrinsic values about nature in our climate change-denying audience as it is to change behaviors. Our audience may deny the science of global warming; they may also deny the value of nature or assert that humans deserve to be dominant over it, but they can see the connections and the value to themselves as humans, members of a community and as individuals, to make adaptive behaviors. We need not make the connection complete, that is, we need not convince someone that burning fossil fuels impacts global warming, but we may convince them that it has a negative impact on their own community’s air quality and encourage adaptive behavior. The factors involved in global warming that are readily visible in their rhetorical ecology and that they can see the fluidity of are more convincing than science itself when aligned with pre-existing virtues. The three following chapters each consist of a case study
utilizing this method and discussing further implications for this type of research. The concluding chapter will discuss what can be done next.
CHAPTER III

POST-FACT FACT SHEETS: COMMUNICATING PAST CLIMATE CHANGE
DENIAL IN COMMUNITY ACTION-ORIENTED GENRES

_Environmental rhetoric, then, addresses people and their relationships with both the humans and nonhumans who inhabit the global agora._

—Nathaniel Rivers, “Deep ambivalence and wild objects”

**Introduction**

What persuades people one way or another to accept or deny climate change? More importantly, what persuades people to act on, ignore, or even be defiant of climate change? Must one persuasion presuppose the other, i.e., do you have to first convince your audience to believe in climate change before you can convince them to adopt new behaviors toward being more environmentally progressive? These are questions that have plagued environmentalists concerned about climate change for the past few decades. As discussed in Chapters 1 and 2, technical communicators and rhetoricians at large have worked to understand what our role is in this wicked problem (Blythe et al., 2008; Cagle & Tillery, 2015; Coppola & Karis, 2000; Herndl & Cutlip, 2013; McGreavy et al., 2016; Palmer & Killingsworth, 1992). These questions may need to be examined now in light of recent trends among the general population of the United States to doubt science and science-producing institutions (Pew Research Center, 2017). Technical communicators are perfectly poised to apply rhetorical theories and research methods discussed in the preceding chapters to this problem of motivating people to adopt new behaviors (or adapt old ones) toward mitigating climate change.
In an era when misinformation is almost more readily available than truth, focusing our efforts on clarity in science communication can seem pointless; at the very least, it should be clear we cannot solely rely upon clarity to convey important messages. As discussed in Chapter 1, despite the wealth of readily available information in the form of websites, government-issued climate reports, and blockbuster documentaries, only 17% of Americans say they are “Alarmed” about global warming, while 10% are “Dismissive” and tend to oppose all climate action (according to an estimate from the “Yale Six Americas” study by Roser-Renouf, et al, 2016). In the middle of these two extremes lies the rest of the population who remain cautious or skeptical. The problem is not that the science is not clear enough; the problem is that it is easily (and conveniently) denied in favor of maintaining our current lifestyles. Even if we accept climate change, how do we get motivated to do anything about it when the risks seem so far away?

The challenge for technical communicators and rhetoricians invested in this problem is to shift from trying to move people from the “Dismissive” to the “Alarmed” column and instead start looking for other strategies to move people to action. To examine the first research question of this dissertation, *What strategies are currently being employed by technical communicators to engage these rural communities in understanding and, more importantly, acting upon environmental science?*, this chapter will consider a case study of two fact sheets, how they have an opportunity to engage rural communities in Utah, and how the content within them is framed. Fact sheets are short, succinct presentations of information and research published by the university for wide distribution among community members across the state, both rural and urban. As discussed in Chapter 1 of this dissertation, I am focusing on rural communities.
throughout because not only are they a traditionally underserved population, but their more limited access to information (Hodge et al., 2017; Whitacre & Mills, 2007) presents a unique social and environmental justice challenge for technical communicators. In order to also consider the third research question of this dissertation, How can technical communicators apply a new materialist lens (which I see as the most effective as I will describe later in this chapter) toward understanding rhetorical ecologies? How can this understanding be applied toward engaging unique communities in creating or adapting environmentally progressive behaviors and cultivating an ethic of environmental care?, I will also examine the rhetorical ecologies of a potential audience of these fact sheets and discuss how those ecologies may impact the interpretation and reshaping of the messages.

Rural Utah⁷, particularly Central Utah, is of particular interest because this is an area where many citizens are employed in mining and processing a good deal of the Western United States’ fossil fuels (US Census Bureau, 2010). These areas tend to run strongly conservative on most issues and tend to be in more denial than the rest of the country about climate change, yet there is still strong, perhaps unexpected, support for funding into renewable energy resources (Howe et al., 2015; Olson-Hazboun, Krannich, & Robertson, 2016). For example, Millard and Emery counties each deviate an estimated negative 20 points from the national average on climate change acceptance (see Figure 3-1); only Grant County in West Virginia and Panola County in Texas deviate that far in denial (Howe et al., 2015). Yet the Utah counties also express overwhelming support for funding research into renewable resources. That support is still about eight to ten points below the national average, but at an estimated 72% in both Millard and Emery counties,

⁷ I am considering the following counties in my assessment of rural Utah based on population distribution: Millard, Emery, Sanpete, Sevier, San Juan, and Carbon.
Figure 3-1 Estimated percent of adults who think global warming is happening, 2018, based on a nationally representative survey; highlighted is Emery County, Utah, which has one of the lowest rates of acceptance of climate change science in the United States.

Source: Yale Program on Climate Change Communication

this is an unexpected stance in the heart of Western coal and cattle ranching country (Howe et al., 2015). It seems that considering this particular audience only through statistics and political polling data is insufficient when it comes to understanding what motivates attitudes and behaviors regarding the natural environment.

As discussed in Chapter 2, conducting a traditional audience analysis by constructing an idea of the rhetorical situation (meaning examining the human context in which your audience is going to be receiving the information) may lead to a
straightforward and measurable view, one that appears helpful for the purpose of constructing a comprehensive and all-inclusive argument from climate change acceptance to adaptive behavior adoption. But looking instead at an audience’s context as a rhetorical ecology allows us to also see the fluidity of the situation and better strategize communication organization patterns for the complex connections between humans and their environments. In doing so, we may find unexpected avenues for approaching a persuasive argument to motivate behavior changes and even support for environmental protections and climate change mitigation. This chapter will conduct a rhetorical analysis of one form of communication, fact sheets, that have the potential to be used to reach out to these communities and will demonstrate that the persuasive approach in the sample of this genre is neglecting the rhetorical ecology. It is important to note that these fact sheets are not intended to represent all communication that all science writers are conducting in these communities, but rather they present two examples of a common genre of communication with rural communities that demonstrates some potential problems with current rhetorical strategies when it comes to encouraging adaptive behaviors.

It is also important to note that the authors of these fact sheets were likely giving closer consideration to more urban communities, including, and perhaps especially, donors to the university who are looking for evidence that the Extension office is working on climate change communication specifically, as well as citizens of the state who are not members of rural communities at all. The goal of this chapter is not to diminish the work of these authors or to imply that these fact sheets were not written with great care and thoughtfulness. The goal is to assess how these fact sheets may be construed by a rural audience and how future fact sheets could be written to better engage rural communities
in adapting behaviors with regard to the environment. Attempting to engage a wide range of audiences existing across a wide range of rhetorical ecologies is a tremendous challenge, so the goal is to consider how we can tailor communications toward more specific audiences.

**Rhetorical ecologies in rural Utah**

Recall from Chapter 2 that the rhetorical ecology is an idea put forth by Jenny Edbauer to expand upon the traditional rhetorical situation in terms of audience analysis and research. It involves considering all factors, human and nonhuman, that shape rhetoric for an audience before, during, and after that rhetoric is received. Similar to Thomas Rickert’s (2013) call for being attuned to and acknowledging the “ambient rhetoric” all around, Edbauer breaks with the sender-receiver model and asks communicators to look more closely at factors not yet considered and how those factors’ connections with each other and the audience are constantly shifting and therefore changing the meaning of rhetoric as it moves through and across these other factors. For rural Utah, the rhetorical ecology includes things like coal plants, ranging cattle, and a rampant rhetoric of the mistrust of science as well as more limited visible effects of climate change (the air seems clean because they are in flatter land with open skies and it is almost always hot and dry in the desert), industries under pressure to make big changes, the various local and national factors contributing to a troubled economy, and even aesthetic perceptions. For a clearer example of how complex a rhetorical ecology is, consider that Olson-Hazboun et al. (2016) found that support for proposed wind farms in these areas correlated quite closely with the distance from the wind farm, meaning the
closer the household was to the proposed site of the giant wind turbines, the less likely its inhabitants were to be in support of them.

The specific location matters significantly because there are so many factors impacting the rhetoric at work in these areas. Billboards and lawn signs may spout messages of support or rejection for various environmental actions. But looking at this as a static situation, as people who either accept or deny climate change flatly and then correlating that with willingness to take action or defy adaptive action when framed as a climate change issue is an irresponsible way to examine the audience. Olson-Hazboun et al. also found that there was little-to-no correlation in these communities between attitudes of acceptance toward climate change and support for the proposed wind farms; being close to the proposed wind farm was enough to make self-identifying environmentalists staunchly oppose this source of renewable energy in their area, due to what is known as the NIMBY effect (Not In My BackYard). There is an agency of assemblages at work here (Bennett, 2010) that includes the nonhuman agency (or affectivity) of scenic vistas, birds, land, mountain ranges, and the agency of humans who need or have jobs, humans who interpret the rhetoric on those billboards and lawn signs, humans who interpret the rhetoric of their natural environment as calming and may connect it to their values of purity and freedom.

The Olson-Hazboun case study indicates that there are other factors that impact the decision-making process and adjust how specific behaviors align with specific virtues. In fact, the proximity to mountains may have a positive impact in developing an environmental ethic of care—the more convenient it is to spend time in “nature,” the more an individual may develop a connection to nature and a desire to protect it. The
mountains in this way reveal a nonhuman rhetorical agency; their existence, their positioning, the sun rising or setting behind them, and the human perception of them as beautiful are additional factors in this rhetorical ecology that, when intersecting, create a new means of persuasion on human stakeholders, persuading them toward not accepting a change to this ecology and not wanting that ecology to be damaged. However, that ethic of care may extend only to the immediate environment and not to the environment of the planet as a whole. A second virtue held by the same individual may be an appreciation of pristine nature, in which case, the wind turbines would be seen as a destruction of that pristineness, as “the machine in the garden” (Leo Marx, 1964), even though the goal with the development and installation of the technology would be to provide cleaner air for the state and to preserve the natural world at large.

The Olson-Hazboun et al. (2016) findings refute an assumption that may be considered valid in a traditional model of a rhetorical analysis: We could assume that our audience either accepts or denies a basic premise and will therefore act accordingly. We could conduct a blanket survey of the area to find out whether a community is “alarmed” or “dismissive” with regards to climate change and choose from there whether a persuasive argument for the wind farms should frame it as a climate change issue or first begin by convincing the audience that climate change is a problem they should be concerned with. However, this type of approach would also assume that acceptance and denial are the only positions individuals can take with regard to climate science and that acceptance correlates to action (or support for action) as denial correlates to defiance (or lack of support for action) on climate change mitigation. As I addressed in the first
chapter and will continue to argue throughout this dissertation, technical communicators need to move beyond this binary.

There is a problem with this binary perception of climate change denial/acceptance and the subsequent correlations with the binary of action/defiance. Not only is this binary largely inaccurate, but this binary view has also led the conversations within environmental communication to focus on convincing the public to believe in the science when the real issue is motivating people to act. As discussed in Chapter 2, this banking model (in which the communicator seeks to simply fill a perceived void of information) is ineffective (Cagle & Tillery, 2015; Ceccarelli, 2011; Edbauer, 2005) partially because even those who accept the information do not necessarily act upon it (Amel et al., 2017; Bard et al., 2000; Heath & Gifford, 2006; Olson-Hazboun et al., 2016). Not only does this assumption of the binary between denial and acceptance miss the point, we no longer have the luxury of the time it takes to motivate people first to care and then to act. Climate change is not slowing down; in fact, it will only accelerate exponentially unless humans act quickly and collectively (IPCC, 2018). While it is important that communicators and scientists continue to increase scientific literacy and understanding among the general public, we must also move in a different, more direct way to cultivate an ethic of care that results in action.

Coupled with almost all adaptive behaviors that will contribute to mitigating climate change are other reasons to adapt that have nothing to do with the global natural environment. The willingness to adopt new behaviors may be more easily identified and communicated by looking at the complex and fluid interactions taking place in our audience’s rhetorical ecology. Neighbors installing solar panels, for example, may have a
positive impact toward action if there is either a sense of community or competitiveness, but a negative impact if the relationship is more contentious, for example, if the neighbors are perceived as obnoxious “hippies” or otherwise outsiders. If the connection between factors, human or nonhuman, is not positive, it can create a negative perception of one factor to another. In other words, there are many factors at work cultivating ethics of care, just as there are for cultivating ethics of domination; examining what those factors are can help technical communicators better tailor communication to these groups in ways that will cultivate an ethic of environmental care and simultaneously a real motivation toward actions that will benefit the audience immediately and be better for the environment in the long-term.

To closely examine how communicators are working in Utah, I conduct below a close rhetorical document analysis of two fact sheets distributed by the Utah State University Extension office. These fact sheets were written by university professors and students, aimed at encouraging adaptive behaviors to help mitigate climate change (such as switching to LED light bulbs and planting more trees). Extension publications are a prime bridge between scientists at a land-grant university, where part of the mission of the institution is to produce research to benefit citizens of the state and surrounding communities, especially rural communities. As discussed above, rural communities in Utah tend more toward denial of climate change science than the majority of the nation; technical communicators working to engage these communities should be aware of this, if nothing else. As the authors are also members of a more broadly defined community (residents of Utah), there is a real opportunity to investigate what other factors are at work and what the audience’s pre-existing perceptions of their connections to these issues
are. These fact sheets produced by students and researchers at Utah State University also reflect what types of rhetorical strategies are currently employed by scientists trying to persuade people to create adaptive behaviors in the face of climate change.

**Rhetorical ecologies and short genres**

The strategies in these fact sheets in many ways reflect the trends in theory in the overlapping fields of rhetorical theory and technical communication over the past 30 years. As discussed in Chapter 2, the preeminent theories and texts have revolved around humanism and the underlying assumption that providing clear information about science is enough to persuade an audience to act. Even the authors of EcoSpeak, a text that goes deeper into suggesting an understanding of the audience’s relationship to nature on a rotating scale from nature as object to nature as resource to nature as spirit, identify themselves most closely with *eco-humanism*, an approach that relies often on a pathos appeal to humans (Palmer & Killingsworth, 1992). Yet this humanist approach often results in a banking model—we first understand the void of information and then speak and write clearly to fill it in one of three frames: Nature as Object, Resource, and/or Spirit.

As discussed in Chapter 2, the eco-humanist approach has proven to be successful in the past. Recall that Palmer and Killingsworth discuss the success of Rachel Carson’s narrative- and pathos-driven writing at getting DDT banned and raising national awareness of environmental concerns. Yet recall also that Carson has since become a symbol for overbearing regulations that lead to unintended negative results. More recently, Al Gore’s 2006 film *An Inconvenient Truth* was also full of the logos of
scientific data and the pathos of shots of beautiful mountain streams juxtaposed with shots comparing the receding lines of glaciers. While it did motivate thousands of Americans to acknowledge the realities of climate change, some point to as a factor in the politicization of climate change as it made Gore, a former Democratic presidential candidate, an easy target for criticism. We find today more extensive denial and outright defiance in light of, not in spite of, appeals to eco-humanism.

In a limited genre such as fact sheets, we also unfortunately do not always have the space to appeal to human pathos on the scale taken by authors of full-length works and to connect those appeals to pathos to pre-existing virtues. Moreover, we no longer have time to consider what individuals or communities feel and think about an issue as global and as imminent as climate change. We no longer have the luxury of patiently and painstakingly changing individual attitudes through civic engagement and participation in order to effect change at the level it is needed; we have to shift focus to working toward convincing people to make behavioral and policy changes.

To complicate the problem further, while we spend our time trying to make the science clearer, there is an abundance of “bad science” being produced by corporations that would be hurt by regulation and behavior adaptation (fossil fuel companies and their investors, primarily), throwing seemingly reasonable doubt into the general public, as discussed in Chapter 1 (Oreskes & Conway, 2010). Their information appears to be legitimate, is more conveniently believable, and requires no behavior changes whatsoever. Trying to combat that overwhelmingly preferable message with a few paragraphs citing climate change science reports at the beginning of a few-pages-long fact sheet is probably insufficient. What we can do in this limited space is provide
information that is useful and immediately beneficial to our audience that will encourage changes in behavior regardless of the audience’s attitude toward nature. These changes in behavior will hopefully, in the long term, cultivate a virtue of environmental care by demonstrating the interconnectedness of factors in the environment with factors in their homes and health.

When it comes to this kind of complex, multidisciplinary, and global problem, digestible genres like fact sheets need to be designed to engage individuals quickly, without expending precious space and time on the larger scientific concepts, and with the intent of getting their informed involvement in creating sustainable, resilient, and adaptive behaviors. Fact sheets have the potential to reach an often-ignored population and expose them to new ideas and new motivations to act, rather than simply reiterate old ideas in new frames. The challenge is for the authors of fact sheets to consider the rhetorical ecologies of the audiences who they need to be engaging with science communication.

Edbauer (2005) concludes that the traditional composition method of examining an audience’s rhetorical situation (Bitzer’s notion of considering the social context in which rhetoric is received and how that affects the audience’s interpretation of that rhetoric) does not allow for the shifts that happen through interactions between human and nonhuman actors in an audience’s environment, or what impact those shifts have on the reception of the rhetoric. Edbauer points out that although “oversimplified sender-receiver models of public communication have been productively complicated by theories like Lloyd Bitzer’s notion of the rhetorical situation,” these theories still assume rigidity in the audience and in the text and in the author (p. 7). As we saw in Chapter 2,
Jane Bennett (2010) recognizes this as a limitation for political ecology, and a limitation which I see as applying to technical communication. A rhetorical ecology perspective instead examines where each of the factors that might get taken into account overlaps with other factors and changes the rhetoric; it does away with binaries and static connections, examining instead where and how those connections are kinetic, how they are active and how that activity changes the rhetoric.

Recognizing the agency of the nonhuman actors in the rhetorical ecologies we find ourselves working within allows us to see alternate avenues of communication by studying the points of connection we may have otherwise missed. This recognition also allows us to see points of connection that should be avoided, as well as points that are in flux. For example, communicators may observe how the agency of a mountain impacts an individual in a coal mining community who is actually predisposed to believe in climate change science but does not want a wind farm placed in their view of that mountain. This knowledge helps us understand that appealing to purity might not work in this situation, as Dickinson et al. (2016) have suggested, even though the individual probably ranks the purity/sanctity moral fairly high. This is because the agency of the mountain impacts how that moral applies in this situation in a somewhat unexpected way. Appealing to purity may be effective, but only if we know what the audience perceives as “pure,” and nature may not be it. Many Americans actually perceive nature as wild and untamed, and civilizing it, or bending it to the human will, makes it pure (Cronon, 1996; Nash, 2014).

Although it is extremely important that we continue to produce comprehensible scientific research for the general public, increasing scientific literacy is not enough to
motivate people to action. The information is already available, but so is so much misinformation that it has become easy for citizens to pick and choose to believe the content that is most convenient to them and to avoiding cognitive dissonance with their daily habits (Oreskes & Conway, 2011). We cannot rely on an appeal to fact because the facts have been muddled and truth has become a matter of opinion. For example, an estimated 49% of Americans believe that most scientists think global warming is happening (Howe et al., 2015). In the state of Utah, that number is 40%, and an estimated 64% of Utahns say they trust climate scientists about global warming. As that number varies further by county (in Millard and Emery counties, an estimated 55% trust climate scientists), it is important that we examine what factors are causing that variance and find other avenues of communication besides making the science clearer and more accessible. What do people in these areas see as being at stake, and what risks are visible and invisible? Furthermore, how can we use what we find within their rhetorical ecologies to encourage them to make adaptive behaviors?

