



# Embodied Participation: (re)Situating Bodies in Collaborative Research

Michael Clay  
University of Maine  
michael.clay@maine.edu

Jennifer Smith-Mayo  
University of Maine  
jennifer.smithmayo@maine.edu

Bridie McGreavy  
University of Maine  
bridie.mcgreavy@maine.edu

## ABSTRACT

Our paper centers embodiment as a theme and a process in research through describing the fine-grained practices and everyday interactions that shape collaborative research in the contexts of watershed restoration and environmental monitoring. We focus on embodiment because it offers a means for attending to the process and politics of knowledge production within and across boundaries. We offer two case studies that focus on embodiment to structure research processes and shape ongoing, emergent, and collaborative research practices. We argue technical communication as a field is well positioned to include embodied practices in research design and writing.

## CCS Concepts

Human-centered computing, applied computing

## Keywords

Genre, Embodiment, Rhetorical ecology, Interdisciplinary, Knowledge map

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## INTRODUCTION

*“But it’s just the smell of the ground and the equipment, the soil, the not being—there’s always something new. We never get really sick and tired of doing anything in farming, because the jobs just don’t last ... But, like I said, we ship potatoes. We ship for most of the winter. And we’re done shipping now. We’re going to go work in the shop for a few months. And then we’ll start cutting [potato] seed. And then you get on the ground and it’s just about the time you get sick of doing something, a new job comes along. So, that’s what keeps you going....”*

— Interview with farmer working in the Meduxnekeag River watershed

*We logged into the virtual map and typed in our ideas. Text boxes simultaneously popped up in different places on the canvas. “Oops,” someone said while laughing and dragging a text box, “I didn’t mean to bump into you.” Another said, “I’m lost and not sure how to do this, can someone help me?” As the map filled with ideas, we asked each other: How are we thinking about eDNA? Is it a science? A tool? A technology? How is it connected to social sciences ... history ... ethics ... and to whom ... and for whom?*

— Reflection from a participant in a knowledge mapping activity focused on eDNA

We open our manuscript with these passages because they deal with a foundational interest that guides work within our distinct research projects as well as our collaboratively-written piece here: how bodies are involved in work, research, and collaboration. Upon reading this opening sentence, we encourage readers to go back to the passages offered above and read them again; but, this time focus on bodies as they appear in the words. Consider how recalling the smell of soil or machinery is a necessarily embodied experience. Or how the dynamism of farm work as it moves bodies

through different rhythms depending on the season is articulated as an energizing and important part of farming. Or how bodies are noticed and felt amidst the messiness of co-producing knowledge through movement, emergent questions, and practices of listening and sharing through knowledge mapping. Finally, we encourage readers to pay attention to how interactions with the passages above are embodied acts. Did re-reading require repositioning one's body? Did the pace of reading change, to slow down and attend more thoroughly or at skimming speed? How was the body present in the act of engaging these words? Attending to these questions, and the presence of bodies and their/our relations with texts, is part and parcel of the work we describe in this paper.

We offer embodiment as a central concept that has guided both collaborative research projects we discuss throughout this piece. Embodiment, in this sense, refers to the myriad ways in which bodies—researchers, participants, partners, interviewees, and beyond—are foundational for research, writing, and collaboration (Clayson, 2018; Ellingson, 2009; Haas & Witte, 2001). We aim to show how these processes are fundamentally embodied practices, though research-based writing does not often acknowledge the role of bodies within the production of texts. As such, our piece is motivated by two guiding questions: how are bodies present, or not, in research; and, how might we start to cultivate ways of doing, participating in, and writing about/for research that help us pay attention to bodies? To operationalize embodiment as a concept, the authors (Michael, Jen, and Bridie) reflect on research experiences that are helpful for positioning embodiment as both a theme and a process to highlight how the production of research is always-already embodied (Hawhee, 2009; Middleton et al., 2015).

Taken as a theme, embodiment becomes central to the research and interview questions we ask as well as the types of “data” we gather. For this, Michael and Bridie reflect on their project in the Meduxnekeag River watershed (hereafter referred to as “Meduxnekeag watershed” or “watershed”) as they worked with partners to design an interview protocol that asks participants—farmers—how the act of farming helps them shape relationships with land and water. This created a space for farmers to reflect on and share stories that position these relationships as deeply embodied which allowed us to trace how bodies, work, and farming rhythms shape what it means to farm in the Meduxnekeag watershed.

When we approach embodiment as a process, we acknowledge how the practices of research are embodied actions. This allows us to focus on the literal processes of participating in research, whether that be the preparation of texts/materials, co-producing knowledge, or moving through a field site. Myriad bodies perform and remember research through the development of specific deliverables for recording, writing about, and making sense of experiences. As such, the creation of research deliverables has implications for recognizing embodiment. As Sauer (2002) argued, though the very process of recording knowledge is embodied, it is common for recordings themselves to be prepared in a way that makes this invisible as bodies are written out of texts. For example, the knowledge map exercise that Jen and Bridie reflect on relies on these processes of embodiment as participants navigate and embody sharing ideas and shaping research by discussing, listening to and learning from each other, and organizing their knowledge visually on the map. However, without specific attention to the importance of embodied participation for that exercise, such a deeply embodied process for guiding the project may go unmentioned or underrecognized in final research reports, articles,

and related deliverables. In both cases we describe in this paper, we focus on embodiment as a theme in the lived experiences of those who participate in our research. We also focus on the process of embodiment itself, emphasizing how we use what we learn to make choices about the ongoing practices of collaboration (McGreavy, Randall, et al., 2018).

We use an ethnographic and engaged methodology based on observations and qualitative interviews to build partnerships, participate in research, and co-produce knowledge (Graham et al., 2017; Lindenfeld et al., 2012; Rai, 2016; Wilson & Herndl, 2007). Our engaged rhetorical methodology orients us to the material, relational, strategic, and critical exigencies in our collaborations (Druschke, 2018, 2019; McGreavy, Fox, et al., 2018; Middleton et al., 2015; Rai, 2016; Rai & Druschke, 2018; Wilson & Herndl, 2007). A rhetorical lens helps us attend to embodiment and what bodies are doing; changes in language and symbol use; the emergence of new terms, metaphors, and visuals over time; and the development of communication artifacts. By using specific genres, such as research presentations, technical briefs, and diverse visual images and diagrams, we regularly share findings with participants and partners, offering opportunities to modify or reshape shared communication practices (McGreavy et al., 2015). Such methodologies can be used to observe changes on a broader scale by connecting communication data and research with organizational changes via systems ethnography, qualitative modeling, and critical praxis (Graham et al., 2017; Wilson & Herndl, 2007).

We turn to embodiment to position our work within a larger network of scholarship that connects participatory and community-engaged research with increasingly complex questions at the intersection of conservation, climate change, and environmental justice (Blythe et al., 2008; Druschke, 2018, 2019; Druschke & McGreavy, 2016; McGreavy et al., 2022; McGreavy, Ranco, et al., 2021). Embodiment becomes a guiding concept for our methodology as we aim to build a case for how technical communication scholarship can attend to bodies in research processes. We must find ways to lean into research designs that can address differences in forms of knowledge and disciplinary expertise and recursively shape the ongoing production of knowledge for particular, situated, and multiple purposes. Attending to questions of embodiment becomes central for this pursuit, in part because such questions offer a means for reflecting on the power relations and politics of knowledge production within and across disciplinary boundaries (Freeth & Caniglia, 2020; MacMynowski, 2007; Moosa-Mitha, 2005). For instance, Michael and Bridie’s work in the Meduxnekeag watershed responds to the conservation needs and goals of our community partners as they relate to farming communities and practices, water quality, and soil. And Jen and Bridie’s work on the Maine-eDNA (environmental DNA) project acknowledges and responds to the intensification of social and environmental precarities occurring along the Gulf of Maine which is warming faster than most of the world’s oceans (Pershing et al., 2015). These patterns are the overarching and ambient catalysts that guide our cases.

We operationalize embodiment to argue that focusing on bodies in these contexts matters because it is through our embodied interactions with the world that we are called into responsible relationships with it. As Proven (2018) argued, it is the “ongoing intra-actions of ... bodies, technologies, and worlds [that call for] ethical responsibility and ... compassionate conservation” (p. 32). Focusing on embodied interactions within our cases, such as the relationship between farm work, soil, and water or collaborative

processes of knowledge making, asks us to focus on how bodies (human and non-human) are present with each other and are mutually constitutive of each other. This read on bodies calls on researchers to (re)consider responsibility, and how we discuss, or don't discuss, bodies in conservation, climate change, and environmental justice work. Attending to how bodies come to matter is important for responding to the complexities and entanglements of social and environmental precarities emerging amidst climate change.

Furthermore, a focus on embodiment allows us to respond to an exigence that emerged within the transdisciplinary projects we discuss throughout our paper: a positivist paradigm built on logics of objectivity and detachment. We argue that such logics, as they guide scientific research, are ill-equipped to attend to the complex issues mentioned above (Freeth & Caniglia, 2020). Although there has been ample scholarship critiquing and offering alternatives to a positivist paradigm, in our experiences in science-based collaborative projects, positivism and its relatives remain alive and well. It's thus important to pay attention to this paradigm in the context of transdisciplinary research that aims to connect scientific work with communities and community partners. As we discuss, a focus on embodiment enables this by calling researchers to attend to practices and politics of knowledge production within diverse teams as well as the types of data that research aims to create, share, and use.