An ecological rhetorical model, as Edbauer puts it, “reads rhetoric both as a process of distributed emergence and as an ongoing circulation process” (p. 13). We have to move beyond focusing on a static concept of the denial/acceptance binary and move to motivating adaptive behaviors in an active and constantly shifting ecology. The factors that shape an audience’s attitude toward nature and environmental adaptations are constantly altering the connections among factors and humans and pushing rhetoric in different directions. Assuming that in order to change behaviors about climate change we must change attitudes about climate change is limiting, particularly in a genre such as fact sheets that offers little space to communicate to a relatively disengaged audience.
However, there are plenty of adaptive behaviors we can work toward that do not necessarily require an acceptance of climate change or even an appreciation of nature, and whose immediate benefits can be described in a short amount of time and page space. By looking at what factors in a rhetorical ecology might be having an influence on attitude toward the necessary behavior changes, we may be able to design our communication in these limited genres more strategically to encourage more rapid adoption of those behaviors.

**Case study of fact sheets**

For this chapter, I have examined the rhetorical strategies employed in two different yet similar fact sheets distributed by the Utah State University Extension Program. These short, information-packed pieces fulfill an important role of the state’s land-grant institution mission: to provide research that benefits the community. They offer information on home gardening, community-supported agriculture, natural hazard preparedness, local fishing and hunting, and other home and life improvement topics, as well as reports on the status and effects of regional air quality and anticipated impacts of climate change on local recreation.

The fact sheets are largely designed to supplement extension programming, such as 4-H engagement, master gardener classes, and other community projects; they are designed to provide quick bites of information to members of the community about the research going on at Utah State University and to synthesize research from other institutions relevant but not easily accessible to individuals. They have the potential to reach a subset of the population (members of rural communities) who are often
overlooked by environmental communicators because they may be seen as completely unreachable and too deep into climate change denial to ever be willing to take action. Despite the rise in negative feelings toward colleges and universities in recent years (Pew Research Center, 2017), state-funded extension programs are still a trusted source of information for rural communities, but that relationship with the community is dependent heavily on continued two-way engagement and an understanding of the concerns of the individuals within that community. If the fact sheets are to be effective in these communities, they must reflect those concerns and provide useful information; they cannot focus too strongly on information and research that the scientists writing them see as important without regard for what the audience might see as important. As discussed above, this is particularly challenging as the fact sheets are distributed across a variety of communities in Utah, both urban and rural.

Fact sheets are usually written by undergraduate or graduate students getting some experience synthesizing research and designing documents, or by faculty boosting their credibility and service by translating their own research into language and terms more easily understood by the “general public.” As such, fact sheets provide an example of science writing that is usually taught at institutions by technical communication and composition instructors and reflects the lessons learned in those classrooms. By studying them, we can see what students are learning and taking with them when they present their research writing outside of the classroom. We can also get an idea of how science writers are attempting to engage community members on issues across the board, including global issues like climate change.
Methods

I chose the two fact sheets analyzed here because they, more than other fact sheets produced by this program, explicitly encourage behaviors toward mitigating climate change. I wanted to analyze examples of writing that is designed to create behavior changes in order to demonstrate what approach is being taken toward creating those changes. The fact sheets cover two different approaches to mitigating climate change, but both fact sheets recommend changes that can be done at the household level: saving energy and planting trees.

To assess the framing strategies of these fact sheets, I first tagged and coded their argument appeals. To avoid a binary trap in my own research, I used an open coding methodology, meaning instead of having a set of predefined codes, I made note of the appeals and then categorized them based on what values I observed the authors appealing to (see Tables 3-1 and 3-2). Finally, I used those codes and categories to model the communication frames that are revealed in these fact sheets and describe what assumptions were made about the audience based on the frames used to try to encourage the different adaptive behaviors.

I then conducted a holistic analysis of the assumptions made and the values perceived in each fact sheet to draw conclusions about what frames the authors are working within. I also include findings from external research to suggest what alternative frames might be more effective with these particular audiences and to suggest why climate change acceptance need not be, and even in some cases should not be, a precursor to recommending these behavior changes. Below are examples from and a further detailed analysis of each fact sheet.
<table>
<thead>
<tr>
<th>Synthesized Argument</th>
<th>Appeal to</th>
<th>Assumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fossil fuels supply most of Utah's energy...stress Utah's beautiful natural resources.</td>
<td>value of natural resources</td>
<td>audience does not know about energy, fossil fuels and their impact on the environment.</td>
</tr>
<tr>
<td>Coal fuels most of Utah's energy...adds mercury to our waterways...mercury in ducks and fish restricts Utah’s family recreation.</td>
<td>value of outdoor recreation, family</td>
<td>audience does not know coal can be detrimental to immediate environment.</td>
</tr>
<tr>
<td>Household energy use contributes 23% of energy use; the average American emits 20 tons of CO2 every year.</td>
<td>value of scientific studies</td>
<td>audience does not know household energy use contributes to climate change.</td>
</tr>
<tr>
<td>&quot;Reducing your energy consumption at home will aid climate stability and save you money on your utility bill each month.&quot;</td>
<td>value of climate stability, value of saving money</td>
<td>audience connects reducing energy consumption to climate change.</td>
</tr>
<tr>
<td>&quot;With proper implementation, you’ll be well on your way to enjoying a lower energy bill and a healthier environment.”</td>
<td>value of saving money in the long-term, value of a healthy environment</td>
<td>audience wants to save money and help the environment at the same time, and may be willing to invest to save money in the future.</td>
</tr>
<tr>
<td>“While LEDs are more expensive earlier on, they still save money because they last a long time and have very low energy use.”</td>
<td>value of saving money in the long-term</td>
<td>audience wants to save money and may be willing to invest to save money in the future.</td>
</tr>
<tr>
<td>Purchase insulation for water heater.</td>
<td>value of saving money in the long-term, value of simple steps</td>
<td>audience wants to save money, audience does not want to make drastic changes.</td>
</tr>
<tr>
<td>&quot;More Cost Saving Easy Steps&quot;</td>
<td>value of saving money in the long-term, value of saving money, value of simple steps</td>
<td></td>
</tr>
<tr>
<td>&quot;Home wind turbines emit zero carbon, and ... can generate income for residents via selling excess electricity generated back to local utility company.&quot;</td>
<td>value of saving money in the long-term, value of a healthy environment, value of reducing carbon emissions</td>
<td>audience wants to save money and help the environment at the same time, and may be willing to invest to save money in the future.</td>
</tr>
<tr>
<td>Solar is a great option for sunny Utah...cost of solar has decreased dramatically.</td>
<td>value of saving money in the long-term, appeal to local pride</td>
<td>audience wants to save money and may be willing to invest to save money in the future.</td>
</tr>
<tr>
<td>&quot;Implementing these technologies and ideas will reduce the carbon footprint and energy dependency of your home.”</td>
<td>value of reducing carbon footprint, saving the planet, reducing energy dependency, value of independence.</td>
<td>audience wants to save money and may be willing to invest to save money in the future, wants to help the environment at the same time.</td>
</tr>
<tr>
<td>&quot;This will allow you to save money and reduce your personal impact on the environment.&quot;</td>
<td>value of saving money in the long-term, value of environment.</td>
<td>audience wants to save money and save the environment</td>
</tr>
</tbody>
</table>

Table 3-1: Coding for “Easy steps to reduce your energy bill”
# Trees and Climate Change

| Earth's climate fluctuates naturally, but we are in a warming trend that is human caused and making things warmer. | value of climate science | audience needs to know that global warming is human-caused. |
| Explanation of “greenhouse effect” caused by human activity. | value of climate science | audience needs to know what causes global warming. |
| depending on whether humans alter their behavior or not, this warming climate will likely have severe consequences for us and for the future of our planet. | value of climate science, value of the future | audience needs to be convinced global warming has consequences for humans and the planet. |
| “The use of fossil fuels to generate electricity is the largest source of atmospheric carbon dioxide emissions in the U.S.” | value of science | audience needs to know what causes global warming. |
| Consequences of rising temperatures in the global climate include “longer growing seasons, later first-frost dates, changes in precipitation patterns including more precipitation falling as rain and less as snow, increasing frequency of severity of droughts and heat waves, and an increase in the frequency, duration, and intensity of hurricanes.” | value of stability and a temperate climate, pathos, value of helping others in less fortunate circumstances | audience understands why longer growing seasons, later first-frost dates, and less snow pack are bad, perceives themselves to be at risk of these weather occurrences |
| “Hardest hit, perhaps, are impoverished countries in the equatorial zone.” | value of climate science, value of the future | audience cares about people in impoverished countries. |
| “Sea levels have risen more than 6 inches in the last century, and are predicted to rise another 1-4 feet by 2100. Climate scientists estimate that the current warming patterns may lead to an ice-free arctic by 2050 (Nasr & Stroeve, 2016).” | value of climate science, value of the future | audience needs to know the global consequences of climate change, cares about and understands the significance of the arctic. |
| There are two ways people can change this trend: 1) reabsorbing carbon dioxide from the atmosphere, or 2) reducing carbon dioxide (and other greenhouse gas) emissions. Trees can help us do both. | value of reversing climate change, reducing carbon dioxide in atmosphere | audience needs to know how trees can help reduce climate change. |
| Explanation of how trees trap and store carbon dioxide. | value of science, environment | audience needs to know how trees can help reduce climate change. |
| Ecologist and carbon cycle expert Dr. Richard Houghton, from the Woods Hole Research Center, estimates that aggressive rural forest management, including tree planting, could offset half of the current carbon emissions on earth over the next decade. | value of environmental science, value of reducing impact of climate change, value of the future (hope) | audience needs to know how trees can help reduce climate change. |
| “The values of urban trees are financial, ecological, and they even can improve people’s physical and mental health.” | value of money, environment, personal health | audience needs to know the full benefits, personal and global, that planting trees has. |
| “The usefulness of urban trees in combating climate change is not so much in absorbing carbon dioxide as it is in using them to reduce our carbon footprint.” | value of environmental stewardship | audience wants to reduce carbon footprint. |
| “By establishing 100 million mature trees around residences in the U.S., we could save $2 billion a year in energy costs, along with reducing the associated carbon dioxide emissions (Akkari et al. 1988, 1992, Donovan & Butry, 2009).” | value of climate science, value of saving money at the national level, value of reducing carbon emissions | audience wants to save money on energy costs, wants to reduce carbon emissions. |
| “Thoughtful tree placement can reduce cooling costs by 30% in the summer, and heating bills by 20-50% in the winter.” | value of saving money in th long-term | audience wants to save money on energy costs, and is willing to invest money to do so. |
| “Tree and shrub windbreaks can reduce your energy demands for heating and cooling by up to 30% by reducing infiltration of cold winds in the winter and hot winds in the summer.” | value of saving money in th long-term | audience wants to save money on energy costs, and is willing to invest money to do so. |
| Tree and shrub windbreaks can also control snow deposition, reducing the energy required to plow roads, parking lots, and driveways. | value of saving energy, both as an individual and a community | audience wants to save energy, lives in an area impacted by large snowfall. |
| “Climate change is predicted to lengthen growing seasons, which at first may appear positive for forests, but the story is complex.” | value of climate science, forest growth | audience needs to understand why longer growing seasons are not good for forests. (Neglects to consider other growth the audience may consider to be positively impacted from longer growing seasons.) |
| “An important result of the 2015 Paris climate talks, that included more than 150 world leaders, was the emphasis on the importance of preserving forests.” | value of world leadership, preserving forests | audience supports Paris climate talks. |
| “Reducing energy consumption and increasing urban and rural forests are two key actionable items going forward. Planting trees and preserving existing forests will not eliminate excess carbon emissions, but these actions can play a role in helping reduce greenhouse gas emissions and mitigating negative effects of climate change.” | value of reducing carbon emissions, mitigating negative effects of climate change | audience is now informed enough about climate change to receive the call to action based on the desire to mitigate effects of climate change. |

Table 3-2: Coding for “Trees and climate change”
Fact sheet number 1: “Easy steps to reduce your energy bill”

Summary description

This fact sheet begins by discussing the dangers of burning fossil fuels, coal in particular, connecting it to the detriment of Utah’s air, water, and other natural resources used for recreational activities such as fishing and duck hunting (see Figure 3-2). The next paragraph cites statistics on overall energy consumption in the United States and how much the average American contributes to that each year—an astounding and eye-catching number, but an abstract one nonetheless, lacking in connection to the audience’s perceived ecology. Just over one page total of the two-page fact sheet is listing ways to reduce your home’s energy bill and includes some of the basic science behind why those changes are more energy efficient for things like installing LED light bulbs, home wind turbines, and solar panels. The fact sheet is short and uses plain language, citing prominent (albeit slightly outdated) climate science research, but the argument focuses more on the reasons to reduce energy use besides reducing your energy bill. In other words, the focus of the fact sheet reveals that the real motivation the authors have for writing this is to encourage people to protect the environment, a potentially sharp turn from the title’s draw to save money.

Analysis

As the fact sheet begins heavy on climate science, it reflects the eco-humanist banking model, the popular 90s humanist assumption that people just need to have more information to do the right thing. By beginning with communicating the larger environmental problem in plain language, the authors demonstrate that they believe that
clear access to climate science is what it will take to motivate people to action, and by connecting the issue to our air, drinking water, and recreation in two swift sentences, they attempt to drive home the long-denied science and shift their audience to acceptance.

This also reflects the perceived binary that acceptance of climate change science must precede action and denial must be the thing preceding inaction. The title acknowledges that there may be other factors that could motivate people to make these changes that
have nothing to do with acceptance of climate change science, but there is an immediate shift from this appeal to pragmatism in the title to hard science in the first paragraph.

The title is smart in the sense that it can quickly engage an audience anywhere along the acceptance-denial spectrum in considering behavioral changes, but with the first sentence, the fact sheet immediately shifts gears. This seems almost misleading, as if the authors are conducting a bait-and-switch. Most notably, the immediate reference to fossil fuels brings up a real problem for many in the state of Utah. Recall that in many of the rural communities these fact sheets have the potential to reach, fossil fuels are a major source of income, and citizens in counties that rely on coal mining for their livelihoods are among the least likely to accept climate change or trust climate scientists (Howe et al., 2015). As more power companies switch to natural gas (a potentially “cleaner” source of energy, but with its own environmental complications) and as more consumers and cities turn to renewable energy resources, coal production is down, and plants are closing all over the state. The request that the audience reduce their own fossil fuel consumption, especially coal, by making these behavioral and lifestyle adaptations neglects the very tenuous economy in these rural communities. Advising on how to reduce a bill is one thing; first asking for acceptance of previously rejected science and second suggesting changes to reduce your community’s livelihood is another.

**Implications**

Applying a heuristic based on Edbauer’s rhetorical ecology to these fact sheets might look at the communication goals beyond the science and beyond the banking model to consider why people might be motivated to change behaviors in these
communities. This means looking at the more complex connections between nonhuman factors and the role they may play in the audience’s interpretation of the rhetoric, especially when compared to those factors in the rhetorical ecology of the creator of the content. For example, it is important to note that these rural communities tend to be in topographically flatter areas, unlike Cache Valley where Utah State University’s main campus is situated. The campus is prone to heavy smog due to inversion, a process by which cold air gathered between mountain ranges traps warm air and heavy pollution, resulting in what is known as a red air day, an alert that the air is unsafe for many groups, including pregnant women and people with asthma. On these days, the air is tangibly polluted—whether you suffer from asthma or not—and breathing becomes more difficult.

Because of the flatter topography in more rural areas, however, this phenomenon is not experienced in the counties where most coal mining takes place. Residents of these areas may be aware of the issue of smog, but they likely and somewhat accurately attribute the problem to the urbanization of those areas and natural processes. The damage that fossil fuels do to our air is likely not as visible to an audience in rural Utah as it may be to the authors who are likely living in areas that are more densely populated than rural areas, congested by traffic and natural processes that trap polluted air where it becomes a danger to humans. There are debates in some of these rural areas in Central Utah over whether to allow the building of a large wind farm nearby. Many are in favor because the production and maintenance of the giant wind turbines will bring jobs, but some are opposed because it may more rapidly shut down coal plants and obstruct otherwise untouched landscape views (Olson-Hazboun et al, 2016). Billboards and lawn signs pick over science and local sentiment to shift messages of climate science and
energy consumption to reflect support or disgust for wind farms. Mentioning home wind turbines as a way to reduce coal consumption may make the issue more cut and dry, but not in the way the authors intended.

The situation is not static. It exists in an ecology in which human and nonhuman factors are intricately connected in a way different from the ecology of the authors and in which those connections are adjusting all the time. Simply providing information and connecting it to issues believed to be of importance, such as the authors do here with fishing and duck hunting, is not enough. A genre with such space limitations has to walk the balance between being concise and being considerate of the rhetorical ecology of a more rural audience; there is simply not enough space to connect an issue as complex as climate change to a recreational activity believed to be enjoyed by the audience, even if that connection seems so clear to the author. This is especially true if we consider that to make that rhetorical connection, the authors would need to clarify even more the role that fossil fuel industries play in destroying natural resources necessary for outdoor recreation, and consider that fossil fuel industries are perceived as being far more important to many of these communities than outdoor recreation.

The fact sheet’s hook is in the monetary benefit of making these changes, and regardless of the acceptance or denial of climate change, the audience can still be motivated to reduce their energy consumption. I would never argue that we should ignore science or avoid an opportunity to increase scientific literacy, as that is also certainly an important strategy to persuading people to accept climate change science. However, with such a short amount of space, the efforts of the fact sheet may be better put to use avoiding complex topics considered controversial, considering the ecology of the
audience, and recommending direct adaptive behaviors through a more tailored frame. When considering the complexity of the connections between factors and how they differ from the complexity of the factors experience by the authors, it becomes clear that a frame of straightforward science communication is not enough to make the science both understandable and actionable. The potential audience’s rhetorical ecology convolutes the information, twisting it, making it susceptible to doubt. These communities’ reliance on fossil fuel industries, lack of experience with polluted air, and ready access to open public lands for outdoor recreation make the argument inaccessible or even questionable.

**Fact sheet number 2: “Trees and climate change”**

**Summary description**

The second fact sheet is somewhat longer (7.5 pages including references), and also begins with an overview of the science of climate change, as might be expected from the title. As this was published by the Utah State University Forestry Extension, the authors go into much more depth in tree science and the specific details of how deforestation affects climate change and the immediate climate of the Global South, as well as how planting more trees can combat climate change by reabsorbing carbon dioxide, a greenhouse gas, and by reducing carbon dioxide emissions. The persuasive strategy of this fact sheet is similar to that of the first one: Hit the audience hard with the problem and the big picture science to back it up, then move to what can be done about it. The first 2.5 pages are dedicated to reiterating the science that explains climate change and why it presents a problem for nature and for humans in the long run. This is substantially more space dedicated to the broad issue than in Fact sheet number 1. The
authors strategically move from what is causing the climate to change (greenhouse gas emissions) to what effects this dramatic change is already having and is anticipated to have. The next 2.5 pages explain the science of how trees can be used to combat climate change, drawing on the assumption that the first section convinced the audience to accept climate change once and for all. The next page (p. 6) abruptly jumps to other possible reasons that planting trees in your own yard is a good idea: reducing energy demand, increased yard shade, a reduced energy bill, and controlling snow deposits. For the first reason, the authors here cite some studies that say that planting 100 million trees in cities
could save $2 billion a year in the United States, though how exactly this happens is not explained. The second reason is more straightforward: Plant a tree in your yard and you could actually reduce your summer air conditioning costs by up to 30 percent and reduce your winter heating cost by up to 50 percent, because the tree provides both shade and insulation if planted in a proper place. The next reason is that trees can break cold and hot winds, again reducing your energy bill, and the last is that trees can control snow deposits, “reducing the energy required to plow roads, parking lots, and driveways” (p. 7). Finally, the last page pans out quickly from the homeowner’s yard to bring the fact sheet back to the global issue of climate change, drawing a loose connection between local tree planting and global forest preservation.

Analysis

The title strongly reflects the authors’ motivation for writing this fact sheet but leaves some mystery as to the usefulness of the content for a non-scientific audience. The first few sections also reflect that same banking model, the eco-humanistic ideal that we can fix the problem of climate change denial by exposing people to the science in clear and relatable terms. This strategy may work fine when used carefully to supplement educational programs engaging communities on climate change issues like deforestation; but in terms of giving sufficient motivation to take adaptive action, the fact sheet is sparse. The personal benefits of planting a tree are buried at the very end. What might really motivate the adaptive behavior recommended for either a rural or urban audience (planting a tree) is the savings in energy bills and overall more stable temperatures in the hometown, but that gets lost in the abstract, big-picture of climate change. Deforestation
of the rainforest has been on the public’s radar for the last century and everything seems fine, so why would an audience in rural Utah care about it now? What has changed in their ecology? For one thing, it has gotten increasingly and dangerously hotter, and people have noticed. It would likely be more persuasive to focus on the fact that planting trees, when done strategically, can save energy and therefore money by cooling your home.

Again, this fact sheet reflects the assumption of the binary that climate change acceptance must precede adaptive action, and again, there are other potential factors that may motivate the audience toward adaptive behaviors. The heavy emphasis on what is causing climate change, what will happen as a result, and how it can be mitigated takes away from the potential that this fact sheet has to encourage people to plant more trees. It assumes that in order for people to be convinced to do this, they have to accept the science of climate change, and this again reflects the eco-humanism that filling a perceived void of knowledge will be enough, that people will naturally be motivated to do the right thing and make adaptations.

Implications

What if the authors considered the rhetorical ecology of a rural Utah audience? What other factors are in flux? An analysis of the rhetorical ecology might look at the literal ecology here: People may not care about climate change or accept it, but the idea of shade, cleaner air in your own back yard, even attracting native birds and bats that will eat harmful insects and spiders, etc. may be motivating factors regardless of acceptance or denial of the larger issue. These factors can be motivating because they are a tangible
part of the rhetorical ecology of the audience. People tend to notice that summers have been getting hotter, not to mention it is all over the news when another month becomes the “hottest on record,” but this very tangible fact is still difficult and abstract to connect to the bigger problem. Connecting the behavioral adaptation of planting trees in your own yard to reducing local temperatures in the summer and saving money on your own energy bill year-round leaves the abstract out of it and leaves less room for climate change denial to be a factor.

Considering the rhetorical ecology of the audience should even extend to the medium chosen for most effective distribution and how that medium changes the rhetoric. Will this be distributed via the Internet or through printed hand-outs at an event? What graphics or images could be utilized, and do they reflect or contradict the environmental factors experienced by the audience? Of course, the audience is not uniform, so the content creators could drive themselves crazy thinking of all the factors that could play a role in how the rhetoric of these fact sheets will change as it moves across different rhetorical ecologies. But recall from Chapter 2 that this is where the necessary step of embracing uncertainty comes into play. This is the point at which the content creator has to acknowledge what can be known and embrace that the rhetoric will change outside of the anticipated outcome, but where they recognize that they have done their best to account for human and nonhuman agents and their complex connections. In Chapter 4, I will demonstrate a clearer example of this step, and in Chapter 5, I will demonstrate how it can be done proactively.
Summary

Although we must continue improving scientific literacy, shorter, more limited genres may not be the place to try to cram in research on what is considered a controversial topic to many audiences. It is important for scientists and technical communicators working in such genres to acknowledge that this topic appears controversial because of the fluidity information can have within a rhetorical ecology. What may be reiterated constantly and consistently in the halls and classrooms of a university’s natural resources department may be tied to more complicating factors in the rural areas those researchers are intended to be benefiting. The design of these documents should reflect the ecology of the audience, and they should focus on what is going to get the audience to engage constructively. We know they are impacted by a rising heat index and are always concerned about extreme temperatures, so we can address these local issues. We know that the communities most uniquely reached by this genre of the Utah State University Extension fact sheets are prone to climate change denial, but we also know they favor funding renewable energy research (Howe et al., 2015). We also know that they are likely either directly or indirectly connected to fossil fuel industries, so rather than push them to adopt completely clean energy and blaming their community’s livelihood for the problems of the planet and of city-dwellers, we could start by pushing for behavioral changes that reduce their personal impacts but also benefit them by reducing their costs and improving their quality of life. Whether they make their living mining coal or not, they are surrounded by the coal industry, and it is part of their ever-evolving ecology, meaning they are impacted daily by the rhetoric of the coal industry and surrounded by neighbors concerned about plant closings.
These two fact sheets represent the common frame of first attempting to convince the audience of the importance of environmental mitigation and then convincing them to make behavioral changes that will also benefit them personally. This reflects that the authors may be assuming that the audience shares their values and their ethic of environmental care. While there is nothing inherently wrong with making this assumption, it may create more barriers than avenues in connecting the necessary behavior adaptations to existing values. What might we do differently, then, when writing in such short genres, to effectively communicate the importance and accessibility of making these adaptive behaviors?

Discussion

Technical communicators, including scientists and writers specializing in the sciences, need to recognize and move beyond the false binary of climate change denialism/acceptance that we have constructed for ease of audience analysis. Each side appears correlative to a side of another binary: taking defiant, anti-environmental action vs. taking mitigating, eco-friendly action. This leads to the false assumption that creating acceptance creates action while allowing denialism allows defiant action, but that may not be the case. From *EcoSpeak* onward, we have been aware that audiences are more complex in their relationships to nature, but we have continued to assume that climate change acceptance must come before climate change action.

Perhaps this continued assumption is because we have stuck with the eco-humanism that believes that clear transmission of information is the answer to getting people to change their behaviors. Technical communicators can apply a posthuman virtue
ethics lens similar to what is found in ecofeminism, which calls for an end to binaries such as human/nonhuman, acceptance/denial, and action/defiance in favor of an understanding of the complexity and connectedness of situations motivating behavior (Coole & Frost, 2010; Phillips, 2014; Warren, 1996). By applying this lens, we can move around the blockade of denialism and focus our arguments instead on creating adaptive behaviors in communities that may be particularly prone to the effects of climate change. By looking at the rhetorical ecology of the audience instead of at a static situation, we may be able to better understand what agency-possessing factors are at work on the issue and how those factors work to cultivate different virtues and to connect those virtues to environmental issues.

What may ultimately be most effective going forward is including a form of argument that Chaim Perelman and Olbrechts-Tyteca called *dissociation* (1969). This is separating an idea that contains a negative association for our audience into two ideas to avoid incompatibility with a belief system that cannot accept a particular aspect of the idea. For example, a technical communicator working on motivating the public to adopt solar energy and get rid of non-renewables altogether, in an area known to be heavily dominated by climate change science denial, might opt to separate the idea of renewable energy resources from climate change entirely. An understanding of what perpetuates that denial, what factors, human and nonhuman, would open the door for connecting solar panels as an opportunity to improve the community in specific ways that members of that community are concerned about. This could allow for open discussion of solar plants without what is considered the incompatible association of climate change or even environmental pollution, even if solving or mitigating climate change is the original goal.
of the communicator. They might instead focus on energy independence and job creation. By dissociating these adaptive behaviors (supporting solar energy) from the broader, abstract, and potentially controversial issue of climate change and then associating them with local, tangible, and straightforward results, we can let go of the acceptance/denial binary and make these ideas of clean and reduced energy usage, tree planting, and other adaptive behaviors compatible with our audience’s beliefs and values. If we do not pair suggestions for making these behavioral changes with the idea of climate change, the suggestions can be compatible even for someone who outright defies climate change science.

This does not mean that we should abandon all efforts to increase scientific literacy in these communities, even though science in this political climate is often mistrusted. However, perhaps we have reached a time for more community engagement with science and a deeper assessment of what the community is capable of adapting to and willing to adapt to, with what motivation, and at what cost. Writers designing these genres need to consider the rhetorical ecology of their audience, perhaps even consider carefully how the scientist’s and environmental communicator’s ecologies are different from the audience’s. Moreover, writers in these genres need to approach their audience with humility and seek out local knowledge for an understanding of how to best communicate with their audience. For many researchers working in an environmental science department, most behavioral adaptations that will help with climate change seem like an unbiased no-brainer, but for an outside audience, there are likely associations with those behaviors and even the agenda of mitigating climate change that are linked to both negative and positive factors in their ecology. These associations are formed as naturally
for the audience as they are for the writers, so it is important that technical communicators embrace an understanding of what is important to their audience. What values are underlying in the decision-making, to what factors are those values currently connected, and what values could be tapped into and connected to environmental issues (Dickinson et al, 2016)?

This case study contributes an understanding of how we are currently framing attempts to shape adaptive behaviors and to demonstrate the limitations of current rhetorical strategies in these limited genres. The rhetorical analysis of these fact sheets is evidence that our current push for motivating behavioral change toward the environment is still rooted in a humanistic assumption that the facts will speak for themselves. But what else is speaking to our audience? As discussed above, this genre is useful for technical communicators to reach out to otherwise underserved populations in rural Utah (and elsewhere) and to engage them in creating adaptive behaviors that can create positive environmental changes. By analyzing what other factors may be at work in this community, I have examined what other tactics might be successful instead of framing this information in primarily environmentalist ways of perceiving actions. How do we use this knowledge to work toward an environmental ethic of care and motivate adaptive behaviors? The task ahead is to find and specify the positive associations that will lead to adaptive behaviors in these limited genres while continuing efforts to increase environmental science literacy in more long-form writing or community engagement genres and programs.

In order to move past climate change denial and encourage the adoption of environmentally friendly behaviors, and toward mapping the audience’s rhetorical
ecology, I recommend authors consider the following questions when engaging rural communities (or any communities) in shorter genres:

- What broad factors might be involved in the audience’s decision-making?
- What are the major industries in this area? (coal, cattle, fishing, cash crop farming, etc.)
- Based on the answers to the previous question, what topics and frames might we want to avoid? (the evils of coal mining, the need to reduce red meat consumption, etc.) How can we dissociate adaptive behaviors from these topics?
- What sort of natural environment are they living in, and what are the challenges within that environment? (Is it hot and dry? Cold and dry? Do they have inversions or not? Are wildfires common? Is water or air quality a concern? etc.)
- What other values might they have besides environmental concerns? (saving money, saving time, religious values, etc.) How might those values be realigned with the behaviors or attitudes we want them to adopt?

In the next chapter, I will expand upon this mapping of rhetorical ecologies to understand how a more specific community (a women’s association in rural Morocco) perceives their relationship to environmental issues and how that informs their decision-making.

**Conclusion**

With the climate changing more rapidly and risks of natural disasters increasing every day, and especially with an administration that seems bent on continuing the
pattern of scientific denial and environmental destruction in the name of free market enterprise, we do not really have time to spend designing our arguments first to overcome climate change denialism and then to persuade to action. With short genres that have the ability to reach otherwise disengaged and dismissive audiences, we need to spend the time getting right to the point and presenting alternate reasons for making the adaptive behaviors in ways that align with pre-existing virtues. Arguments for creating adaptive behavior should be focused on tangible effects of those behaviors that extend beyond what seems abstract or controversial to the audience. By understanding how our audience perceives their connections to the environment and where other unseen connections may lie, we can focus on forming good environmental habits regardless of acceptance or denial of climate change.
CHAPTER IV

INCORPORATING THE NARRATIVE OF SILENT STAKEHOLDERS:
A CASE STUDY IN MOROCCO

I would like to see the women be able to travel more, to think for
themselves and make their own decisions and be more independent.

Participant 3

Introduction

In May of 2017, I took part in a research trip with Dr. Rebecca Walton and Dr. Peg Petzelka to learn about how civil society organizations (CSOs) operate in Morocco. One of the most striking memories I have from our research was a member of one women’s association telling us that what gives her hope is that the greatest benefit to being a member of the association is that the women of this village have more agency—more of a voice—when they are part of this collective than they would on their own. According to this participant, on their own, the women feel that they have no voice and no agency. Another participant later said that one of the goals of their organization is to bring in people like us to see what these women’s lives are like and to learn about their stories. These were striking comments not only because they drew attention to their sense of limited efficacy, even as a collective, but also because it highlighted the important role that technical communication researchers can have in incorporating the narrative of otherwise silent stakeholders across the breadth of topics and issues that our work
encompasses. For my work directly, this means highlighting these women and their community as important stakeholders in debates regarding climate change.

In preceding chapters, I have argued that it is vital that we engage our audience, including and especially stakeholders, in environmental communication by considering their rhetorical ecologies and how those ecologies cultivate virtues within our audience, listening to narratives, and understanding what is important to our audience and how they perceive these issues to be affecting them. In this chapter, I will first explain what it means to consider silent stakeholders in climate change debates and why this should be a vital concern for the field of technical communication and rhetoric. Second, I will discuss how this case study emphasizes this problem by looking at how climate change is impacting a community of women in rural Morocco; in other words, I will put into practice incorporating these women’s narratives into the climate change debate and discussing what we learned from their local knowledge and observations. Finally, I will discuss the rhetorical ecology of this community and how nonhuman agents have an impact in cultivating a virtue of environmental care, thus impacting the reception of climate change and environmental communication; I will also explain how mapping these rhetorical ecologies can help technical communicators work toward social justice for underresourced populations.

**Environmental justice through technical communication**

The idea that we should be engaging stakeholders is nothing new for the field of technical communication; we have been talking about it even specifically for environmental issues for more than 25 years. From Palmer and Killingsworth’s (1992)
cornerstone work *EcoSpeak*, to Coppola and Karis’ (2000) collection *Technical communication, deliberative rhetoric, and environmental discourse: Connections and directions* and several of the chapters therein, to more recently W. Michelle Simmons’ (2008) work *Participation and power*, the field of technical communication has long recognized that when participating as mediators in debates around environmental justice issues, it is vital that we make sure all stakeholders are heard and feel heard. These authors all write that the best way to engage stakeholders and build efficacy toward creating important change is to take their needs into account when it comes to decision making and policy creation, meaning we need to communicate stakeholder needs across differing groups and empower these communities to be heard.

In practice, however, we often see that these engagements with stakeholders can boil down to a debate between maintaining the current way of life—or a group’s livelihood—and protecting the environment. For example, consider the debates regarding protecting coal mining jobs vs. protecting the environment by shutting down coal plants (e.g. Bloomberg, 2017; Hood, 2018). We have known for some time now that burning coal and other fossil fuels for energy not only releases harmful pollutants into the immediate air (Querol, Alastuey, Lopez-Soler, Mantilla, & Plana, 1996), but this process also releases greenhouse gases into the atmosphere, contributing to global climate change (Fahey, Doherty, Hibbard, Romanou, & Taylor, 2017). Amidst staunch denial and doubt that this is happening, coal mining operations, miner labor unions, and politicians argue that it is more important to protect jobs at home than to make changes to our energy consumption toward mitigating the severity of climate change around the world. It may

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8 Recall from Chapter 1 that “environmental justice” refers to how environmental hazards or issues create disparity among minority or disadvantaged groups, so environmental justice issues *are* social justice issues.
be worth noting that a common counter to this argument is that replacing coal with solar and wind energies would actually create plenty more jobs that would be less dangerous and be more economically sustainable, so what is really being put at stake here is not simply jobs but a way of life, a tradition held by generations of coal miners that formed communities and strong identities within those communities. (Loretta Lynn never sang about being proud to be a solar panel installer’s daughter.) What is truly being attacked, coal communities may feel, is their culture and their livelihood, their ability to provide for their families and their community in the way they always have.

Current debates in the United States about making behavioral changes thus focus on two sides: protecting the environment (local air and water as well as global climate impacts) against protecting our way of life (coal jobs, convenience of burning fossil fuels, difficulty and expense to change infrastructure, etc.). Consider the rhetorical argument in the photo from the news article in Figure 4-1—EPA regulations destroy jobs and put seniors at risk—implying that protecting the environment has to be pitted against maintaining good jobs. But this framing of the two-sided argument is narrow and marginalizing. According to the IPCC (2014, 2018), developing nations are going to be hit first and hardest by the effects of anthropogenic climate change, which is driven primarily by Western actors. Because developing nations do not have the infrastructure to build resilience now or to bounce back after an extreme event (such as a hurricane, drought, or desertification, all intensified by anthropogenic climate change), they are even more at risk of being impacted by the actions of humans than are populations in developed nations. For example, if a drought hits the Western United States, we have (theoretically, at least) shored up finances and safety nets to see farmers, ranchers, and
Do environmental regulations reduce employment? Not really.

By David Roberts | @dvox | david@vox.com | Updated Mar 28, 2017, 10:27am EDT

Figure 4-1: Members of the United Mine Workers of America rally outside of the Environmental Protection Agency headquarters to protest proposed regulations on mining and coal power plants. Source: Vox.com.

Other citizens through the worst of it. We have the infrastructure to communicate the need for reducing water consumption and enforcing statutes on things like watering grass lawns, and to redirect temporary water resources. However, when droughts hit nations that are less prepared for natural disasters, where governments struggle to afford basic daily needs for citizens, it accentuates the effect of the drought, as there is little or no infrastructure to combat the problem and sustain the population until the drought ends.
With such hazards expected to increase, people in developing nations are at a continually increased risk of experiencing these amplified issues.

Technical communicators and rhetoricians alike have already established that we have a responsibility to consider the broad-ranging impacts of our actions and the actions of our audience when we are engaging in communication that involves decision-making that may impact the environment (Gross, 1994; Herndl & Cutlip, 2013; Hopton, 2013; Miller, 1979; Rose & Walton, 2015; Simmons & Zoetewey, 2012). Technical communicators are engaged in the creation of documents from policy formation to business and cross-departmental communications to routine daily communications such as emails and marketing campaigns, and because of this, we have recurring opportunities to either engage in social justice or do nothing and maintain the status quo that disenfranchises underprivileged actors (Williams, 2010). An environmental justice lens identifies that these actors include nonhuman agents, such as plants, animals, even oceans and mountains. While, again, the purpose of my work here is not to assert that nonhumans should have equal rights to those of humans, a posthuman social and environmental justice lens can quickly see that the health of these actors impacts the health of human actors as well, particularly humans who are traditionally disenfranchised by the status quo.

Walton and Jones (2013) argue that social justice “is also relevant to technical communication pedagogy, for example in preparing students to advocate for marginalized and underresourced people in a range of contexts from their local communities to their organizations of employment” (p. 32). This notion that we have a responsibility to instill these ethics of social justice is echoed throughout technical
communication pedagogy scholarship (Kienzler, 2001; Thralls & Blyler, 1993; Wilson & Wolford, 2017), most notably in the recent trend in emphasis on service learning strategies (Bowdon & Scott, 2003; Bridgeford, Kitalong, & Selfe, 2004; Dubinsky, 2002; Moore, 2013), with the goal of developing “user advocates” (Cleary & Flammia, 2012) and “community intellectuals” (Eble & Gaillet, 2004). The pedagogical challenge added with environmental justice in the current age is getting our students to broaden their view of community to include members not visible or even accessible to them.

**Societal teleconnections**

When it comes to a global problem like climate change, whose impacts and causes cross continents and oceans, the underresourced people for whom technical communicators have a responsibility to advocate are more often than not far away from the site of debate. Even environmentalists who do draw the global issue into the forefront of debates over energy issues, for example, may choose to focus on images of starving polar bears on ice flows. There is certainly a link here, but a far-removed one for most people. Because anthropogenic climate change has such far-reaching impacts, it is important to remember that when we make environmentally irresponsible decisions at home, it incurs a negative impact on populations and stakeholders whose voices were never heard or considered in the debates around how to make those decisions.

This idea of examining the far-away effects of decisions made at home is a concept known as *societal teleconnections* (Moser & Hart 2015), a term that has been used for some time by social scientists to explain the ways in which environmental vulnerabilities to human populations “do not just originate and unfold in one place but
can also result from long-distance relationships” (p. 14). Moser and Hart point to an often-considered example: “several studies have examined the impacts of deforestation—due primarily to global demands for increased cropland and local slash and burn agriculture—on communities located near the sites of deforestation (Aide & Grau 2004; Lambin & Meyfroidt 2011)” (p. 15).