## A POSITIVIST PARADIGM AS EXIGENCE

How did embodiment come to matter for us in our respective research projects? To begin to address this mattering, we start by situating our research projects as they relate to, and differ from, positivistic research approaches and perspectives. Positivism came to matter for us because the logics associated with this paradigm constituted important exigencies within both of our projects, and especially the influence of logics of objectivity and detachment. Though positivism does not exert the kind of control over research that it once did, positivistic logics are still alive and well in scientific research (Anand et al., 2020; Kuhn, 1996) which has implications for transdisciplinary research involving diverse and interdisciplinary partners (Eigenbrode et al., 2007; Pohl & Wuelser, 2019; Nurius & Kemp, 2019). Drawing from Lincoln and Guba (1989), we define positivism, and its corollary post-positivism, as a:

fundamental ontological premise that there is an actual reality, a 'way things really are,' that can be discovered (converged on) by the methods of science...scientists, in their work of discovery and determination, must be objective...assume a detached stance so that they will not influence the outcome of the inquiry nor allow their values...to affect the results. (pp. 223–224)

Following this definition, paying attention to positivist logics in transdisciplinary research directs our attention to embodiment in collaborations in at least two ways. First, positivistic influence on research design processes constrains attention to embodiment in the types of data collected and in the processes used to generate knowledge within collaborative research contexts. This has important epistemological implications for how positivist logics influence commitments in research design by calling for accurate measurement and reporting of an objectively fixed, knowable,

and external world (Brown & Strega, 2005; Haraway, 1988, 2016; Smith, 2021). This paradigm also shapes work across the social sciences by replicating logics of detached and objective measurement in "human subjects" research (Brown & Strega, 2005; Ellingson, 2009; Madison, 2005; Miller, 1979; Sauer, 2002) and then attempting to accurately communicate those findings as objectively as possible (Druschke & McGreavy, 2016; Sauer, 2002). Within such a process, there is little room for attending to embodiment, as the myriad bodies involved in research are often made invisible as a means of yielding "deceptively tidy accounts of research" (Ellingson, 2009, p. 35).

Early on in Michael and Bridie's work in the Meduxnekeag watershed, much of the project focused on identifying barriers to motivating farmers to install riparian buffer strips on farmland bordering the tributaries throughout the watershed. As a result, project goals sought to develop and use data to promote "behavior change" in farmers, including efforts like financial incentives, technical assistance, or education about buffers. This early focus on discovering information about farmers and then using that to motivate behavior change follows logics of objectivity and measurement within a positivist paradigm. The focus on detached discovery limits the capacity for approaching research as a process of relationship building or for facilitating collaboration in the Meduxnekeag watershed. However, through commitments to embodiment, this project in the Meduxnekeag watershed shifted to describe farmers' relationships to soil, water, and the rhythms that guide their farm work. Instead of detached assessment and behavior change, our focus on embodied relations of farming facilitated partners' capacities for, and sense of value in, building relationships *with* farmers as a part of future conservation work in the watershed, riparian buffers included.

Second, embodiment offers a powerful framework for highlighting and working against a positivist paradigm focused on covering over bodies in research or otherwise ignoring them. More specifically, attending to embodiment as a theme and process within research offers opportunities to work against a positivist paradigm through the ways that we design, collaborate, and write about/within research. This perspective resonates with Kuhn's (1996) keystone articulation of paradigms within science. Paradigms develop within scientific research to define logics and values associated with research, including the types of prioritized theories, desired knowledges, and methods employed (Kuhn, 1996). Although such paradigms are useful in how they enable precision and can aid in the identification of material evidence to support argumentation, they can also become constraining in how they establish norms for what counts as science and knowledge.

To address positivism as an exigence within our transdisciplinary and engaged research, we turned to theories drawn from rhetoric, technical communication, and sustainability science to work with interdisciplinary concepts such as boundary objects, rhetorical ecologies, and genres. These concepts are significant across these fields and have been formative for how we approach embodiment as a theme and process. We draw on Propen's (2018) call for resituating environmental and conservation work so that it is less about "managing or controlling bodies in the natural world" (p. 1) and more focused on the ways that we can embody more caring and compassionate relationships with proximal bodies we exist alongside. Similarly, scholars such as Haraway (1988, 2016), Alaimo (2016), and Barad (2007) have asked us to attend to how myriad bodies do not have neatly delineated boundaries capable of

distinct separations between entities. A positivist paradigm guided by logics of objectivity and detachment do not easily attune to these deeply embodied and entangled relationships within science-based and transdisciplinary collaborations. Instead, as Alaimo (2016) argued, we must acknowledge the “trans-corporeality” (p. 164) of bodies in how they give shape to one another through their relationship(s). Engaged transdisciplinary research offers one site for bringing some of these embodied commitments to situated research to focus on embodied and trans-corporeal context. In the following sections, we describe case studies that provide insights for both understanding embodiment as theme and process as well as how technical communication researchers can design, practice, and write about research in ways that foreground and engage with bodies.

## **EMBODIMENT AS A PROCESS IN TRANSDISCIPLINARY COLLABORATION**

We start with the Maine-eDNA project as an example of a large transdisciplinary project because it consists of more than one hundred participants with diverse disciplinary and knowledge backgrounds who work among nine geographically-distant partner institutions and with multiple community partners. Through a collaborative approach that is also guided by a governance document, our communication research team pays attention to differences in understandings of research, decisions about what “deliverables” are important, and how knowledge is co-produced and applied across contexts (Darbellay, 2015; Wilson & Herndl, 2007).