Teleconnections has, for even longer, been a concept in the physical sciences used to describe the long reach of physical impacts such as an earthquake causing a tsunami to occur hundreds or thousands of miles across an ocean. Societal teleconnections, then, focuses on the connections created by and impacting humans and the environment alike. For example, recent drought in Syria can be linked directly to the trend in migration from rural to urban areas, creating pressure on the urban population’s resources and economy, creating conditions that led to civil warfare (Pecl et al., 2017). This also has far-reaching impacts in Europe and even the United States, as populations continue to migrate toward areas less impacted by climate change and with stronger adaptive capacity and access to resources.

It could even be argued that this has led to the growth of religious extremism, as pressure on resources creates tension and internal divisiveness, allowing extremist groups to offer a revolutionary alternative to the failing status quo. In fact, in a 2014 report, according to the United Nations Framework Convention on Climate Change, the Pentagon found that climate change is a top threat to national security (UNFCC, 2014). This was again repeated in the 2015 report from the United States Department of Defense. The drought itself can, to a certain degree, be attributed to anthropogenic

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9 Note: The original 2014 and 2015 reports from the Pentagon has since been largely removed from public access and has been altered under the Trump administration to no longer point to anthropogenic activity as
climate change, which comes down to decisions and policies made in more developed nations, particularly in the United States, which alone contributes about 8 billion metric tons of CO2 annually, more than the entire European Union (Gillis & Popovich, 2017).

These long-reaching impacts are rarely, if ever discussed in the mainstream of climate change or environmental debates. Emaciated polar bears and melting glaciers are more often used to invoke pathos in favor of an environmental ethic of care, since the connection between these issues and global warming is clear, while the connection between climate change and chemical warfare in the Middle East seems far removed and is presented as two separate and unrelated issues with unique solutions. The concept of societal teleconnections can help technical communicators understand the significance of these connections, however, when addressing issues of social justice and their connections to issues of environmental justice. From this posthuman social justice perspective, environmental justice in a global context is a social justice issue.

Researchers in interdisciplinary fields are already applying this concept to argue for Western actors to increase the accessibility of resources for climate change risk management, especially the risks that can be highlighted by these societal teleconnections. In particular, these resources need to be made accessible to actors who can help mitigate risks on the ground in areas impacted the most by the effects of climate change. Moser and Hart argue that “the inclusion of long-distance relationships in locally-focused assessments must remain a manageable task for adaptation practitioners in the private and public sectors who neither have easy access to nor the capacity for

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a factor in climate change and to no longer assert that climate change is a threat to national security. This is deemed by the scientific community to be a dangerous political move to protect the powerful fossil fuel industry. I was able to track down a copy that a colleague had saved before it was removed and used that as a reference.
complex systems modeling, but whose assets are nonetheless at stake” (p. 15). By this, the authors mean that they are presenting a pragmatic and applicable format for assessing these teleconnected risks and behaviors that anyone can implement and that do not require additional resources. However, Moser and Hart recognize that being able to identify where these risks are going to come from does not give us all the resources to mitigate those risks.

The term *tele-coupling* may also be used to describe a broader conceptual framework of accounting “for long-distance influences on the functioning of” natural-human systems (Moser & Hart, 2015). This term is often applied to land-use sciences to understand impacts of activity across spatial distances that result in a change to the functionality of land use. As alluded to above, I am using the term *societal teleconnections*, as it refers rather to the series of complex and interwoven factors interacting constantly, and thus fits more snugly into the framework of a rhetorical ecology. The emphasis on social impacts is also preferable for posthuman technical communicators, as it emphasizes that the reason we give so much credence to nonhuman actors is not necessarily to assert their rights as equal to humans, but to increase “channels of communication between members” (Bennett, 2010, p. 104). In other words, we are not trying to bring humans down or elevate animals or rocks above humans, or to even suggest that they have equal rights, but to draw attention to the interconnectedness of these actors and to take those connections into account in order to create more effective policy for the improvement of human actors (Barad, 2011). I will discuss later on in this chapter how opening the door to a closer consideration of these factors can help technical communicators work toward social justice.
Walton and Jones also call for “methods that preserve the rights and interests of the full range of research stakeholders, methods that are respectful and meaningful across cultures,” (2013, p. 33), and the methods used for this chapter seek to meet this call. One of the goals of this dissertation is to contribute to technical communication research in a way that progresses the field toward inclusivity and a social and environmental justice focus. I work toward that goal in this chapter by examining the perceived impacts of global climate change among stakeholders typically left silent in environmental debates and by connecting our local communication efforts to the impacts on these communities; I seek to include this narrative of global, silent stakeholders in the greater conversation of climate change while still managing to be persuasive to a local audience.

But it is also important to learn from the communication as it happens in these regions, from local knowledge and local practice. For this example of rural Morocco, I will apply the methodology laid out in Chapter 2 to closely examine the rhetorical ecology of a women’s association. I will map out factors that play a role in an agency of assemblages (Bennett, 2010) that can have an impact on creating the conditions required to cultivate an ethic, or virtue, of environmental care (while embracing uncertainty, as also described in 2, and drawing reasonable boundaries). The virtue of environmental care has been cultivated over centuries by communication tactics and modes but also by the rhetoric of nonhuman actors. By examining the rhetorical ecologies currently present in rural Morocco, we not only include the narratives of these silent stakeholders by discussing what is important to them as well as what their needs are with regards to the environment, but we may also see a way of studying an audience to understand what avenues of communication exist through agents that are already communicating
successfully. This will address my second research question: *What aspects of a rural audience’s rhetorical ecologies (intersections of multiple human and nonhuman factors) have the capacity to alter technical communication, either toward or away from persuading the audience to make adaptations to their behaviors?* In this chapter, I will first discuss the narratives of the women in rural Morocco to get a better sense of how climate change has impacted and is expected to continue to impact their livelihoods; I will then discuss how examining this case study as a posthuman rhetorical ecology can further the goals of technical communicators studying with a social justice lens.

**Research approach and methods**

**Broad goal of the study**

The broad goal of the study, as proposed by Drs. Walton and Petrzelka, was to learn about civil society organizations (CSOs)—particularly CSOs designed to improve the lives of women in underresourced populations—and how the organizations function, as well as what challenges the groups and individuals face. The study was also designed to help the researchers, including the undergraduate and graduate students, apply and expand their understanding of technical communication research to a cross-cultural context. To these ends, we worked closely with a rural women’s association, supported by a government initiative designed to improve the livelihood, education, and standing of women by helping to jump-start the production of sheep and honey bees. Our group included two professors, two graduate research mentors, and five undergraduate students on the trip, as well as two local translators who travelled with us. Drs. Walton and Petrzelka sought and received approval from the Utah State University Internal Review
Board, protocol #8414, “Civil Society Organizations in Morocco,” to conduct our research.

As we learned more about this particular association, their activities, and their challenges, a secondary goal for me became to understand how climate change is contributing to those challenges and what the perceptions are within the association of climate change and environmental actors. I was already aware from my own research that climate change is likely already impacting this general area of the world, but it became clear very quickly that it is already having an impact directly on this association and that some of the women in our study are aware of it. I sought then to closely connect the environmental impacts of climate change with sociological impacts on this women’s association.

Interview methods

Our primary method was to conduct community-based research, in which we immersed ourselves in the culture of the people we were working with so closely. In doing so in a rural community, we sought to avoid what Robert Chambers (1983) calls the urban bias, (as discussed in Chapter 1) meaning that because urban areas are more accessible and tend to contain a greater percentage of the population, they are studied more, and studies therefore tend to project urban results across all areas, even rural areas, without accounting for factors that differ between urban and rural areas. In travelling to a more remote location, we were able to visit a more underresourced population to better understand how CSOs are attempting to improve the lives of their communities.
Before conducting interviews, and before even arriving in the village, we spent a few days in Marrakech, one of the larger cities in Morocco, getting acclimated to the culture and observing what was unique and what was similar to our homes. Once we arrived in the village, we divided into groups of two or three and stayed with local families, each hosted by a member of the association. By staying in homes with members of the women’s association, eating all of our meals with them and spending evenings and free time with our host families, we were able to contextualize our research findings with our own observations. In doing this, we were able to see a broader context of Morocco and understand that what is true in the urban areas is not necessarily true in the rural areas, and vice versa.

We worked in teams of four or five to conduct 30–45-minute interviews with participants who were all either current or former members of the association. Each team consisted of one professor, one graduate research mentor, and either two or three undergraduate researchers. In order to maintain complete anonymity of the participants while keeping track of which team of researchers had interviewed which participant, one team named each participant alphabetically and the other named each participant numerically. So we had Participants A, B, and C being interviewed by one team at the same time as Participants 1 and 2 were being interviewed by the other team in a different room. Interviews were conducted through one of two local translators, whom we valued as important members of our team. The interviews were mostly conducted in a temporarily empty home that was being used at the time as a meeting place for the association, so that the members could feel at ease and were not burdened by hospitality rituals before or during the interviews, and so that they could speak without being
interrupted by their children, husbands, impromptu guests, or other household responsibilities. A few of the interviews were conducted in the homes of the participants, because they either felt more comfortable there or they did not feel they could take the additional time away from their household responsibilities.

We did not record or take notes during the interviews in order to make our participants feel more comfortable about opening up to strangers and sharing their opinions, especially with regard to challenges to the association’s goals.10 Instead, each team would conduct separate, simultaneous interviews, then, once the participant had left, team members would sit in silence and write up our notes as quickly and accurately as we could for about twenty minutes; then each team would regroup and compare notes with one person keeping a master set of themes and key takeaways from the interview. Finally, both teams would regroup and discuss our separate findings. All of the master sets of notes were shared with all researchers at the end of the study, so responses included in this chapter include responses from interviews conducted by both teams as well as my personal set of notes that may contain details not included in the master set but still corroborated by the group’s short-term memory.

Limitations

Working across languages can cause some limitations, most obviously that sometimes things are lost in cultural nuances, and some things just do not translate.

10 To a certain degree, this is because Morocco is largely a police state and citizens are somewhat fearful of being critical of their government. While we did not hide that we were researchers from the United States and told all participants that we would use their answers for publication, our contact from the Moroccan institute informed us that the women would speak more freely about challenges they face if they did not feel that their every word was being written down or recorded for reporting to the government.
Translators also end up contributing to the meaning themselves, providing much-needed cultural context, and actively utilizing this as part of our methodology improved our understanding of the responses (Gonzalez & Zantjer, 2015; Walton et al., 2015). Both of the translators we worked with are from Morocco, so they were able to offer insights during the notes-taking regroup and remained available after the interviews for us to ask clarifying questions. (Both are also female, so their gender did not make the participants feel uncomfortable.) Working from memory, even short-term memory, also has its limitations, so our collaboration on our notes was key to making sure we had gotten the important details right. Inevitably, different points of the interview and different responses stuck out to each member of the team, so in regrouping, we were able to piece together the important details more fluidly than any of us could on our own.

A third limitation to the study was the number of interviews we were able to conduct during our time in the village. Between the two groups, we were able to conduct eight interviews, speaking with nine different members over a period of eight days. Because of the small number, we are not able to definitively draw broad conclusions about this association or associations in Morocco in general. We cannot assume that these women are accurately representative of all 50 members of the association or that their experiences are universal. We can, however, include their narratives as evidence of the impact that climate change is having on underresourced populations and the organizations that have arisen to try and mitigate their lack of resources. We can conclude that their experiences are relevant and worth considering; we can still include their narratives to make their voices heard and consider them to be stakeholders in the climate change debate.
Findings: Incorporating the narratives

Structure and background of the association

The women in this village, located in the foothills of the High Atlas Mountains, formed their association in 2012 with some assistance from the government. The government of Morocco, a strict religious monarchy, has recently established some new incentive programs in an effort to improve the lives of women, but also to improve the sustainability of agricultural practices (Plan Maroc Vert, n.d.). One of these efforts is a grant initiative to help women’s associations start up. If the women of a village are able to organize and petition the government to help them start an association (meaning that at least one of them must be literate), they will receive a certain number of sheep (the association we studied received five pairs of sheep, so five males and five females, but we were not able to confirm if that is the usual number) and a certain amount of food for the sheep, which they continue to receive annually. Each association has autonomy for what they do with the sheep. The women in this association have chosen to put their names in a lot, and their elected president drew the names of women who received the first five pairs of sheep. The women whose names were drawn took home a male and a female sheep. When those sheep produced their first lambs, then there was another drawing to see which women got to take home a pair and so on. After the first lambs have been produced, the women are allowed to keep any other lambs for themselves to be able to continue breeding or to sell at the market in the bigger town nearby and thereby earn some independent income.

This association also received three boxes of honey bees from the same government initiative (we are again unclear if this is typical of associations or not). The
women tend to the bees and collect the honey to sell in the market. The proceeds from the honey sales go directly into the association’s funds, and they either use those funds for buying more supplies and equipment for the honey production (jars, sieves, beekeeper suits, etc.) or they save it toward building a location of their own in the village, an important step that I will discuss at length below.

There are in total 50 members in this association, including the leadership board, which consists of seven members. Each woman pays annual dues to be a member of the association. If a woman does not have the money herself, she has to ask her husband (or father or brother if she is not married) to borrow it, and if they refuse, she cannot join.

The leaders include the president, vice president, secretary, assistant secretary, treasurer, and two counselors. These positions are chosen by election; each member gets one vote, and they vote on almost everything, though Participant A, the secretary, told us the leadership make many other day-to-day decisions, so it is important that she keep detailed notes about what they do to maintain transparency. Participant E also told us that the members do not do much of anything; the leadership makes most of the decisions, but they keep careful notes so that if even one dirham (the Moroccan currency) goes missing, they will know. Several of the participants in this study told us that they get together once a year to nominate and vote on leaders, decide what to do with any money they have received from the government as well as what to do with money they have earned from honey sales, and how to handle any other issues the leadership brings forth. This meeting is also where they draw names and determine who gets the new sheep.
Goals of the association

One of our research questions from the beginning of the study and which we asked every single participant was, “What are the goals of the association?” The responses varied only slightly, and all of the responses fell into three themes. **First,** an immediate goal the women are working toward is to build a facility where they can meet and expand their association’s activities. Two of the participants mentioned that they would like to see the women begin a rug-making co-op as part of the association, but to do that, they need a large space where they can set up several looms. The more important reason for needing the facility, however, came up in nearly every interview we conducted: They need a meeting location that they can use as their official address in order to apply for more grants and funding from the government. They have continued to apply for more funding to expand their association, but their applications are repeatedly rejected because they do not have a location. The money they earn from the bees goes toward achieving this goal.

**Second,** the women repeatedly told us that the overall goal of the association is to bring financial independence to its members. For some of the women, this means financial independence from their husbands, not necessarily to leave them, but to be able to buy themselves new clothes or other things at the market, or to be able to send their children to school. For unmarried women or widows in the association, financial independence means they would not need to be entirely reliant on male relatives. Women are otherwise dependent on men in the village for their income and thus experience a lack of agency. The women want to be able to buy things at the market for themselves or pay for their children’s education without relying on their husbands, whom they do not
always trust to manage their money. When asked if the women in the association control the money they bring in, Participant 3 (who is also the president of the association) responded, “Yes. We will not let a man control our money.”

The association brings hope to women that they will achieve agency for themselves and be able to improve their lives and even potentially the lives of their children, especially their daughters. Participant D told us that she does not always go on the excursions, but she will send her daughters, and Participant E told us that she is extremely proud that her daughter is growing up and taking a leadership role in the association, so proud, she said she sometimes brags about it.

Participant 3, who is not married but is educated, went on to say that one of her goals for the association is to “let the women see past the curtains” of their homes. She said they are treated like machines for having babies and keeping the house, but she wants them to be able to get out of the house and experience more things, and earning their own money is an important step toward that goal. She leads the association on excursions to the bigger city nearby, where the women go to the market together or go on field trips or even participate in things like the International Women’s March in 2017. Most of the women have to have their own money to be able to go on these trips, as their husbands typically will not give them money to spend on their own. One participant told us that her husband will give her the money, but only if she has already arranged for someone to watch their child and taken care of the house duties for the day, so being able to earn money through the association is vital to their being able to leave the village.

A third, but possibly the most important goal that was repeated with nearly every participant we interviewed was improving the community. They are participating
members of the association not just to benefit themselves; they are participating for the good of their community—their village as a whole, the women of the village, and their families. The association pays part of the cost of bringing a veterinarian to the village to check on their sheep, and this means that everyone in the village can pay a much smaller, more affordable fee to have him look at their sheep when he comes to town, whether they are members of the association or not. The excursions discussed above are also occasionally for petitioning the government to support an improvement project for the village. Participant D said she has participated in an excursion to town to get a road paved to the village and one to ask for transportation for the children to get to school. This is an extremely important step for improving the low literacy rates in the village, especially among young girls, who are often not allowed to continue school past about sixth grade, because doing so means traveling to the big town, a potentially dangerous endeavor for the girl and a costly endeavor for her family that participants said the men in the village do not often see as valuable.

When we asked Participant E why she had joined, she kept repeating that she wanted the association to improve the village and the community of women. We continued to ask her if there was something specific she was hoping to gain from it, but she kept saying she wanted benefits for the community. When we finally asked it in a way that was clear we meant something she wanted for herself personally, she said, “No, I don’t have any goals for myself. That’s not possible. There’s no point to that. If I do

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11 The vet also occasionally gives vaccinations and check-ups to the village dogs, a major improvement in the health of the village overall, as issues with rabies and other diseases carried by canines is reduced. The dogs are not strays and do belong to specific families, and they also serve the important purpose of keeping wolves out of the village and away from their sheep. However, before the more regular arrival of the vet and a government initiative to educate rural communities about rabies, the dogs were not as well cared for and posed as much risk as benefit.
something that benefits me, I want it to benefit everyone.” This response reflects a sentiment that we found in many of our participants when asked about why they joined the association: They are not doing this just to benefit themselves, though financial independence is a personal goal for many of them; the primary goal for members is to benefit everyone and to improve the livelihoods of everyone in their community, whether they are members or not. Through the production of sheep and honey, the women are working toward achieving their goals.

Impacts of climate change on the association’s activities

Yet the actions of others outside the village, even outside of Morocco, are already having an impact on their ability to achieve those goals. As discussed in the introduction to this chapter, anthropogenic climate change is projected to be hitting rural areas in developing nations first and hardest (Adger et al., 2003; IPCC, 2014, 2018). In our time in Morocco, we were able to witness these impacts and to discuss environmental barriers with the women’s association. Moreover, our findings in Morocco suggest that these communities may be more aware of the impacts of climate change (correlated to human actions in the West) than we anticipated, due to their government’s strategic use of media (television) and incentives (a new solar plant and water conservation practices). What follows are specific enterprises of the association and how climate change is impacting those enterprises.

Honey production: Climate change is most notably impacting the association’s honey production through drought. In a group interview with Participants A, B, and C, and in a
solo interview with Participant 3, we learned that there was a drought in their area in the summer of 2016 that meant there were “no roses,” or not enough pollen-producing vegetation for the bees to feed off of. If there is no food, the bees either leave the area to find vegetation elsewhere (and likely die trying) or they die. Participants 3 and A both told us in separate interviews that to prevent this from happening, the women had to feed the bees sugar to keep the insects producing honey; but Participant 3 said the women dislike doing this because for one thing, it adds to the cost of honey production, and for another, it lowers the quality of the honey and therefore the price they can charge for it at the market.

**Sheep:** Drought also impacts the sheep production, as it makes it difficult to grow the alfalfa needed to supplement the sheep’s diets between shipments of feed from the government. Adding to that problem, the Sahara Desert has been creeping in for some time through desertification made more expedient by climate change, increasing the frequency and severity of droughts (Hulme & Kelly, 1993; Sheffer, Carpenter, Foley, & Walker, 2003). Desertification is caused by the removal of vegetation, either to create more rangeland for grazing or by overgrazing itself, but also through the dramatic temperature changes and reduced precipitation that we are seeing increasingly as a result of climate change. Once this process has begun, it is extremely difficult and resource-consuming to reverse.