This project is timely given how collaborative approaches to research, and especially transdisciplinarity, have increased over time (Darbellay, 2015; Stokols, 2014). We define transdisciplinarity, as a commitment to produce knowledge in ways that connect across disciplines and to design knowledge that can make a difference with and for situated communities through societal and/or policy-related decision making (Hall et al., 2019; Klein, 2014; McGreavy et al., 2022). Knowledge co-production is a related approach that is both a theoretical framework for how to conceptualize the relationship between knowledge and social order as well as a set of practical commitments that guide how collaborative research should be conducted (Jasanoff, 2004; Norström et al., 2020; Tallbear, 2013; Tengö et al., 2014). This context enables us to focus on communication practices that foster collaboration such as commitments to active listening, working through tensions that emerge from differences in language and worldview, fostering empathy, and spending time and laughing together because they are deeply embodied and interactional (Nurius & Kemp, 2019; Thompson, 2009). As Bloomfield et al. (2020) suggested, “human bonds matter, maybe more than the information underlying people’s views, in helping people to collaborate” (p. 388).

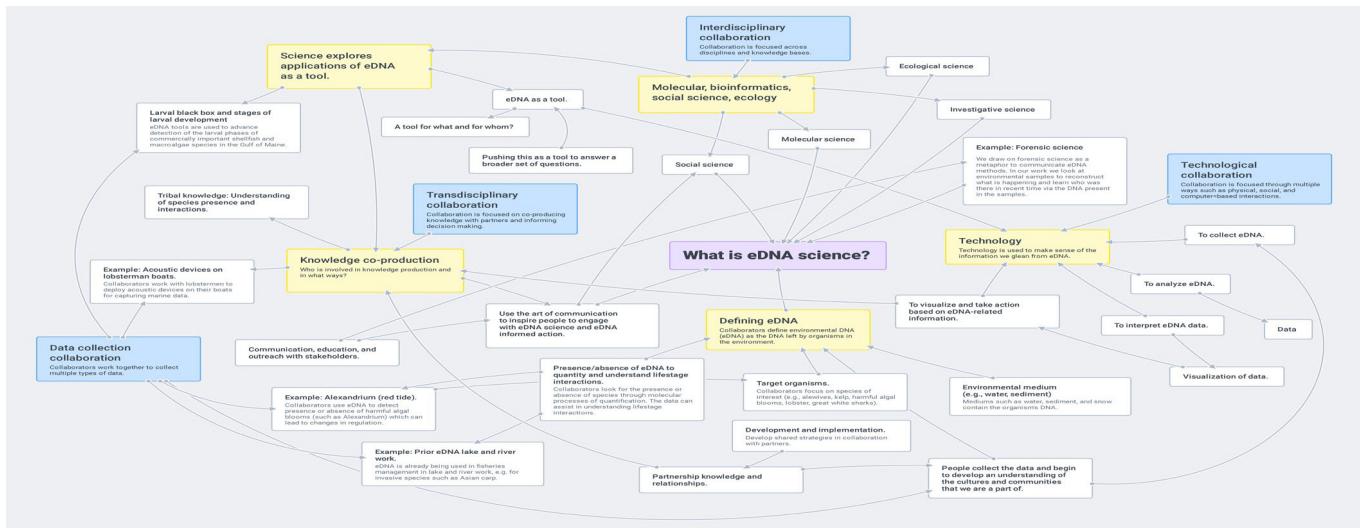
As such, the Maine-eDNA project offers an opportunity to focus on fine-grained embodied practices among collaborators and how they provide communication researchers with a sense of how communication, as an embodied process, shapes transdisciplinary collaboration. For example, it is one thing to say that it is important to listen across differences in perspective and quite another to uphold and demonstrate that commitment, especially when what listening means varies by context and across cultures (Cooke & Hilton, 2015; Druschke & McGreavy, 2016). The heightened

presence of difference between collaborators in an interdisciplinary research context offers ways to (re)focus on embodiment as a process through how those differences are felt and navigated by participants. Within the Maine-eDNA project, knowledge mapping emerged as a practice for co-producing knowledge across differences. Furthermore, knowledge mapping offers an opportunity to bring embodiment into focus in our project as well as help facilitate a paradigm shift that decenters and deemphasizes positivist logics.

We define knowledge maps as “visually oriented aids” (Dilevko & Soglasnova, 2013, p. 143) that have been used for decades by disciplines such as education, psychology, business, information technology, and communication to convey complex visual information (Huang et al., 2021; Kim et al., 2003; Vail, 1999; Wiegmann et al., 1992; Wilson & Herndl, 2007). Some knowledge maps, such as textbook illustrations or visual lecture aids, are shared as one-way streams of information from sender to receiver in which the recipient decodes and interprets the map (Wiegmann et al., 1992). In the eDNA project, we approach knowledge mapping differently from the aforementioned model by drawing on a collaborative approach where the map is co-produced by a community of interdisciplinary participants who seek to identify different meanings of core terms within a project and find ways to acknowledge and value diverse perspectives (Wilson & Herndl, 2007).

As a collaborative activity, participatory knowledge mapping facilitates opportunities for boundary spanning and connection across differences (Graham et al., 2017; Wilson & Herndl, 2007). Within our own project, the knowledge map proved useful in the early stages of our project-based collaboration by providing a “communication device” that identifies diverse forms of knowledge and fosters connections for transdisciplinary learning (McGreavy et al., 2013, p. 4199). As a part of this, our team designed and facilitated a virtual knowledge mapping workshop that included reflective writing practices that generated conversations between Science of Team Science (SciTS) working group participants as they related their knowledge to eDNA science. Through guided conversations, this workshop explored the messiness of language and technology by attending to multiple disciplinary and partner perspectives in an attempt to define eDNA. Though participants often refer to eDNA as a material component (the genetic material left behind by an organism in its environment), they also define it “as a science, a tool or technology, and as a communication process” (McGreavy et al., 2022, p. 5). The knowledge map can be used to foster an awareness of what a project means to participants, highlight how those meanings may be different from each other, and help collectively identify where the knowledge making effort may be headed. Beyond this, the map can be synthesized with future information we collect to be formed into a systems model to share with project participants (Graham et al., 2017; Wilson & Herndl, 2007).

Knowledge mapping provided participants physical and verbal opportunities to make linkages around the concept of eDNA and to engage in dialogue about people’s perceptions, ideas, and differences. As our workshop facilitator said, “There is no single right way” to do knowledge mapping given that the map can be modified and revised over time but also allows participants to remain rooted in their discipline while working across boundaries. As Wilson and Herndl (2007) noted:



**Figure 1. Representation of Maine-eDNA SciTS participatory knowledge map (Smith-Mayo produced in collaboration with Maine-eDNA SciTS WG, 2021)**

as a boundary object, the knowledge map recognizes difference and division, but it also provides identification across the sites of action...the balance between division and identification allows the knowledge map to function as a boundary object that encourages integration rather than demarcation. (p. 138)

From the knowledge map, a discussion emerged about relationships between several topics, questions, and eDNA-related issues. For example, a participant noted that eDNA science and knowledge integration requires a multi-disciplinary approach which could be compared to forensic science and its use to reconstruct a crime scene. Another participant mentioned struggling to unlock thinking about eDNA, but when the group talked about eDNA as one type of “thing” and technology as another, this discussion allowed the group to begin to approach eDNA as multiply arranged in the context of environmental science. The participant noted the knowledge-sharing process was interesting: to be locked up on something and then, through the group’s dialogue and mapping, be able to add and draw new connections about a concept.

Another participant noted several important social, political, or economic issues and questions about eDNA such as: for what or whom is eDNA a tool, and to what ends? The participant noted the project may be missing social science and humanities expertise that more fully considers history and ethics. The group also discussed how the co-production of knowledge helps us consider ethical issues associated with how we form relationships and practices through research.

Knowledge mapping not only gives participants space to “communicate across differences” (McGreavy et al., 2013) and move beyond their own boundaries toward cooperation (Wilson & Herndl, 2007), but it also affords engaged communication researchers opportunities to witness, be part of the shaping of, and make sense of the embodied collaboration practices at work. For example, the use of metaphors such as forensic science, were used by participants as a way to communicate the complexities of defining eDNA science (see Figure 1, “Example: Forensic Science,” white box, upper right). Our team also noticed the forensic metaphor used

in our semi-formal interviews (n=15). These combined findings informed further research into exploring the links between eDNA, crime, forensics, and how participants use metaphors made popular through television crime shows such as CSI (Crime Scene Investigation). This connection opened up continued critical reflection about how to make sense of eDNA science and the power-related implications of crime-based metaphors, especially in light of how eDNA science could be used to further regulate activities, such as fishing or related to water quality, that increase the risks of criminalization for those whose livelihoods intersect with those regulations (McGreavy et al., 2022).

From the knowledge map activity, our SciTS team presented the data at various meetings to gauge project-wide interest in pursuing discussions about ethics. Overwhelmingly, Maine-eDNA project participants expressed interest in future sessions that would strengthen the project-wide focus on ethics. As a result, the SciTS team led an ethics presentation and discussion at a bi-annual project-wide gathering in 2020, ethics frameworks and training approaches were added to the spring 2021 University of Maine “eDNA Fundamentals” graduate course, an ethics workshop was offered in summer 2021, and a follow-up set of ethics questions was included in a project-wide communication survey.

Such conversations foreground embodiment by highlighting how engaging in dialogue, working collectively on activities such as knowledge maps, co-producing new ideas from discussions, and struggling through the tensions and frustrations of not having concrete answers take place through embodied participation. During the workshop, participants became aware of the necessarily messy and embodied processes involved in co-producing something as seemingly simple as a collective definition of eDNA. Practices of active listening, patience, sharing, reflection, and shared laughter fostered a collaborative atmosphere within the workshop precisely because they rely on embodied participation with others (Bloomfield et al., 2020; Nurius & Kemp, 2019; Thompson, 2009). Such commitments create space for participation and voice, especially those who may be less inclined to vocalize their ideas. From this commitment, ethics emerged as a key theme as the need to strengthen the focus on ethics was fostered by the inclusive discussion space (Norström et al., 2020). Through writing and

conversation, embodiment became central for the knowledge mapping workshop while the task of defining eDNA slightly receded. This movement allowed bodies, human and non-human, to be noticed and included in discussions of how to practice eDNA responsibly and allowed iterative topics such as ethics to flow more freely out of the collaborative work and inform the larger project.