In our conversations with her, Participant 3 also observed that the temperatures have been becoming increasingly cold in the winter and hot in the summer, and she attributed this to global climate change. Between the increased drought and these extreme
temperatures, the conditions are perfect for disease to spread quickly through the village sheep. This impacts each individual woman’s ability to become financially independent. If one woman’s sheep die due to disease, or if she does not have enough alfalfa from her field to feed them, then she has only to hope that another woman’s sheep are thriving and producing lambs, and that her name will be drawn again to receive the new sheep.

While droughts are neither uncommon nor necessarily directly attributable to anthropogenic climate change, we do know that they are expected to increase in frequency and duration due to anthropogenic climate change (Dale et al., 2001; Wehner, Arnold, Knutson, Kunkel, & LeGrande, 2017). In the summer of 2017, the rains fortunately returned, and honey production began to go back to normal, just with fewer bees producing honey. But with the direction the global climate is going, the increased threat of drought puts the association’s bee project in a precarious position, and the increase in extreme hot and cold temperatures make sheep production on this small scale difficult as well. The largest flock of sheep that any of the women have is 20 sheep, so each one is precious. As this is the only way these women currently have to make money for themselves, anthropogenic climate change is threatening their livelihoods; and since the US is such a major contributor to anthropogenic climate change, we must begin to consider this impact when we discuss the merits and virtues of making significant changes to our energy consumption and other environmentally impactful actions here and abroad.
Mapping a Moroccan rhetorical ecology: An example from the narrative

Looking at the posthuman rhetorical ecology of the situation in rural Morocco can further the goals of technical communicators studying with a social justice lens, particularly as we do this by comparison with the rhetorical ecology of, say, a similarly rural and underresourced population in the United States. As discussed in Chapters 1 and 2, it can help us understand what factors are impactful on the understanding of climate change and decision-making toward adaptive behaviors. Understanding the vibrant complexities of how these factors overlap, interact, and impact rhetoric as it moves through and across them can help better prepare technical communicators to tailor climate change and other environmental information to audiences in order to enact positive change. Knowing how rhetoric moves through these rhetorical ecologies can help us work toward developing communication that will have a stronger influence on decision-making and cultivating a virtue of environmental care. Considering these women, their situation, and the impact that our actions have on that situation should make a difference in how we approach environmental communication here in the United States (or in the West or developed nations in general).

Recall the mapping rhetorical ecologies method from Chapter 2 rooted in the works of Edbauer (2005) and Gries (2015). Here, I will examine what human and non-human assemblages are at work in cultivating virtues toward adopting new behaviors that we observed and discussed with participants: Planting olive trees.

Participant 3 told us a story of how she has used the collective strength of the association to improve her village. In 2016, she learned of a government initiative (part of the 2008 Plan Maroc Vert, or Green Morocco Plan) to provide olive tree saplings to rural
areas. With the collective weight of the association behind her, she went into the nearby larger town and asked for 700 olive trees, which she was given. She gave 200 of these trees to the neighboring village, gave 100 to the school, and distributed the remaining 400 to families in her village.

Trees by themselves are an important part of nearly any ecosystem and are vital to the health of the planet as a whole. At the local level and of benefit to humans, they provide shade and some protection from extreme heat, improve the landscape by preventing soil erosion, offer a habitat to birds and other small fauna that eat insects that might otherwise destroy crops, and in the case of olive trees, even provide produce. At the broader level, trees are important for the health of the planet, as they convert carbon-dioxide into oxygen, clean up pollutants in the air, prevent soil erosion that speeds up desertification, and work to lower the air temperature. All of these are excellent reasons to plant trees in one’s neighborhood, arguably the most important being the removal of greenhouse gases from the atmosphere. But what factors led Participant 3 to the decision to go out of her way to get these trees? And what factors motivated the government to offer these trees in the first place?

Step 1: Tracing

In tracing the factors, I will begin with the broadest: Policies and incentives from the Moroccan government. The Plan Maroc Vert was instituted in order to improve agricultural sustainability, especially in rural areas, in order to boost economic growth (Faysse, 201512). Factors include the environmental climate of Morocco, desertification

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12 It is worth noting that Faysse, among other scholars of North African sociology, criticizes the Green Morocco Plan for being too focused on modern agricultural structures and not taking into account rural
from the Sahara Desert, climate change impacting Morocco; the political climate, including the Arab Spring incentivizing more transparency with the government and more democracy, increased political efficacy, even in rural areas, and an increased desire to keep people happy with their religious monarchy and likely to resist religious and political extremism. Importantly, the incentives resulting from the Plan Maroc Vert played a large role, as did the access to information and information itself regarding the tree program.

Next is to consider what factors influenced Participant 3 to action. She told us in her interview that when she was a young girl going to school in this same village, there was never any shade in the school yard, and now that she is grown up, she can actually do something about that. She had heard about the Plan Maroc Vert subsidizing olive tree plantings, and she decided that would be a good thing for her to seek out. Through the collective agency of the association, she was able to acquire olive trees to plant in the school yard and throughout her village. A list of factors that impacted this decision-making specifically might look like this: sun, hot air, mountainous climate, school yard, dirt, water access, access to information about the environment, access to information about climate change, government initiative, community, centuries of community as part of the ethic. Some moment of communication (rhetoric) had to happen to inform her that this was an option; that rhetoric moved through this ecology in such a way that it motivated her to act. But the positive incentives from the government (giving the trees farming practices. For example, one of the reforms subsidizes the installation of drip irrigation systems, but the measure of goals for the program is on land covered by irrigation rather than water saved, so it does not factor in current practices or actual amount of water needed or saved by the current practice. This means that larger-scale farmers are more likely to get the subsidy than smaller-scale farmers, who may be using more water per acre and would benefit more from the drip irrigation.
freely) changed an entire community’s perspective and increased knowledge through engaged activity.

**Step 2: Following**

The next step is to ask: How do these factors play off of each other? How did they impact Participant 3’s decision-making? Our interviews with Participant 3 shed more light on the kinetic connections between factors.

Participant 3 told us that there is some degree of awareness of the extreme changes she and others have noted, and that there is some degree of awareness that the West is to blame for excessive consumption. When asked if she has noticed if members of the community have changed their behaviors at all since the extreme temperature increases, she said yes, they bathe more often in order to cool off. Every home we visited is connected to a source of running water, so the immediate need of getting cool is met conveniently by consuming water. Therefore, while this community has information about what causes climate change, mitigation for that does not necessarily mean becoming more environmentally friendly; rather, mitigation means adopting behaviors that will temporarily increase water consumption and impact on the local environment.

Even in rural Morocco, where there is clear awareness and acceptance and even concern about anthropogenic climate change, and even with this particular individual who is educated, literate, and who accepts climate change, motivating behavioral changes is difficult due to these assemblages of human and nonhuman, sociopolitical and environmental actors. There are more pressing needs, more immediately persuasive factors such as hot air and sun, and as long as water is still perceived to be readily
available, much like what we find in the United States, the long-term, community concern of drought is put aside for the individual’s immediate concern of overheating.

There is not a strong kinetic connection between \textit{access to information about climate change} and the behavior of \textit{planting olive trees}. However, factors in the environment do have some strong kinetic connections to this behavior. Factors such as the sun, the mountainous climate, the school yard, and the supportive community, as well as the education of this participant and her access to information about \textit{opportunities} for the community all played a significant role as an assemblage toward her getting these trees. If we follow the active connections among factors, we can see how rhetoric moved across this ecology and engaged this audience toward making that change to her environment for the better. In doing so, she has not only benefitted herself, but also her community and the earth as a whole (to whatever small extent).

**Step 3: Embracing uncertainty**

Because we are looking for what factors impacted a behavior that has already occurred, there is less uncertainty to embrace. However, there is uncertainty that remains in sifting through the \textit{messiness} of narrative research (Walton, et al., 2015). In other words, I can only rely upon my own observations alongside the observations the participants shared with me. What factors was the audience (Participant 3) aware of, and what had a silent rhetorical role to play? I cannot be made aware of what factors played a role and went unnoticed by me and either unnoticed or unarticulated by the participant.

I also do not have access to exactly what rhetoric informed her of this opportunity for getting trees from the government, so I cannot be certain that it did not connect more
directly, for example, to a concern for her community or a concern for the environment. But when we asked her what had motivated her to go to all that trouble to get and plant the trees, she began by telling us about how there was no shade in the schoolyard when she was a child. The trees also only came up in the interview because she wanted to show us a video on her phone of the school children taking care of the trees. Because of the emphasis that she put on her own narrative, I can feel comfortable drawing a conclusion in the next step of this methodology.

**Step 4: De-scribing**

From the process of tracing, following, and embracing uncertainty in this rhetorical ecology, we can assess that Participant 3 was motivated to act out of this kinetic connection between the natural environment and her desire to help improve the lives of the children in her community. This action reverberated throughout the community, as they saw her motivated to make this change. The rest of the community also benefitted by having their own trees to plant in their yards, so they share in the building of an environmental ethic of care as much as the benefit from it. Her behaviors, shaped by her rhetorical ecology, have also impacted that same rhetorical ecology by adding new factors and opportunities. Those trees, and the added information about opportunities through the Plan Maroc Vert, continue to shape rhetoric that moves through this community.
Discussion: Tele-connecting rhetorical ecologies

This case study of one women’s association in rural Morocco demonstrates how we can gain a sense of how human–nonhuman assemblages interact in order to better understand what motivates members within communities as well as larger institutions. This example also highlights why it is important that we consider stakeholders who may not be visible as part of those assemblages when we discuss stakeholder engagement in environmental debates in the West, and that we may need to also broaden our notion of what constitutes a stakeholder. The concept of *societal tele-connections* can help us and potentially our audiences gain a better visualization of the breadth of the impact of our actions here in the United States on communities’ livelihoods in underresourced areas.

Invoking *pathos* alone cannot be enough to persuade an audience to change their behaviors, especially when the object of that *pathos* is thousands of miles away. Connecting the narratives of these otherwise silent stakeholders may help to cultivate a virtue of environmental care, as I will discuss more in Chapter 6. By tele-connecting these rhetorical ecologies, technical communicators can examine what factors are having an impact that typically goes unnoticed by dominant groups and can draw upon findings to improve communication toward decision-making that will create adaptive behaviors in light of anthropogenic climate change.

Dr. Katherine Hayhoe, a well-respected atmospheric scientist and associate professor of political science, as well as an evangelical Christian, has made it her personal mission to connect issues of climate change with evangelical Christian groups around the country, and does so quite successfully (Webb & Hayhoe, 2017). She appeals to the virtue of care for the poor that is a central tenant of her faith by explaining that
climate change is already affecting people in developing nations and that it is therefore the duty of good Christians to do something about climate change, whether their political leadership accepts it or not, because to do so is to demonstrate the brotherly love they are called to exercise. While she continues to present the scientific evidence, she also appeals to the notion that this is ultimately an issue of protecting the lives and health of underresourced people across the planet. Beyond that, Hayhoe appeals to the evangelical mission, connecting the concept that people in developing nations tend to not yet have heard the gospel of Christ, and therefore will die without going to heaven. This is certainly not an appeal that all communicators will feel comfortable making, but it is one that Hayhoe connects for her particular audience through an understanding of how highly this mission of evangelism to the world is held by many Christians.

Hayhoe’s approach uses tele-connecting to link her audience’s actions, attitudes, and local policies to climate change impacts abroad while connecting the virtues held close at home to impacts happening far away. She encourages her audiences to see the people in these far-away places (to literally see them, by presenting images of drought and famine) as stakeholders in their local debates about environmental issues. She connects our excessive water use to drought, and our fossil fuel consumption to extreme hot and cold temperatures contributing to a wave of natural disasters. Her final move is to re-connect these impacts to the evangelical virtue of brotherly love, working to cultivate an ethic of environmental care by connecting it to the (presumed) pre-existing ethic of human care.

While technical communicators may not always be in a position to know their audience’s pre-existing virtues, and while some may find it inappropriate or
uncomfortable for us in a professional context to tap into explicitly religious perspectives, understanding what human-nonhuman assemblages are at work, actively constructing our audience’s rhetorical ecology, can move us toward a more tailored form of communicating environmental issues that will work toward cultivating the virtues of environmental care while motivating them toward changing their behaviors. In the next chapter, I will discuss applying my research method toward getting a sense of the audience’s perceived relationship to the human-nonhuman assemblages in their rhetorical ecology, and I will discuss applying that method toward future communication efforts.

**Conclusion**

Narratives like the ones we gathered from the women in this association in rural Morocco are extremely important to consider in the debates surrounding environmental issues. It is well-established that technical communicators have a responsibility to include stakeholders in these types of debates: we consider the coal-mining community’s concerns over closing a coal mine; the concerns of people who want to keep their cars warm as they wait to pick up their children on a cold day (or cool on a hot day) and do not want their car idling restricted; the concerns of people who do not want a wind farm installed in a place that will obstruct their view of mountains from their back porch. Yet it is also extremely important that in considering these issues, we consider the concerns of the silent stakeholders. We must include their narratives, write them down, carry them home, repeat them, and, in doing so, include them in the conversation. What impacts will the decisions we make regarding our local environment have on these women in Morocco? It may seem far distant and of such little significance that it will not matter to
local stakeholders, especially stakeholders who have not accepted the concept of anthropogenic climate change. But for technical communicators dedicated to social justice, it is vital that these narratives come into the light and be included.

Walton and Jones have argued that “communication (written, verbal, visual, and technological) is an inextricable part of social justice because change occurs through communicative practices” (2013, p. 33, emphasis mine). Sarah Beth Hopton reminds us, “Technical communicators must not abuse their persuasive talents. She must not forget that people are affected by what our documents pre- and proscribe” (2013, p. 67).

Technical communicators are in a unique position to include these narratives of stakeholders who otherwise have few other ways of making their voices heard. Because we have that capability, we must make use of it when engaging in debates about environmental issues. When we go to engage stakeholders and to understand where they are coming from and what their concerns are, and when we write in such a way as to take these concerns into consideration for policy making, in forming arguments, and in framing environmental science information, we have the opportunity to include these silent stakeholders. In this way, we can change the way environmental debates occur to include the impacts on humans in developing nations, and we can begin to fight for their social justice by making their narratives and their voices heard. Moreover, by connecting decisions made in the United States to impacts on people in underresourced communities (even communities within the United States), we may find successful frames for climate change communication for certain audiences toward cultivating a virtue of environmental care.
Because global climate change is impacting everyone, and especially underresourced populations who have a limited ability to communicate their own narratives to those who are adding most dramatically to the problem, it is our responsibility to recognize that this is not simply an environmental justice issue, but more prominently a social justice one. The environment will adapt to global climate change in some way, quite likely beyond our recognition of it as natural, but it will adapt. Some human populations may even be able to adapt and survive, but those populations are the elites: the wealthy and heavily resourced. The major impacts of anthropogenic climate change will be on rural populations in developing nations, and because most of the people living in these areas are already disenfranchised due to limited resources and low literacy rates (among other factors), technical communicators have a real opportunity and responsibility to bring their narratives into the climate change conversation in a way that accounts for these impacts.
CHAPTER V

“STEWARDS OF THE LAND”: MAPPING RHETORICAL ECOLOGIES OF THE OHIO FARMERS UNION

And I think we’re probably over-using glysophate,\textsuperscript{13} that is detaching nutrients from our soil that’s running out the tile lines, but I think there’s an easier solution to the water issue. But get government involved and they’re making a big deal about it and throwing lots of money at it. People are gonna get wealthy over it and not solve the problem. Cause I’ve got several ideas of how I think it could be fixed.

—Participant U

Introduction

The Ohio Farmers Union 2019 annual convention in Lima, Ohio, begins at the Howard Johnson Hotel and Convention Center on Friday, January 25, with a convocation from Psalms and a prayer. Next, the organization’s president leads us all in the Pledge of Allegiance to an image of the American flag on the projector screen. The president of the Allen County chapter, where Lima is located, gives a presentation on the history of the tank plant in Lima where he and many of the other citizens of the town have found employment over the last 78 years, taking great pride in contributing to the United States military and defense strategies. He shows us a lengthy video produced by the tank plant demonstrating the features of the M1A1 battle tank, the pride of the US Cavalry during the Gulf War. It seems oddly out of place to see such pride in building weapons at a tank plant.

\textsuperscript{13}Glysophate is a commonly used herbicide.
farmer’s convention, but it brings to mind the verse in the Bible about turning plowshares into swords (Joel 3:10).

Next up is the new Director of the Ohio Department of Agriculture, Dorothy Pelanda, discussing the new administration’s desire to listen to what family farmers have to say (but does not stay for a Q&A, citing her ignorance in such a new position). Then the communications director presents on the issues the organization lobbied for in 2018 in both Washington, D.C. and the state capital of Columbus as well as what issues the leadership expects to encounter in the coming year, such as a likely hike in the fuel tax and possible outcomes of the next farm bill.

Through these examples of religion, patriotism, and activism, the Ohio Farmers Union convention reveals a complex network of value systems and factors through which rhetoric is moving. The setting of the Howard Johnson Hotel in Lima, Ohio, the sounds of the farmers’ children echoing from the pool, the grand ballroom full of round tables that are half full, the bitter cold and brisk winds outside are all factors contributing to the complexity of this rhetorical ecology. And outside of this moment, there are factors such as the soil and water of Ohio farms, the Lake Erie watershed to the north, the Ohio River to the south; increased rainfall and extreme temperatures throughout the state; and ongoing conversations around pesticides and fertilizers, cover crops and hemp production, policy and practice. All of these factors and the observations described above contribute to how rhetoric at this convention—and through the Ohio Farmers Union website and newsletter—acts to motivate farmers to adopt (or not to adopt) new behaviors or adapt old ones with regard to impending threats from climate change.

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14 Governor Mike DeWine took office in January 14, 2019, just 11 days before this convention.
My observations at the convention confirmed much of what I had already learned from conducting an online survey of members and several interviews: While this organization is made up of a diverse group of farmers with localized rhetorical ecologies, there are several factors that unify them across county lines and divergent watersheds, factors that connect their value systems and contribute to a united virtue of environmental stewardship. Through this community-based research, I investigated these connections and sought to understand what makes members of this community unique and yet unified. I conducted this research toward better understanding of how to frame environmental issues so that the information would be most useful and actionable.

Recall from Chapter 1 that even though policy could create more substantial changes, even individual, household behaviors could drive a significant “wedge” in reducing carbon emissions in the United States (Dietz et al., 2009). In the case of farmers, even small family farmers, that impact may be even greater. From switching to no-till farming that aids in carbon sequestration to improving water quality by reducing contributions to algal bloom, farming practices can play an important role in reducing the human impact on climate change. Moreover, the organization I partnered with for this case study is involved in lobbying efforts at both the state and the national level, and shifting the membership toward more environmental virtues may make it easier for the leadership to present a unified front toward enacting environmentally progressive policies.

Recall from Chapter 2 that the goal of the new methodology I present in this dissertation is to be able to proactively anticipate how rhetorical ecologies will alter rhetoric and how that rhetoric is understood by unique audiences. To put that method into
action in this chapter, I present a case study of community-based research conducted in 2018–2019 in collaboration with the Ohio Farmers Union (OFU), an agricultural community spread across the state of Ohio. Through mixed-methods research, I sought to better understand the attitudes and values of members of OFU and to pair that understanding with knowledge of nonhuman agents to conceptualize what rhetorical frames may be effective at communicating the need for adapting new, environmentally progressive farming practices. Through a digital survey, interviews, and observations, I aimed to answer my first research question: *What strategies are currently being employed by technical communicators to engage these rural communities in environmental science? And what strategies are effective at motivating changes in behavior?* and my second research question: *What aspects of a rural audience’s rhetorical ecologies (intersections of multiple human and nonhuman factors) have the capacity to alter technical communication, either toward or away from persuading the audience to make adaptations to their behaviors?* The conclusion of this chapter will discuss how these findings can be used toward answering my third research question: *How can technical communicators apply a new materialist lens (which I see as the most effective as I will describe later in this chapter) toward understanding rhetorical ecologies? How can this understanding be applied toward engaging unique communities in creating or adapting environmentally progressive behaviors and cultivating an ethic of environmental care?* This final question is answered in partnership with the communications director and leadership of the Ohio Farmers Union. This partnership is extremely important, as local knowledge from the participants and leaders of the organization, in addition to the expertise of the technical communications practitioner, contribute important findings to
this research and are vital for understanding how best to improve communication models with this community.