Finally, focusing on knowledge mapping and co-production as embodied processes that require diverse perspectives and forms of participation also decenters positivist logics at play in the Maine-eDNA project. What eDNA is, and how it ought to be used, was defined through the interplay of participants embodying practices of listening and collaborating with each other. Participants, as well as ideas, processes for doing eDNA work, and other parts of the project are thus transcorporeal (Alaimo, 2016) in how they give shape to each other through collaboration. As noted previously, positivist logics focused on neat definitions and objective analysis are poorly positioned to recognize this work, much less mobilize it as productive, transdisciplinary practice.

## **EMBODIMENT AS A THEME IN ENGAGED RHETORICAL RESEARCH**

Turning from the focus on embodiment as a process for facilitating collaboration in transdisciplinary eDNA research, we offer embodiment as a guiding theme in our work in the Meduxnekeag watershed. We turn to embodiment as a theme to assist us in designing and reflecting on an engaged rhetorical research project that grew out of a thirty-year collaboration among our community partners—the Maine Department of Environmental Protection (MDEP), the area's Soil and Water Conservation District (SWCD), and the Natural Resources Conservation Service's (NRCS) local field office, and the Natural Resources Department for Houlton Band of Maliseet Indians (HBMI) whose tribal lands and ancestral homeland is located within the Meduxnekeag watershed—and their interest in better understanding why farmers in the area use some best management practices (BMPs) and not others. In particular, our partners asked whether or not farmers describe riparian buffer strips as an important BMP for fields that border tributaries throughout the watershed.

As a part of attending to embodiment as a theme in our work in the Meduxnekeag watershed, we adopt an engaged rhetorical methodology (Druschke, 2013, 2018; Middleton et al., 2015; Rai & Druschke, 2018). We sought to characterize how farmers describe their farming practices and what values guide those practices, how farming shapes their relationships to land and water within the watershed, and what BMPs they find useful, or not, and why. Our development of such an engaged rhetorical methodology is guided by two theoretical frameworks within rhetoric: rhetorical genre studies and rhetorical ecologies. These frameworks highlight how embodiment, as a theme, can shape research question design, and how research makes future projects possible.

Rhetorical genres offer a framework for better understanding how research experiences are generic in how they are shaped by specific norms or paradigms (Bawarshi, 2000/2018; Campbell & Jamieson, 1978/2018; Miller 1984/2018). We borrow Miller's (1984/2018) argument that, "what we learn when we learn a genre is not just a pattern of forms or even a method of achieving our own ends. We learn, more importantly, what ends we may have" (p. 51). Miller's argument that genres shape not only our research processes but also what ends we see as possible for research to strive towards

provides a powerful lens for attending to how research genres can reinforce, or challenge, dominant epistemologies and ideologies. Paré (2002/2018) exemplified this when he argues that "as habitual practices, genres serve as one of the chief forces in ... the 'naturalization of ideology'" (p. 185).

Given the ideological power of rhetorical genres for shaping action, this perspective is helpful for showing how embodiment as a theme is often suppressed or precluded by the form or process of research through logics of objectivity and detachment that constitute positivist research genres. However, rhetorical genre studies also articulate genres as performative in that they are not static or settled in how they organize social action. Rather, as Bawarshi (2000/2018) argued, genres do not simply precede decisions we make but are "reproduce[d] as we function within [them]" (p. 179). Put another way, though genres play a role in organizing how we participate in social action, those actions can both maintain or change the shape of genres, their organizational logics, and the types of social action they enable.

This understanding of genres as both shaping social action but also being shaped by that action connects with another important concept and area of scholarship that has emerged in the field of rhetoric, namely rhetorical ecology. Rhetorical ecologies attend to how environments—i.e., the contextualized particular places of the everyday—shape rhetorical capacities (Druschke, 2019; Edbauer, 2005; Ewalt, 2018; Rai & Druschke, 2018; Stormer & McGreavy, 2017). As Ewalt (2018) put it, the everyday contexts within which we live and work are themselves ecological and rhetorical arrangements that shape or invent potential futures or actions that can emerge. Ewalt refers to these as "inventing arrangement[s]" (p. 154) that are informed by the very arrangements, actions, and understandings they produce. Drawing from articulation theory, Ewalt posited that these inventing arrangements can be recursive in how the products of such an arrangement enable the continued production of similar arrangements, outcomes, or actions.