**Case study set-up: Ohio**

**Why Ohio is an interesting site**

While climate change is already having an effect in rural Ohio (McEwan, Brecha, Geiger, & John, 2011; and observed by many of the participants of this study, even if not always attributed to human actions), it is happening slowly. Protected by the Great Lakes and distance from the equator and coastal regions, Ohio has never been prone to natural disasters and continues to be largely protected from the most immediate effects of global climate change. In areas where climate change is more visible through increased and intensified natural hazards, such as North Carolina (see Chapter 1), discussing global climate change is in many ways easier. Adults in rural Ohio are less likely to think that humans have anything to do with global warming than the national average (see Figure 5-1); the national average is estimated to be about 57 percent, while Ohio as a whole is estimated to be about 54 percent, and rural counties are estimated to be around 48 percent (Howe et al., 2015). Connecting locally intensified natural disasters to a global phenomenon is still a challenge, to be sure, but such connections are possible.

The human nervous system has evolved to respond quickly to apparent dangers, making it challenging to adapt to incremental changes that pose long-term dangers (Webster, 2012), so when the long-term danger is made immediate, as in the case of a prolonged drought or more severe hurricane, the human brain can become more receptive to responding to the severity of the long-term danger. Yet when these immediate dangers
Figure 5-1: Estimated % of adults who think global warming is caused by human activities in Ohio. Source: Yale Program on Climate Change Communication

are not present, or are less experienced and invisible, as in rural Ohio, the incremental changes are more easily ignored or attributed to normal irregularities in weather patterns. As a result, climate change or communication with groups like communities in rural Ohio may not be able to rely on experience with climate change-related hazards. Since the conventional method of explaining how climate change will harm the audience is not likely to be effective at motivating changes in behavior, there needs to be some other rhetorical model adapted for unique audiences that will not experience the significant impacts of climate change in their lifetimes.
On the other hand, farmers are the group most likely to notice incremental changes in climate, as they are dependent on the weather patterns being somewhat predictable and cooperative. Changes to weather patterns and the climate in general would likely be noticed by this group, so perhaps connecting those smaller shifts to the greater, global problem would be effective. We may be able to assume this and construct rhetorical frames around that connection, but to be certain, more research is needed. The research conducted in this case study and described in this chapter seeks to answer the question of whether or not connecting these specific locally experienced effects of climate change to the global problem of anthropogenic climate change is likely to be an effective rhetorical strategy, and if not, this study seeks to understand what factors could be connected to make a compelling case for encouraging farmers in rural Ohio to adapt their farming practices or even adopt new technologies for more environmentally progressive land management.

Studying farmers in rural Ohio, therefore, is worthwhile because while they do contribute to anthropogenic climate change through the practices they choose to employ on their land, and while they are observant of the smaller changes to their climate, they may not be persuaded by humanist rhetorical models of connecting climate change to the audience directly. In fact, my observations and conversations with many of the farmers revealed that there is resistance to attributing their actions to climate change at all. In this chapter, I will employ a new rhetorical method for constructing (inventing) rhetorical strategies toward effectively encouraging adaptive farming practices that will reduce the farmer’s carbon footprint.
Rural research: Importance of local knowledge

A key component to modeling climate change communication in rural communities is valuing the importance of local knowledge, as discussed in Chapter 1. This means not only looking at the recorded and verified evidence of how climate change may be impacting the environment of rural Ohio, but also gathering observations from locals who rely upon that environment. As stated above, farmers are more likely to notice changes in weather patterns more than the average citizen because it impacts their livelihoods more directly. Nearly all interview participants observed specific dates of beginning and endings of planting seasons that have shifted in the last ten years, and several noted increases in extreme precipitation events (flooding) but not an increase in annual precipitation.

Moreover, in conducting research to understand the complex connections within an audience’s rhetorical ecology, especially toward improving communication models, it is important to engage local stakeholders. OFU’s informational outputs (newsletters, website, convention) are important resources for this community, and this research offers a way to increase efficacy of participation among members of the community by establishing more multi-directional communication between leadership and members.

Community-based research can, of course, be messy (Walton et al., 2015), especially when also engaging in civic action research (Bowdon, 2004; Rude, 2004). Walton et al. (2015) argue this:

well-designed, well-conducted community-based research encounters unexpected challenges and serendipitous surprises because power is not centralized with
researchers and because complex, dynamic local contexts are informing the
work—conditions which are required for good community-based research. (p. 62)

By engaging with local knowledge and treating it as equally important to my own
expertise, by presenting myself humbly as an outsider wanting to learn from my
participants, I did my best to approach this research by flipping the hierarchy and
working to redistribute the power to my participants when possible. During interviews, I
would often reassure participants that I did not have “right” answers in mind to questions
about their observations of changes to the environment, nor did I have an idea of what I
think they should be concerned about. In other words, even though I had seen the
scientific data and could make guesses as to what weather patterns might be observed in
this region, I was at this point more interested in what had been observed by the
participants and what mattered to them. In mapping complex rhetorical ecologies,
observations are at least as important as verified occurrences of factors such as flooding
and extreme temperatures, because those factors that have been observed are more likely
to be influential in the role of rhetoric in these communities than projections of what may
be observed.

While I came into this project with specific goals in mind and on paper, I needed
the assistance of community members to help me direct my research questions and
methods toward achieving those goals and, more importantly, toward making those goals
beneficial to the community participating in this research. This is especially important in
these communities who feel abandoned or marginalized by research itself (Chambers,
1983). Research that takes place at land-grant institutions in particular should benefit
citizens, and many in rural communities in particular object to their taxes going to
research that they do not see as benefitting them. Engaging them not just as stakeholders but as co-producers of knowledge is an important step in repairing the relationships between science, research, and the community.

**OFU background**

The Ohio Farmers Union is a state branch of the National Farmers Union (NFU), an organization dedicated to educating, connecting, and lobbying for the interests of family farmers across the United States since 1902. The NFU is founded on the principles of “Cooperation, Legislation, and Education,” and OFU carries these same principles (NFU, n.d.). Since 1934, OFU has advocated for family farms at the local, state, and national level of legislation, and continues to work toward improving the lives of its members by connecting them to each other and to additional resources for education, including scholarships and resources for information on farming practices and policies.

OFU provides information to its members through the NFU website, the OFU website, and the monthly newsletter (The Ohio Country Messenger). The newsletter and website contain updates about the lobbying activities the organization has been involved in, upcoming events and meetings, updates on farm policy and legislation, and occasionally information on farming practices that members may benefit family farmers in particular, such as no-tillage, cover cropping, and switching to organic farming.

OFU is made up of more than 5,000 family members, meaning there are at least that many memberships, but each membership may include several individuals within that household who benefit from the OFU. Membership can be either annual or lifetime,

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15 The leaders I partnered with could not say for sure how many, as they have had some recent technical difficulties in tracking their membership records. Because the organization has been around for so long and
and includes direct benefits, such as discounts on insurance, equipment, travel deals, and other items; delivery of the newsletter; and membership in the National Farmers Union.

The leaders of OFU are democratically elected at the annual conventions through a nomination and voting process. Leadership is comprised of the president, vice president, secretary/treasurer, five district executive committee members and one executive committee member at-large. Each county in Ohio that has members also has a county officer (though many officers represent several counties at once in areas where there is low membership).

The leaders I spoke with in partnership for this research all expressed concern that their members are not getting the message that climate change is happening and that farmers have a responsibility to do something about it. Both the NFU and the OFU have educational programs regarding climate change, renewable energy, and sustainable farming practices, but the leadership understand that there is significant resistance among farmers in Ohio to accepting climate change science and that there is further resistance to adapting farming practices in light of uncertain data projections. When I reached out, they were interested and excited to work with me, because they want to strategize how to use their existing communication methods to more effectively persuade their members to act, to adopt new farming practices that are better for the environment as well as to prepare to adapt their farms for the changes that are projected to impact the state of Ohio.

many of the members still do not have access to the Internet (largely by choice), there are some unique challenges to transitioning to a digital form of communicating with members while maintaining the traditional means of communication.

I spoke first with the vice president, then the president, then the secretary/treasurer, then the at-large executive committee member.
Methods

Overview: Community-based research in rural Ohio

After conducting some initial research on the Ohio Farmers Union through their website, including rhetorical analysis coding of some of the articles on the National Farmers Union climate change blog, and after ruling out the Ohio Farm Bureau as a potential site for study (as their website appeared hostile toward environmental protections, and I assumed they would not be willing to talk to a researcher whose interests lie in increasing environmental protections), I sent emails to the president and vice president of the Ohio Farmers Union about wanting to conduct this study. The vice president called me with more information about how the union is organized and what challenges they are facing and what concerns they have. Dwindling membership and members scattered across the state with limited or no access to the internet and email were the biggest challenges, he explained to me, that could impose limitations on this study.

He also expressed concern that the members are in denial about climate change and are more focused on maintaining their yields year to year than on changing their behaviors in order to be more environmentally conservative. As family farms disappear and either get bought out by or struggle to compete with big agriculture, there is less room to be concerned about environmental impacts, especially if the land your family has been working for generations is about to fall out of family hands if you can no longer maintain an economically sustainable farm. Yet the leadership of OFU is environmentally progressive and is concerned about the long-term impacts of climate change. Because of this, the president and vice president were excited to work with me toward improving
their communication strategies with members in motivating them to adopt new technologies and practices that would be more environmentally sustainable.

Since then, I have been in frequent contact with the communications director (CD) in setting up a digital survey and several interviews as well as arranging for my attendance at the annual convention in Lima, Ohio. The CD is not a farmer himself and is not directly a member of this community, but as he is the practicing technical communicator in this study and has been embedded in this community for some time, it is important to get his feedback and insights. He reiterated several times to me and to participants that he believes the work I am doing is important and will help him better communicate with members of OFU.

Pilot survey

In order to see if there would be anything interesting to study in this community with regard to their relationship to the environment and farming practice decision-making processes, I set up and conducted a digital survey. The questions were mixed: some were quantitative (ranking issues by importance, multiple choice, etc.), but many were open-ended and gave the participants a space to share what issues and factors are important to them and why. The goal with the survey was to understand what issues mattered and to get a sense of how nonhuman agents might play a role in their decision-making, even if that is without the human agent being consciously aware of that role. After drafting the questions, I received an IRB exemption #2 (Protocol #9034) from Utah State University’s review board to distribute the survey and discussed its distribution with the president and CD of OFU. The CD agreed to send a link to the survey (which I set up using Qualtrics)
and to include text from me describing the research goals, as well as a personalized note from him and the president expressing their full support for the project and encouraging members to participate in the survey. The CD then sent the email to their entire list, which comprises about 500 email addresses, about 1/10th of the number of total members, and I got a total of 17 responses.

This seemed like a low response rate, but given that email is not a common mode of communication for most of the members or for the organization as a whole, and given that I had not offered any kind of incentive outside of benefiting the communications of the organization, I was actually encouraged that I got 17 responses, and most of the responses contained robust and length answers to the more open-ended questions. The pilot survey demonstrated the need for me to engage with community members more directly, as digital methods of engagement were always going to encounter such limitations. I actually offered to attend county-level meetings of OFU and gather email addresses in person that I could send the survey out to, but the CD informed me that this was the process through which he had gotten the 500 email addresses he did have. He reiterated that most of the members of the organization simply do not use the Internet as a means of communication. This is why it was important that I find another way to triangulate the data from the survey. The survey responses, as stated above, were robust and still provided useful data.

Interviews

In order to achieve a more in-depth analysis of the decision-making process for members of this rural community, I also conducted interviews with eight members of
OFU. Two were over the phone and six were in person at the OFU annual convention in Lima, Ohio. After I received an IRB exemption (Protocol #9782) for this portion of the research as well, the CD helped me arrange these interviews by selecting members who are engaged in the activities of the OFU and farm in a variety of regions of Ohio and farm a variety of crops, so the selection was not entirely random. He also introduced me at the beginning of the convention and suggested that anyone who would be willing to talk to me should come find me, so two of the interviews were with members who self-selected.

Conducting these interviews allowed me to include the voices of members who do not use email or the Internet, though it did limit participation to either those whom I was able to contact via email to set up the initial conversation, or who attended the convention.

To avoid a power imbalance in this community-based research, I chose not to contradict statements that I disagree with or that I believe to be false or based on popular misinterpretations of data (such as “I don’t believe humans are causing global warming because there have always been periods of warming and cooling”). I also did not hide my intention to understand farmers’ relationships to the environment, and so a number of my questions included words like climate change, environmental concerns, etc. For some participants, these words triggered a defensive response, such as Participant U saying, “The weather has always been changing, and it has changed quite a bit in the last 10 years. But I don’t think it’s anything really that man is doing.” To which I responded, “OK, what specific changes have you noticed?” It was not important in these conversations that I investigate what they do think is causing the changes in the weather, even though most of them told me: they believe it to be part of the natural cycle of the
earth. It was important to find out what they have observed and how they are connecting that to information they receive about the environment, and how that connection influences their decision-making process.

**Observations**

I also attended the OFU annual convention in Lima, Ohio, paying my own registration fee and spending the entire day between interviews listening to the presentations and proceedings of the organization. From these observations, I was able to learn more about how the organization is structured and how communication takes place. I also learned more about what matters most to this community, as the meetings were not governed by rules of order, and members would occasionally interject with questions and frustrations about government interference or corporate farming.

**Findings: Following**

Recall from Chapter 2 that the first step in mapping rhetorical ecologies is *following*, or assembling a concept of the various factors, both human and non-human that contribute to the rhetorical ecology of the audience. In this case, the audience is the members of the Ohio Farmers Union. The rhetorical ecologies through which the information passes are not uniform, but there are factors that unite them as a collective audience. In this section, I will analyze the factors that were recurring or highlighted across my research methods.
Sources of information

To establish whether or not information published through OFU was a factor, I asked participants both in the survey and in the interviews if they use OFU as a resource for information and what type of information they most expected to find there. The survey and interviews confirmed that members tend to use OFU as a resource less on farming practices but more on farm policy and legislation as well as events through OFU. Survey and interview participants also almost all said that they do read the newsletter (with the exception of Participant O who said she does not receive it due to a clerical error in the OFU system).

I also asked interview participants where they seek out information on farming practices outside of OFU. Many participants go to sources of information that they trust because those sources are for a particular area or crop type, such as specialized farming magazines or websites from particular agencies, and many also cited their neighbors as sources of information, especially information on best times to plant and fertilize. Nearly every interview participant referenced utilizing land-grant institutions for information on best practices, though they all rely on different ones. The Ohio State University is the land-grant college in the state of Ohio, but many interview participants expressed disgust with their extension program, with complaints that ranged from ignorance of extension agents to a suspicion of a corporate farm agenda. Participant Q mentioned that as with many extensions, “if something hasn’t been researched yet, as far as [extension offices] are concerned, it doesn’t really exist. They always seem to lag behind what farmers are actually doing.” So, while for many, land-grant research is trusted, it is also not always perceived as being as useful as neighbors or other observational information.
Climate and weather patterns

Every interview participant noted that they have observed changes in weather patterns, whether they had already denied or went on to deny anthropogenic climate change. Increased rainfall or extreme precipitation events (flooding) were noted by all, and all but one also mentioned shorter planting seasons and wetter summers. Five of the eight participants interviewed observed an increase in extreme temperatures, both hot and cold.

Reliance on the health of the land

Certainly, one way in which this rural community in Ohio differs from coal mining communities in Utah is that their livelihood is dependent upon the health of the land. This means they must carefully observe and react to nonhuman agents within the environment, in particular weather patterns and soil and water quality. Because of this reliance, farmers in Ohio are attuned (Rickert, 2013) to many more local environmental factors than the average person.

On the survey, I asked participants to tell me on a scale from one to five how concerned they are about particular environmental issues (see Table 5-1). Global climate change had a mean of 3.31, which was confirmed qualitatively by the interviews. Many of the members indicated they were concerned about climate change and the impact they already see it having on their land, while others were more concerned that regulations regarding climate change would impact their farm unfairly.
Table 5-1: Responses to the question: Are any of the following environmental issues of concern to you? (On a scale from 0 to 5, 0 being “not at all important” and 5 being “extremely important”)

<table>
<thead>
<tr>
<th>#</th>
<th>Field</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>Variance</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Global climate change (global warming)</td>
<td>0.00</td>
<td>5.00</td>
<td>3.31</td>
<td>1.76</td>
<td>3.09</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>Acid rain</td>
<td>0.00</td>
<td>5.00</td>
<td>1.93</td>
<td>1.62</td>
<td>2.64</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Heat waves</td>
<td>0.00</td>
<td>5.00</td>
<td>3.38</td>
<td>1.49</td>
<td>2.23</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>Extreme weather events (blizzards, tornados, hurricanes, etc.)</td>
<td>0.00</td>
<td>5.00</td>
<td>3.50</td>
<td>1.58</td>
<td>2.50</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>Other (please explain)</td>
<td>0.00</td>
<td>5.00</td>
<td>3.20</td>
<td>2.04</td>
<td>4.16</td>
<td>10</td>
</tr>
</tbody>
</table>

Acid rain was rated lower as a concern (mean of 1.93), and heat waves (mean of 3.38) and extreme weather events (mean of 3.50) were rated as higher. Again, this range of concern with a focus on extreme weather was confirmed by the interview participants. Extreme hot and cold temperatures came up in most of the interviews, and many expressed concerns about the increased flooding in their areas (primarily in the northern half of the state).

The concern that was most often repeated in the survey’s “Other” field was fertilizer and pesticide run-off polluting waterways. This was confirmed again by the interview participants, who added to that a concern for soil erosion and soil quality.
Proximity to Lake Erie

One way in which members within this community differ from each other is the watersheds. The Northern third or so of the state falls into the Lake Erie watershed, meaning all of the water that runs off the farms in those counties flows north to Lake Erie. The Southern two-thirds or so fall into the Ohio River watershed. Lake Erie has had a recurring problem in recent years with toxic algal blooms (Michalak et al., 2013), a phenomenon caused by nitrate and phosphorous run-off that algae then feed on in bodies of freshwater (Diaz & Rosenberg, 2008; Hudnell, 2010). In other words, this massive toxic algal bloom is primarily caused by excess fertilizer being swept downstream from farms in the Lake Erie watershed. The algae are able to bloom in massive quantities and cause deprivation of oxygen in the water, killing the fish and other wildlife.

The algal bloom does not have a direct impact on the farms in this area, but many of the towns that surround the lake rely on Lake Erie for their water supply. Moreover, it is a problem visible even from satellites, and provides a clear example of the impact that humans (and in particular, farmers) can have on the environment. Whereas global climate change may seem like a huge problem that cannot possibly be caused by things individual humans do, toxic algal blooms are very clearly caused by fertilizer run-off from farms. Proximity to this phenomenon may have an effect on the relationship of the farmer to the environment, or at least on the farmer’s perception of the connection to the relationship with the environment. Farms in the south do not contribute to the toxic algal bloom in Lake Erie, but they do contribute to the pollution of the Ohio River, the most polluted river in the country (Michalak et al., 2013). Yet this pollution continues moving in a
flowing body of water, joining the Mississippi and dumping all of its waste in New Orleans and the Gulf of Mexico; it does not stay close and visible.

**Agri-economics**

When asked to rank factors that go into decision-making on the survey, half of the participants ranked “Making sure it’s an economically sound decision” as their top priority. Farming economics is complex. Many interview participants explained to me that their hands are tied when it comes to the price they can get for their crops, as the price is dictated entirely by the market, and that is dictated by a multitude of factors. In particular, these family farmers are at the mercy of prices accepted by large corporate farms. The price of crop dictates which type of crop the farmer can afford to continue to produce (or must swap out for a different crop) as well as whether or not they can afford improvements to equipment, storage, and other farm utilities, and plays a huge role in determining whether or not they will adopt new practices. Adopting new practices or adapting old ones is always a gamble, and even for those farmers who do believe the climate change science, the uncertainties about the future make these risks even greater.