Given this perspective, rhetorical ecologies help highlight the way genres shape situations (e.g., engaged research or farm work in a watershed) as well as ways that we may work to intervene in those situations/genres in an effort to promote alternative outcomes or actions they make possible (Druschke, 2018; Ewalt, 2018; Grabill et al., 2018; Jung & Sharp-Hoskins, 2018). Rhetorical genre studies in tandem with rhetorical ecologies allow us to attend to the ways that matter comes to matter as well as how we can "intervene...and participate in creating the conditions of possibility for how matter can come to matter (differently)" (Jung & Sharp-Hoskins, 2018, p. 175). Thus, we understand intervention as an opportunity to change what these inventing arrangements produce in order to change what arrangements become possible in the future (Ewalt, 2018).

As applied to our work in the Meduxnekeag watershed, rhetorical ecologies and genres guide how we attend to embodiment as a theme. In this project, our early conversations about defining project goals were focused on understanding why farmers in the watershed were not adopting buffers as an important BMP in the hopes of shaping education, technical assistance, and resources to overcome these barriers. This focus shifted slightly once we were able to interview each project partner individually. Partner interviews allowed us to ask each partner what they wanted to become possible in the project and to identify some of the larger issues they were interested in addressing. Through interviews, we learned that, along with finding ways to motivate farmers to install

riparian buffer strips, our partners were also interested in broader goals such as better understanding farmer values, how farmers perceive their relationship to the Meduxnekeag watershed, how farmers define riparian buffer strips on their own terms, the borders of the “farming community,” and what farmers see as priorities for restoration and partnerships within the watershed.

We connect this example with the recursive and performative nature of genres because our collaborative work in the Meduxnekeag watershed is a prime example of reshaping genres through embodied actions. Instead of designing a positivist-inflected social science research project interested in developing an objective and detached understanding of the barriers farmers face in establishing buffers, we designed a project, and adopted a rhetorical methodology, capable of highlighting and discussing some of the embodied, mundane, and everyday values and rhythms that guide farming. For example, our interview protocol (Figure 2) consists of questions we created with our community partners that aim to develop a better sense for how farmers describe their understanding around BMPs. Other questions ask farmers to reflect on themes such as: defining farming community boundaries; perceptions about farmers’ connections to the land and how farming as a practice constitutes connections to the land; the watershed’s various borders (e.g. field edges, tributaries bordering fields, etc.); and what it is about farming that moves them, not only on an emotional level, but literally plays a role in inducing motion, as work or play, in their bodies.

We used this interview guide to conduct 17 virtual and in-person interviews with farmers in the watershed. From those interviews we then scheduled field visits (n=5) with farmers that put rhetorical field methodologies (Middleton et al., 2015; Rai & Druschke, 2018) into practice by asking farmers to walk us through the topics we discussed during the interviews. This helps contextualize conversations in interviews by providing researchers with firsthand experience moving through farming operations. For example, instead of just discussing the excitement and value farmers attach to soil health practices, researchers were able to walk with farmers through the embodied, everyday processes associated with that work and show us the steps they take to promote the health of their soil and take care of their farms.

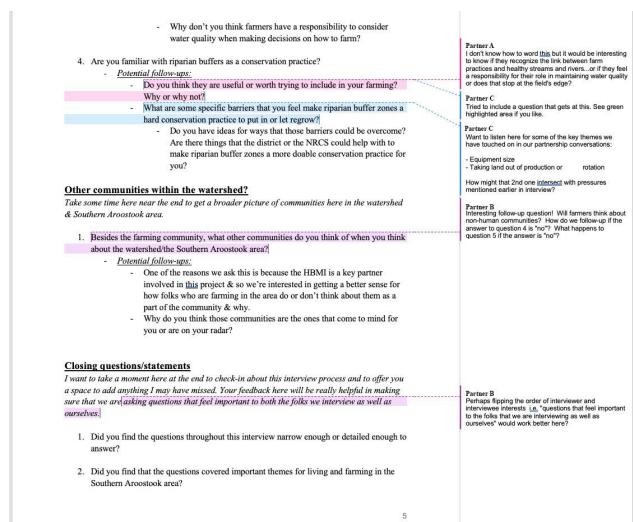


Figure 2. WRRI Interview Protocol Guide

Taking this approach allowed our project to develop a more thorough understanding of the perceptions, needs, and values of farmers in the Meduxnekeag watershed so that our partners can connect to these through future conservation-based decision making and policies. We also highlight how these perspectives and values emerge or take shape within the mundane, everyday embodied experiences of farmers (McGreavy, Fox, et al., 2018; Rai & Druschke, 2018). Whether or not farmers find proposed best practices or projects compelling depends in part on whether those practices can connect to the everyday lived experiences, values, and processes of meaning making farmers constitute and negotiate. In many ways, we are asking farmers about the rhythms that move them, or guide their farming, in the watershed. This use of rhythm follows Hawhee (2009) and Burke (1935)—as ways to attend to how nonsymbolic motion and symbolic action come together to move bodies with purpose or understanding. By asking farmers to articulate how the act of farming helps them shape relationships with land and water, or by asking them to reflect on whether or not the larger backdrop of the watershed and its boundaries influence how they farm, we are directing our findings and data towards tracing how the acts of farming and associated meaning making are embodied. For instance, one of our key findings describes the importance of caring for soil as central to how farmers relate to, make decisions about, and find value in land and water throughout the Meduxnekeag watershed. We include a quote (Figure 3) from an interview with a farmer that we shared with our partners in a final technical report that helps show how some farmers’ relationship to water is constituted through their relationship with soil. Put another way, many farmers make meaning of water not through direct relationship with the Meduxnekeag river but through the interconnectedness of water and soil.