**Discussion: Tracing**

Even though participants in this study indicated they turn to OFU’s resources more for information on farm policy than practice, OFU may also have some influence in farming practices. Because OFU’s resources are a trusted source of information, and because OFU’s members are politically engaged and concerned about farm policy on the
state and national scale, this is an important site for connecting values to support for policies that are beneficial both to family farmers and to the environment.

**Environmental stewardship**

Environmental stewardship is a trait shared across the farmers, if at varying levels and to varying degrees of informed stewardship. All expressed concern about their mark on the land, specifically the health of the soil. Participant U, who stated that climate change is *perhaps* happening but does not believe that it is anthropogenic, expressed the desire to switch more of his fields to organic crops. He has one field on which he grows organic hay. I asked if economics had motivated the switch to organic, and he said, “The only thing I’ve got organic is hay, and I’m feeding my own cattle, so I’m really not seeing any economic benefit to it; I just know that the soil health is better with less chemicals or no chemicals.” While he noted economics as the primary motivator for other adaptations to his practices, switching to no-till farming in particular, soil health and reducing soil erosion were also important factors. This demonstrates that the connection for this participant does not need to be made between his own actions, climate change, and its impacts on him in order for him to be motivated to make those changes. Rather it is enough that he sees it as a virtue to take care of the soil that has been entrusted to his family for generations. Economics is strongly connected to this virtue of environmental stewardship, as maintaining healthy soil means maintaining a healthy farm, and the farm is what sustains him and his family economically.
Rhetoric of climate change

Recall from Chapter 2 that Ceccarelli (2011) argues for first addressing the controversy in particular science issues, including climate change, before discussing how to address the issue. For some audiences, that approach may be beneficial; Ceccarelli believes it validates the “opposing” view in order to open up conversation. For some audiences in certain scenarios, I posit that associating any environmental issues with climate change can cause an adverse reaction rather than openness.

In this case study, some participants appeared uncomfortable, even agitated, when I asked if they were concerned about the environment or climate change. For example, when I asked Participant T if he was concerned about climate change at all, after we had discussed the changes in weather patterns he has observed, the participant said,

Concerned about it? I don’t really believe… I wouldn’t go so far as to say I’m concerned about it. I’m not even really 100% convinced that it’s happening. There’s sometimes I think that it is, but then you watch the weather forecast and they’ll show you some kinda weather forecast 100 years ago, they had the same temperatures, same conditions we’re experiencing today, so that kinda makes you back up and think, “Well, really is it?” … But on the climate change, there is one concern that I have, and this is probably gonna throw you way off the bases, but what they are blaming the climate change on does concern me.

He also discussed that the ice caps melting does make him think that maybe it is happening, but his only real concern is that this will create more regulation on farmers, or that farmers will be blamed for causing climate change. Rather than discussing what concerns he has for the impact to his farm, he discussed the belief that the blame should
be placed on other factors. He identified the increase in housing development and black-top roofs and roads as the more likely culprit of global warming, and it is worth noting that this observation is not entirely incorrect.\textsuperscript{17} But he does not see climate change as directly impacting him or his ability to farm in Ohio; he sees it indirectly impacting him through regulations based on improperly assigned blame.

In the survey, one participant responded that they are not concerned about global climate change because “We have not found a way to control the weather. Be prepared with new, and old, practices to alleviate \textit{sic} the consequences. There is some good in everything.” This echoes a mainstream conflation of weather with climate, but also demonstrates that long-term impacts of climate change are not hugely concerning. Farmers may plan to change practices as they become needed with regard to climate change, but not necessarily toward reducing their impact on climate change.

While some were uncomfortable with the topic of climate change or expressed doubts, others were forthcoming with observations they had made that they took as evidence of climate change. An interview participant, Participant Q, was emphatic about her belief in climate change and that the floods she has experienced on her hay fields are proof of it. Yet when I asked if she had any plans to make changes to her farming practices or if she had made changes, the only thing she could think of was that she may be selling her hay equipment, fencing her fields, and switching all of her fields to grazing for her USDA-certified grass-fed beef operation. Here again, even with her belief in climate change and her experience with it impacting her, she is focused on the short-term

\footnote{\textsuperscript{17} Blacktop does increase the surface temperature of the planet (Jin, Dickinson, & Zhang, 2005; Jacobson & Ten Hoeve, 2012); that local knowledge from his observations of land around him being bought up and developed into more housing is indeed part of the problem of climate change. It is only one of many contributing factors, but not entirely insignificant.}
impacts. Like any other farmer, she has to consider the day-to-day, year-to-year survival of her farm. Even the switch to grass-fed beef was less a response to environmental stewardship, but more to a need to keep her family farm viable in an increasingly corporate market. The kinetic connections between the economic factors was at play: the local market for grass-fed beef (driven by consumers), her deep-seated ethic of environmental care, the “worst soil in the state” as she called it, the Lake Erie watershed (which I will discuss more below) through which rhetoric about climate change and the organic movement passed to her. Whatever information she received about this economic opportunity to switch to grass-fed beef resonated with this assemblage of factors and made the decision easy.

**Limitations: Embracing uncertainty**

**Limited survey responses**

Because I only had 17 responses to the digital survey, the answers are of course not generalizable to the entire population of OFU members. However, the results did establish that there were more factors influencing decision-making in this community than party lines or belief in climate change.

**Drawing boundaries**

Recall from Chapter 2 that it is important to acknowledge that once we start examining nonhuman agents for rhetorical capacity and for a role that they may play in rhetorical ecologies, the ecology becomes increasingly complex and knowing where to stop collecting agents becomes difficult. In this case, I drew the boundaries around what
came up often in the responses from my participants, who represented regions across the state of Ohio, in order to draw a line around what makes this a unified community and what factors may be influential to this specific community. While I had a limited number of responses, respondents varied in age, type of crop, and region of the state, so I have a sufficient breadth of scope to begin to draw conclusions about the community of the Ohio Farmers Union, especially since there were several commonalities.

I determined what factors to include in this mapping based on what factors recurred in the conversations. I allowed the participants to guide me in determining what factors were significant and what were not. This was not always a conscious guidance, and as discussed in Chapter 2, most humans are not entirely attuned to the rhetorical agency of nonhuman agents. For example, soil quality came up repeatedly in both the survey and the interviews, so I chose to include that as a significant factor and to examine the rhetorical role it may play. Though not one of the participants said anything like, “The soil is a rhetorical agent in my rhetorical ecology,” soil clearly is a rhetorical agent at work in the rhetorical ecology of all farmers, its significance reflected in how often the participants discussed it with me.

It would be impossible to take into account all factors, such as the role of the email server in delivering emails, or the post office in delivering the newsletter; the type of paper the newsletter is printed on or the ink. In the interviews and survey, I also excluded some factors that others might see as relevant, such as politics and religion, in order to draw more specific conclusions that go beyond a traditional analysis.

For example, a traditional critique or audience analysis might have focused or even relied heavily upon religion and politics in the region as a way to predict audience
response to certain messages, as if those are the only determining factors in an individual’s decision-making process. While I recognize that religion and politics are important to this audience, my goal is to dissociate those as the necessary means of persuasion. My observations (especially the scene described at the beginning of this chapter) revealed that religion and patriotism in fact appear to be factors the members of this audience (members of the Ohio Farmers Union) have in common. The unchallenged (publicly, at least) Christian invocation and prayer offered to open the convention and the voices joined in reciting the pledge of allegiance demonstrated that religion and patriotism may be shared value systems. While those were factors they had in common, this community is still a heterogenous group when it comes to their relationships to the environment and especially environmental science, demonstrating that there are other, perhaps even more persuasive, factors that determine how members of this audience respond to messages about the environment and climate change.

De-scribing

So what do we make of all of these complex factors and the even more complex ways in which they overlap and are connected? In this section, I will lay out my suggestions for improving communications with this community based on these findings.

Explicit discussion of environmental stewardship

Even those interview participants who did not believe in climate change science used the phrase “environmental stewardship,” “stewards of the environment,” or “stewards of the land,” and several survey participants used this phrase as well. This is an
expression of a virtue that many of them exhibit in their habits. This phrase always appears closely in the transcripts to descriptions of behaviors they have adapted in the last 10 years, such as no-till farming (one participant even went so far as to explain to me that not only does this practice save him money and time, no-till reduces soil erosion and sequesters carbon), working on switching to surface irrigation, and reducing (or cutting out completely) the use of pesticides and fertilizers. This phrase “steward of the land” also came up in conversations about behaviors they would like to adopt if they had funding support, such as new technologies that reduce the need for fossil fuels, switching several fields to organic crop, and learning more about when and how to apply fertilizer so they can reduce their run-off.

Many of these farms have been in the family for generations, several at least three generations, a few up to five. This notion of being good stewards of the land is embedded in the identity of family farmers, and one they take pride in, distinguishing themselves from corporate farms. I believe that utilizing this phrase explicitly, though sparingly, might engage members of this community directly in encouraging them to adopt these new habits. The phrase “stewards of the land” should be used with caution, as it verges on being seen as an empty trope, but clearly connected to these new habits, the phrase may invoke this virtue of environmental care.

At the same time, climate change is a term that should be avoided, as for many participants, it is still a divisive term and should be dissociated from the environmental issues at hand. There are plenty of localized environmental reasons for farmers to want to adapt their behaviors and even adopt new ones. The connections they often make between climate change and those behaviors are negative.
Participant U, who was the most certain that climate change has nothing to do with human actions, was also very proud to tell me that he has gone to completely no-till, and that he did this because the practice saves him on labor, equipment, and fuel, but also because no-till helps prevent soil erosion and improves soil quality. In the meantime, through this practice, he is also participating in carbon sequestration, an important step in mitigating climate change. The nonhuman agents in this situation, the soil, the fuel, the equipment, his history on this land, played a role in cultivating an environmental ethic of care; he is reliant upon the soil being of good quality, and therefore it does not matter if he believes in climate change, because he does already believe in being a good steward of the land. When discussing lobbying efforts that the OFU leadership has undertaken or would like to undertake and when informing members of environmentally friendly practices, it may be best to dissociate these issues from climate change and focus on the localized environmental benefits, as discussed in Chapter 1 of this dissertation.  

Economics

Even though only about half the farmers ranked “Making sure it’s an economically sound decision” as their top priority in making a farming decision, financial concerns were prevalent throughout the survey responses and participant interviews that economics are at the heart of farmers’ decision-making processes. I did expect this response, but it is important that this concern of finances be brought to the forefront of the consciousness of anyone seeking to communicate with this group about environmental issues. Instead of being a central focus, economic factors often get

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18 For more on localization, see Agboka’s 2013 piece on “participatory localization.”
wrapped up in the argument that profit is reliant upon the weather and other environmental variables; climate change is going to radically alter those variables; therefore, Ohio family farmers should care about acting on climate change science. Yet as this study demonstrates, there are more complex factors at work. This link between farming practices and climate change is perhaps too far removed for most family farmers who are thinking ahead as far as the next year, but who cannot afford, in many cases, (even in the cases of those who do believe climate change science) to make long-term changes based on uncertain predictions.

As with environmental stewardship, it is perhaps best to focus lobbying efforts and environmentally progressive behaviors on benefits to the farmer and to the local community of these behaviors.

**Conclusion**

As discussed throughout this dissertation, every community is different in terms of what will be effective or not at motivating them toward adapting behaviors or adopting new ones. This case study does not seek the “silver bullet” of climate change communication that many scientists hope is out there. Rather, the goal of this study is to provide a model for improving communication strategies with unique audiences facing unique barriers and challenges—whether those challenges are physical, sociological, or psychological—toward adapting environmentally progressive behaviors. I work toward that goal by examining the factors in the audience’s rhetorical ecology, both human and nonhuman and by examining how these factors cultivate (or do not cultivate) an
environmental ethic of care. This provides an example of how to implement the method presented in Chapter 2.

In order to better understand how best to communicate environmental science and to persuade members of the Ohio Farmers Union to adopt new habits, I directly engaged members of this community in the knowledge-production process. I learned from them what factors are and are not persuasive in their decision-making processes and what rhetoric should be utilized and what should be avoided. By also drawing connections among nonhuman agents in the rhetorical ecologies through which their organization’s communications pass, such as the algae in Lake Erie, this study also revealed other strategies that may be employed in those communications. This kind of direct engagement with a new materialist lens allows for more nuanced technical communication with unique audiences; it allows technical communicators to more directly persuade an audience to adapt behaviors toward being more environmentally progressive. This study is still in-progress, and I am continuing to interview members of this community and engaging with the OFU leadership toward understanding what their goals are for their communications and how best to achieve those goals. What I have presented here is the first big steps toward engaging this rural community in adapting behaviors with regard to the environment.

And as discussed in Chapter 1, there simply is not enough time to first engage communities in convincing them to believe in climate change science and to then convince them to act upon that belief. Moreover, this study further demonstrates the point made in Chapter 1 that just believing in climate change science is not enough to motivate the person to act upon it. When engaging communities, it is important to first understand
what *does* motivate members of that community and what factors have a role in that motivation, to understand how to engage them in science that is understandable and actionable.
CHAPTER VI

CONCLUSION: BROAD APPLICATIONS FOR A NEW
MATERIALIST VIRTUE ETHICS LENS

I’m standing in the Asian foods aisle of my local Kroger grocery store holding a plastic-wrapped packet of ramen noodles and examining the ingredients list: Enriched wheat flour (wheat flour, niacin, reduced iron, thiamine mononitrate, riboflavin, folic acid), palm oil, potato starch, beef bone extract, modified potato starch…yeast extract, yellow cornflower. There, toward the beginning of the list, is something that I, as a devout environmentalist—one who actively strives to form habits reflecting an ethic of environmental care—have been trying to cut out of my consumption entirely: palm oil. I am filled with both knowledge of and concern for what the palm oil harvesting industry does to the Amazon rainforest, including the deforestation of 13.9 million hectares and the destruction of natural habitats of countless species, landing them on the endangered species list and destroying a resource vital to mitigating global climate change (Butler & Laurance, 2009; Wilcove & Koh, 2010). I know all of this; I have even researched it personally, heard pleas from some of my favorite celebrities (Lily Tomlin and Leonardo DiCaprio to name two) and even spoken to friends about the evils of palm oil. Yet here it is in one of my most staple food sources. So why am I still standing in the Kroger Asian food aisle holding onto this packet of ramen? Why is this a difficult decision at all?

As you may have guessed by now, there are dozens of factors at work here, human and nonhuman, creating a complex rhetorical ecology across which messages of why I should or should not consume palm oil are now moving. These factors are as large
and distant as the rainforest and its vital contribution to mitigating global climate change, and as small as the MSG and sodium molecules in the ramen seasoning that my body craves after a long day; the noodles that soften quickly in hot water and provide a temporary sustenance to a hungry graduate student; the packaging that is familiar and creates some nostalgia for my days as an undergraduate, when ramen was a quick and cheap meal that got me through stressful (but often still fun) weeks, stress that is repeated now that I am in the final stages of my dissertation. Yet that packaging also tugs at my ethic of environmental care as I connect it to the issues with single-use plastics; the lingering image in my mind of Lily Tomlin as her character, Frankie, on the Netflix comedy “Grace and Frankie,” her hands covered in red paint that she declares is orangutan blood on the hands of corporate America, much to the hilarious embarrassment of her business partner, Jane Fonda’s character, Grace; the low cost of each meal-in-a-packet (today they are 80 cents each at my local Kroger) weighed against my modest graduate student income; my cart already filled with organic kale and apples, local dairy products and other items that may work to assuage my guilt at this one anti-environmental indulgence.

I put a half-dozen of the palm oil-laden noodle packets in my cart and continue shopping. Perhaps I’ve just decided that it is more important for the environment that I get this dissertation done and revised and defended so that I can continue my work toward encouraging environmentally progressive behaviors of others. The time it would take me to cook a proper meal (and one that would certainly be far healthier for my body) may be inconsequential in the long-term, but in the short-term, it seems of the utmost importance, as if that time must be put to use writing my dissertation.
As I walk toward the end of the aisle, I attune myself to the factors that just went into my decision-making, and the weight of my hypocrisy hits me. The final factor to weigh in is this dissertation itself: the Microsoft Word documents that contain dozens of pages of my writing, demonstrating the importance of recognizing the barriers and motivators that play a rhetorical role in the decision-making of rural communities in both the United States and abroad, the dozens of sources I cite that say we do not have time to waste in acting on climate change and protecting our environments (including the sources cited above that recommend boycotting companies using palm oil as the primary strategy for reducing destruction of the rainforest). And then I think about the barriers and motivators that have had a rhetorical influence that led to me placing those noodles in my cart; as I attune myself (Rickert, 2013) to those factors and become aware of what is most important to me (the environment but also my own ethic of integrity), I turn my cart around and replace the noodle packets to the shelf.

Throughout this dissertation, I have argued that it is vital that technical communication scholars and practitioners consider the complex rhetorical ecologies across which their work will travel to reach their unique audiences. I have presented ways in which we in the field may apply new materialist theories toward understanding how these human and nonhuman assemblages (Bennett, 2010) have rhetorical agency, and how that agency can take part in cultivating certain virtues, the confluence of which influences decision-making processes. Understanding what barriers and motivators are in place for an audience when it comes to creating adaptive behaviors or adopting new ones is important for anticipating how best to communicate environmental science with that
audience. The knowledge that can be gained from the research presented in this dissertation works toward communicating science so that it is both understandable (in the long-term) and actionable (in the short-term) for communities that need it most. This concluding chapter will reiterate the main points of the dissertation; draw connections and comparisons between the three case studies; describe what a virtue of environmental care might look like and how the case studies informed my understanding of this virtue; finally, this chapter will suggest the next steps for this new methodology in research and applications for pedagogy.

**Toward a solution to a technical communication problem**

In the introduction to this dissertation, I discussed at length that global climate change has become a problem for the field of technical communication, and one that has been addressed in recent years by scholars in the field. As discussed in Chapter 1, the work presented here contributes to the field of technical communication in two ways: (1) by informing technical communication practitioners and scholars who work closely with scientists of strategies for improving the effectiveness of science communication toward motivating specific behavior changes; (2) by building upon a tradition (and a more recent resurgence) of technical communication scholars seeking to find more effective means of applying rhetoric to persuade the public not only to accept climate science but to act upon it. My hope is that after reading the chapters and case studies, scholars are able to see applications for this posthuman virtue ethics lens to audience analysis toward improving science communication and toward motivating specific behavior changes.
As described in Chapter 2, new materialism allows communicators to find new openings for engaging rural stakeholders by understanding what barriers there are to traditional science communication and what human and nonhuman actors play a rhetorical role in their ecologies. Also discussed in Chapter 2, a virtue ethics lens allows the researcher or communicator to approach community engagement with science from the goal of cultivating virtuous habits that may or may not stem from an environmental ethic of care. The approach that I have described here applies both a new materialist and a virtue ethics lens toward finding new ways of engaging rural stakeholders in science communication and in adapting behaviors toward the environment.

My work is specifically in behaviors that have an impact on climate change, but the methods presented in Chapter 2 can be applied to issues across STEM (Science, Technology, Engineering, and Mathematics) fields, such as responsible and ethical technology and engineering, increasing public understanding of vaccinations, or engaging stakeholders in new public projects. The methods are designed to bridge gaps between science and the public, but also between science and other fields of research (especially technical communication) that can improve the relationships among researchers, stakeholders, and policy makers toward better outcomes for all.

**Case studies of rural communities**

The case studies presented in Chapters 3–5 serve as examples of three unique rural communities that exhibit overlapping characteristics. I was most interested in engaging with rural communities because I believe that they are traditionally overlooked by many researchers due to what Robert Chambers calls the “urban bias” (1983), and I
believe they tend to be overlooked by environmental groups, as well, partially because rural community members tend to disbelieve climate change science at greater rates (Howe et al., 2015), and partially because, again, access to these groups is limited. Yet I believe a third reason rural communities are often overlooked by environmentalist groups is that the ability to live more environmentally sustainably is simply more of a challenge in these communities. The increased public infrastructure in many urban areas makes taking public transportation, biking, or walking easier than driving, while rural citizens have miles between their home, work, school, grocery stores, and other necessities, and with little to no public transportation in between. Small cars with higher rates of miles to the gallon fare better in urban areas, while large vehicles with lower miles to the gallon may be considered necessary for a rural lifestyle. Because urban areas are more likely to directly experience problems such as air and water pollution, there are policies in place restricting or encouraging certain behaviors toward protecting the environment.

All of these nonhuman factors create physical barriers and motivators in creating habits that cultivate an ethic of environmental care in urban communities and what is often perceived as a lack of care in rural communities. We know that urban communities are more likely to be concerned about climate change than rural communities (Howe et al., 2015), yet many rural communities stand to lose the most from the effects of climate change (IPCC, 2014, 2018). In conducting this research, I sought to find a method for engaging rural communities, in understanding what their concerns are, what knowledges they have to offer, and how human and nonhuman actors are creating habits that are cultivating certain ethics. The ultimate goal is to work with these communities to find ways they can reasonably adapt their behaviors (or adopt new ones) that will be more
environmentally sustainable, and to find ways to communicate the importance of those adaptations.

Rhetorical agents in rural communities

In Chapter 3, I analyzed fact sheets written for rural communities in Utah and concluded that because these communities are often reliant on fossil fuels, communications toward creating new behaviors, especially short genres, should not waste time connecting those behaviors to fossil fuels and fossil fuels to climate change. I considered the unique rhetorical ecology through which the rhetoric of these fact sheets moved. I concluded that connecting the recommended environmentally progressive behaviors to virtues of economism and self-reliance would be more effective, I also concluded that dissociating (Perelman & Olbrechts-Tyteca, 1969) climate change from these behaviors entirely would be more effective than first quickly explaining the connection between climate change and recommended behaviors. To the authors of the facts sheets, sitting in Cache Valley, Utah, where air pollution is a prevalent, visible, tangible part of the ecology and where they are surrounded by climate researchers, the connection between fossil fuels and climate change is clear, and they themselves may find plenty of motivation in adapting their behaviors in order to reduce fossil fuel consumption, as it has the immediate effect of reducing air pollution (and boosting their own ethos with their peers in the College of Natural Resources).

This case study set up the need for the kind of research presented in Chapters 4 and 5. While many institutions and individual researchers (particularly at land-grant universities) make an honest effort at engaging rural communities in environmental
issues, these institutions and the researchers within them are not necessarily conscious of the differences between communities, especially their own and their audience’s. The most frequent question that I am asked as a technical communication scholar is “How do I communicate my science to a general audience?” When the reality is that there is no such thing as a “general audience.” Even the umbrella term rural communities that I have been using throughout this dissertation encompasses a diverse group of audiences, as I hope the dissertation itself has demonstrated, each with unique actors playing a rhetorical role in the decision-making process, and each with their own virtues cultivated through habits, habits that have been created by interacting with human and nonhuman actors.

For example, while a barrier to climate change science acceptance in rural Utah is community reliance on fossil fuel industries, this is far less of a problem in rural Morocco, yet there are barriers to adapting behaviors in both communities. In Chapter 4, I described community-based research conducted with a women’s association in Morocco. As we interviewed members of the association about their organization’s goals and challenges and strategies toward meeting those goals, it became apparent that climate change is creating several challenges for them. Drought, desertification, and disease are increasing in the region due, in part at least, to climate change (IPCC, 2018). Their honey production and sheep-raising enterprises are both at risk, and, seemingly, there is not much these women can really do.

Yet there is still much that they do. In this chapter, I analyzed the human and nonhuman actors that played a rhetorical role in one large behavior adaptation that the association was able to make collectively: bringing in hundreds of olive trees to their village and the village neighboring theirs. Understanding what factors went into the
community’s decision to apply for the trees is important for understanding how we might communicate about other adaptive behaviors that other communities might adopt. It was not a fact sheet that clarified the dangers of climate change and the utility of trees in combating climate change that convinced the women to do this. It was a combination of nonhuman actors creating a situation in which the need for these trees was palpable, information communicated in such a way that it connected to the women’s needs, and the availability of the trees that made this planting possible: Through human and nonhuman rhetoric, the science became both understandable and actionable.

Similarly, the research participants in Chapter 5 revealed that even those family farmers who do accept climate change science (and are concerned about it) are less motivated by the science alone to make behavioral changes than they are the economic and short-term benefits to making those changes. For the final case study in this dissertation, I surveyed and interviewed several members of the Ohio Farmers Union, an organization comprised of more than 5,000 family farmers. This is a diverse community, distributed across the state of Ohio. While there was a range of acceptance of climate change science (many accepted it whole-sale while some accepted its occurrence but not that it is caused by human activity), a virtue that unifies this rural community is a sense of environmental stewardship, cultivated by generations of their families relying upon the health of the land, by habits of adapting behaviors to maintain the quality of the soil and water.

Just as my research in Utah showed, there are barriers to Ohio family farmers fully accepting their impact on the environment. With the prevalent environmental issue of toxic algal blooms in the areas surrounding Lake Erie, some of the farmers wanted to
attribute this to run-off from urban dwellers using fertilizers and pesticides in their yards; others were quick to express that global warming should not be blamed on farmers but on urban sprawl. Still, many of the farmers I spoke with are concerned about their impact on climate change, but they are more concerned at the impact that large-scale, corporate agriculture has on climate change.

And as we saw in Morocco, there are barriers to Ohio family farmers adapting in the ways they would like to. For the women in rural Morocco, the barriers are largely socioeconomic: as women, they have less autonomy in their society, and as rural women, they have less access to opportunity for making money. For Ohio family farmers, these barriers are also socioeconomic: farmers are reliant upon policy makers (who, in a democracy should be acting on the will of the people) to subsidize farming practices that are more sustainable, yet these subsidies have not come. It is always a gamble for farmers to make changes to their practices, and those changes have to be carefully weighed to ensure the longevity of their farms. Increasingly, with tight economic leverages, that longevity means the next couple of years—not the next 50.

Communicating with these unique audiences requires an understanding of the specific literacies and knowledges possessed by these audiences. Chapter 3 demonstrated why it is particularly important that technical communicators consider how the rhetorical ecology through which their work is going to move changes and is changed by nonhuman actors, and how technical communicators need to consider their own situation and how it may differ from that of their audience. Farmers have observed changes in the weather far more closely than the average citizen, and for the case study in Chapter 5, asking about what information they need to receive from their union is imperative to understanding
how best to frame environmentally progressive practices that their leaders want to encourage them to adapt. And gathering narratives from the women we interviewed in Morocco allowed me to connect the issue of global climate change to a localized social justice issue: hearing their perspectives and telling their stories highlights why technical communicators need to be conscious of the environmental and social justice implications of the decisions we make in our local communities. Engaging stakeholders means bringing their voices into the narrative and the debate and making sure that invisible stakeholders are heard.

**A virtue of environmental care**

The case study in Chapter 3 laid out the exigency for applying a new materialist lens to environmental communication and for cultivating a virtue of environmental care. From the case studies in Chapters 4 and 5, I learned a lot about what that virtue of environmental care might look like in different contexts. The participants themselves contributed to the knowledge produced in these case studies, demonstrating that such a virtue may already be there and needs only to be nurtured, or cultivated through certain habits, either new or adapted to be more environmentally progressive.

In Morocco, this virtue of environmental care is revealed in how the members of the women’s association have engaged their entire community in taking care of newly planted trees. The planting of 700 olive trees was not a single act that arose out of a particular desire to benefit the environment; rather, it arose out of a recognition of what a habit of caring for environmental agents could do for the community. By caring for these trees, the women and other members of the community provide shade for themselves and
aid in preventing soil erosion, important outcomes in this hot and arid region that is at risk of desertification due in part to climate change. But this act of tree planting also aids in mitigating climate change itself, as the trees will capture carbon dioxide and produce oxygen. The act that revealed this virtue of environmental care did not need to also stem from a recognition of or desire to mitigate climate change, but only from a recognition that caring for the environment benefits the community and builds resilience.

Farmers of rural Ohio often explicitly referenced this virtue, but it is not necessarily connected to a desire to mitigate the effects of climate change. As discussed in Chapter 5, most of the interview participants referred to themselves as “stewards of the land,” or “stewards of the environment,” including those who also told me they did not believe in climate change science. This virtue of stewardship has been cultivated across generations, tied to their reliance upon the land for yielding good crops. I learned from these participants that the virtue of environmental care does sometimes require some economic sacrifice, as many of them have switched to practices that come at an economic cost but an environmental gain, such as switching a field to organic crop (which produces a lower yield and may not increase profit). I also learned that sometimes, however, the two virtues of environmental care and economy are aligned, and as I brought up in Chapter 3, the virtue of economy can be a stronger motivating factor. Utilizing that virtue (of economy) and engaging community members in it rhetorically, or associating it with environmentally progressive behaviors, can create habits that ultimately cultivate a virtue of environmental care. These farmers have seen that taking care of the land for the long term means the land will take better care of them. This virtue, then, means recognizing
our place in a complex ecosystem (though not necessarily fully understanding it) and acting to improve the ecosystem as a whole.

Conducting the research for these case studies demonstrated to me that upholding a virtue of environmental care does not require total environmentalist zealotry, living a Thoreauvian lifestyle alone in the woods; nor does the fact that I wavered in my ramen decision above mean that I am lacking in this virtue. A virtue of environmental care requires a simple acknowledgement that we as humans are part of a complex ecosystem and that our actions have an effect on the other agents in that ecosystem, just as those agents have an effect on us. Such a virtue does not require an attribution of rhetorical agency toward these agents (though exhibition of the virtue may reveal such an attribution), but for researchers and technical communicators, examining this rhetorical agency of nonhuman agents may help us understand how this virtue may be cultivated and how our communications with unique audiences may work toward persuading that audience to form new habits that are more environmentally progressive.

**Applications**

I see future applications for the work I have presented in this dissertation in two primary areas: Research and Pedagogy.

**Research**

My next steps with this work will be to continue collaborating with the Ohio Farmers Union leadership to improve my understanding of their organization’s needs and how utilizing the strategies outlined in this dissertation can help them meet those needs.
Their communications director (CD) has disclosed to me that the organization is concerned that they are losing membership as family farms decline and members retire without leaving the farm to a family member. He mentioned that there is some potential for new membership as he has observed that younger generations become increasingly interested in small, organic farms, and more people between the ages of 25–35 are moving outside of urban areas to farm sustainably. The CD would like some assistance in recruiting younger members who could keep OFU alive, active, relevant, and influential for years to come. To do that, I can help him do some assessment of the kinds of farming practices these communities are already engaged in and concerned about, understand where they currently seek information, how active they already are, and what might interest them about joining an established organization. The CD is concerned that while many of the younger farmers are already activists and engaged with the political process, they are wary of joining organizations led almost entirely by older white men. Some restructuring of the organization and its communication platforms would require understanding the rhetorical ecologies of both rural Ohio where these communities are located now and urban Ohio from which these new farmers are migrating, as well as the rhetorical ecology of the organization of OFU itself.

The work from this case study may also be applied to other areas of community-based technical communication where the aim is to work collaboratively with the community to develop strategies for motivating certain behaviors or increasing support for policies that will benefit the community. For example, research concerned with areas that have reduced rates of childhood vaccination may look to this method for understanding what factors are contributing to a potential distrust of modern medicine.
and how those communities may offer important knowledges that lead to a deeper consideration for how best to engage them in a conversation about vaccinations that makes the science behind vaccines both understandable and actionable. It is, of course, crucial in conducting research in these sensitive cultural issues to work closely with community members and to first appreciate local knowledges and literacies before recommending strategies for improving communications.

These local knowledges can reflect the nonhuman actors at work that are often invisible or imperceptible to policy makers and external researchers. For example, Rose and Walton (2015) demonstrated this when their research utilizing local knowledges revealed that a restructuring of bus routes had failed to take into account the impact those bus routes would have on marginalized communities. Using a posthuman lens, Rose and Walton conducted community-based research and learned that there were several nonhuman agents that had a significant effect on locals that the city was completely unaware of. Rose and Walton also remind us in this piece that this type of research, while closely examining the nonhuman agents, is “carefully, intentionally human-centric work” (p. 2), as the goal of this type of scholarship is to improve the lives of humans, particularly humans in marginalized communities.

The next steps for my personal research will be applying this lens to transdisciplinary research, to see if this lens can be included in methodology from the beginning of research embedded within the sciences. There is some promise that the sciences are becoming more attuned to the need for engaging their research with humanities researchers. For example, Caroline Gottschalk Druschke has begun work on a similar project with colleagues in hydrology and biology departments called Q Rhetoric,
in which she has adapted an established scientific method for data collection to collect community input on a water conservation project in Wisconsin (Druschke, Booth, & Lundberg, 2019). I seek to understand what factors in a scientific study have rhetorical agency on an audience and how that agency influences their reaction to that science. My research question going forward with this work, then, is the following: Can beginning this kind of new materialist work alongside scientists from the outset of their research lead to more stakeholder engagement with the science itself, toward making science more understandable and actionable?

Pedagogy

Teachers of technical communication have a responsibility to introduce our students to the importance of engaging with communities through communication and to especially pay attention to the impact of technical communication on issues of social justice (Bowdon & Scott, 2003; Cleary & Flammia, 2012; Cook, 2002; Dubinsky, 2002; Hopton, 2013, Eble & Gaillet, 2004; Jones, 2016; Kienzler, 2001; Moore, 2013; Thralls & Blyler, 1993; Weisser & Dobrin, 2012; Wilson & Wolford, 2017). As described in Chapter 4, climate change is a social justice issue. Communities in developing nations are already experiencing the effects of climate change and are less able to recoup the losses after increased natural hazards, while developed nations (especially the United States) are the largest contributors to climate change drivers (IPCC, 2014, 2018). When applying the work in this dissertation to pedagogy, it is first important to note that technical communication teachers have a responsibility to make this connection clear to students and to make sure that our students are considering how the technical communication they
will engage with in the workplace either perpetuates the hierarchies made worse by climate change or works to subvert them. Is the communication going to privilege the interests of white Westerners over the rest of the world unequally? This question does not mean to imply that the interests of the rest of the world should be included in every communication; that would contradict much of what I have argued throughout this dissertation. I mean that technical communicators should be considering how the environmental issues with which they are engaging have a global impact, and we should consciously work to subvert the hierarchies that benefit when we ignore the global impact of local actions. How can we teach our students to question these hierarchies and to ask who benefits from maintaining public ignorance of and inaction toward climate change?

Second, technical communication teachers can utilize the mapping rhetorical ecologies method described in Chapter 2 to improve student’s audience analysis skills. In my own classroom, I have asked students to physically draw out who they think their audience is, where they are, what is going on around them, and how that may influence how their audience will understand the information they are trying to communicate. How will that audience best connect the message to what is perceptible to them, and what might make them not want to connect it? It is important to note that my introduction of this method does not seek to erase centuries of rhetorical work, but rather seeks to build upon and supplement the rhetorical tradition.

Conclusion

There is broad scientific consensus that the earth is warming faster than it has before, and there is scientific consensus that this warming of the planet is caused largely
by human activity (Cox et al., 2000; Dansgaard et al., 1993 IPCC, 2014, 2018; Melillo et al., 2014; Parmesan et al., 2003; USGCRP, 2017). Yet there is a lack of consensus among the public, especially rural communities, that anthropogenic climate change is going to harm humans or is caused by human activity (Howe et al., 2015). According to the latest Intergovernmental Panel on Climate Change report (2018), we have only about twelve years to make drastic changes to human activity on this planet if we are going to avoid the worst effects of climate change. We simply do not have the time left to focus first on changing public acceptance of climate change, and we must instead focus our efforts on motivating necessary behaviors.

Yet understanding why there are such barriers to acceptance of climate change science can be a powerful foundation for communicating effectively about necessary behavior adaptations. Applying the new materialist virtue ethics lens that I have laid out in this dissertation is aimed at understanding what nonhuman actors have had a rhetorical influence on human decision-making and how those decisions have formed habits that cultivate certain virtues, with the goal being to work with community members to rhetorically connect those virtues and those nonhuman actors toward creating new habits (or adapting old ones) that will be more environmentally progressive.
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Articles in Progress
Shirley, B. (Proposal accepted, manuscript under review.). Post-fact fact sheets: Communicating past climate change denial in community action-oriented genres. Communication Design Quarterly, special issue on Environmental Communication in the Age of Un-Reason.
Articles in Progress, continued

CONFERENCE PRESENTATIONS
"‘Because this is the only hope there is’: Community engagement with environmental resilience in rural Morocco." Paper presentation. Association for the Rhetoric of Science, Technology, and Medicine Conference. Minneapolis, MN. May 31, 2018.

ACADEMIC APPOINTMENTS
Graduate Instructor, Utah State University
ENGL 3400: Introduction to Technical and Professional Communication, Fall 2017
ENGL 2010: (Online) Intermediate Writing: Research Writing in a Persuasive Mode, Summer 2017
ENGL 2010: Intermediate Writing: Research Writing in a Persuasive Mode, Spring 2017
ENGL 1010: Introduction to Writing Academic Prose, Fall 2016
Research Appointments
Determine fitness of submissions for the journal, ensure manuscripts are blinded, assist in reviewer selection, assign manuscripts to associate editors, track reviewer progress, conduct light copyediting, manage journal social media presence.
Graduate Research Mentor, USU Study Abroad, Morocco, May 2017.
Conducted interviews with research participants, provided mentorship to undergraduate students, assisting Drs. Rebecca Walton and Peg Petrzelka.

SERVICE & OUTREACH

Service to My Institutions
Writing Center Tutor, Utah State University Writing Center, 2016–2017.
Panel Moderator, Citizen Scholar Conference, Utah State University, 2017.
Curator, Graduate Reading Series, Emerson College, 2012–2013.
Editor, *Byzantium* literary journal, California Polytechnic State University, 2009–2010.

Service to the Field
Invited speaker. “Connecting your Science to your Audience.” Communicating Science Series, Utah State University College of Natural Resources. January 16, 2019
Guest Lecturer and Panelist. “Communicating environmental data in a post-fact era.” Environmental Data Justice Panel for The Ohio State University’s Department of Geography. March 27, 2018. Columbus, OH.
Panel Chair, Rocky Mountain Modern Language Association Conference, 2017.

Outreach
Outreach, continued
Interview Participant. Aggie Radio. *Colony Collapse with JD Herndon*. April 17, 2017. (Discussing Moroccan bees and publicizing the USU study abroad research trip.)

AWARDS AND HONORS

Grants and Fellowships
Presidential Doctoral Research Fellowship, Utah State University, 2015–2019, $80,000
Selected upon acceptance to the program to have a reduced teaching load and an annual stipend and other opportunities to foster research opportunities.

Grants and Fellowships (continued)
Ph.D. Recruitment & Travel Grant, Dept. of English, Utah State University, 2018, $1,000.
Awarded to one Ph.D. student per year to facilitate travel to a national conference and assistance in promoting Utah State’s Tech Comm program.
Graduate Dean's Fellowship, Emerson College, 2011–2013, $15,000.
Awarded to a few incoming Master’s students to encourage recruitment of students who have demonstrated past academic excellence and professional promise.

Other Honors
College of Humanities and Social Sciences Graduate Researcher of the Year Finalist, Department of English Winner, Utah State University, 2016.
Pass with distinction, Doctoral Qualifying Exams, Dept. of English, Utah State University, 2017
President’s Honors List, California Polytechnic State University, 2009–2010.

RELEVANT PROFESSIONAL EXPERIENCE

Freelance Editor, Aptara Corp, Boston, MA, May 2015-September 2015.
Editorial Assistant/Project Manager, Aptara Corp, Boston, MA, March 2013-November 2014.

PROFESSIONAL MEMBERSHIPS

Association for the Rhetoric of Science, Technology, and Medicine
Rhetoric Society of America
Association for Teachers of Technical Writing
Council for Programs in Technical and Scientific Communication