*“So, again going back to what we were talking about, I want to build my soil. I want to keep everything that I have here, I want to keep it here. So, I don’t want it washing down the brook. I don’t want it going down into the Meduxnekeag watershed. Am I necessarily thinking, at that point in time, am I necessarily thinking about the Meduxnekeag watershed, not necessarily. At that point in time, I’m just thinking about keeping my soil here.”*

Figure 3. Quote from a farmer emphasizing connections to soil, copied from a final technical report shared with project partners.

*“Absolutely, yeah. We were put on this earth to take care of it and part of taking care of it is using it but using it to use it not use it to abuse it. So...I mean farming is taking care of the land if you’re doing it right. If you’re not farming to take care of it correctly...there’s only 2 ways to go with soil: you’re either building it, you’re either helping it, or you’re hurting it--there’s no middle ground at all.”*

Figure 4. Quote from a farmer emphasizing how relationships with soil constitute an ethic of care with the land.

Throughout the interviews, farmers expressed a responsibility to care for the soil (Figure 4) as well as financial and economic pressures or forces that were in tension with that responsibility. This tension can be an opening to collaborate with farmers to develop projects capable of acknowledging, working within, and seeking to address those competing pressures or forces.

Furthermore, some farmers also describe the tributaries throughout the Meduxnekeag watershed as a common resource that everyone should have access to but are also responsible for trying to take care of. This helped characterize how farmers describe and embody participation in “community” as it relates to the watershed. This insight can be used to (re)constitute boundaries within the watershed, helping to identify myriad boundaries as potential sites for productive collaboration that could reconstitute boundaries between different communities (Druschke, 2013, 2018; Rai & Druschke, 2018; Wilson & Herndl, 2007). For instance, throughout our interviews some farmers acknowledge that they would like to use the Meduxnekeag River—or its tributaries throughout the watershed—to irrigate their crops. They also acknowledge that the watershed spans multiple communities who have multiple perspectives and values on how it should be used as a resource and/or cared for. As such, the Meduxnekeag watershed itself becomes a boundary-object capable of putting competing, nonetheless co-existing, perspectives into conversation with each other (Druschke, 2013, 2018; Wilson & Herndl, 2007). The interaction between these different perspectives offers an opportunity for collaborative work between communities for how the watershed can be cared for by, as well as useful for, multiple communities.

By taking an engaged research approach that amplified a thematic commitment to embodiment, we were able to move from a narrow focus on riparian buffers to more complex relationships between soil and water as well as myriad boundaries that shape social actions and potential for collaboration in this region. Taking an engaged rhetorical approach, informed by embodiment, shaped the types of questions we asked farmers as a part of interviews and thus what became meaningful as data, including embodied experiences with farmers and the land. In sharing insights with our partners, our project influenced the types of future projects or research that partners are now identifying as possible and worthwhile in the Meduxnekeag watershed. For instance, during the presentation and discussion of our final report, partners discussed the value in building relationships with farmers not solely for educational purposes or to provide technical assistance, but to create capacity for mutual learning, collaborative decision making, and problem solving around water quality issues in the watershed. Similarly, during the discussion, partners reflected on a need to further refine and define riparian buffer zones so that they take into account the values and relationships to land and water farmers articulated.

This embodied, engaged approach helps to change the genres that guide working relationships and a sense of possibilities in the Meduxnekeag watershed. Instead of working relationships guided by logics of positivism that are focused primarily on education or technical assistance, this approach to research helped to promote conservation projects oriented towards maintaining, building, or improving relationships among community members. Although these perspectives on conservation work do not necessarily lead to quantifiable or easily identifiable outcomes, they do follow what Edbauer (2005) described as a “[logic] of generative research ... that takes circulation of effects as an aim” (pp. 21–22) as opposed to the primary aim of research being the production of a particular

end or outcome. Ultimately, the focus on embodied relationships to soil and water that farmers discussed allowed our research to enhance capacities for building relationships between our partners working towards conservation and farmers in the Meduxnekeag watershed.

## WRITING AS AN EMBODIED PRACTICE

When guided by studies of rhetorical genres, ecologies, boundary objects, and practices of knowledge co-production, embodiment as a theme and process in collaborative research provides potentially powerful ways to intervene in everyday life as it is continuously shaped and reshaped through rhetorical participation in it. As both Paré (2002/2018) and Haas (2007) have made apparent, the production of texts—both in their content as well as the process of putting them together—play important roles in these rhetorical situations. A focus on writing is valuable for projects such as ours as a means to acknowledge and develop research capable of attending to embodiment in ways that can challenge positivist paradigms that may guide transdisciplinary collaborations. As such, rhetorical and technical communication scholarship offers key methods for working to reshape genres by attending to how communication shapes complex forms of collaboration (McGreavy et al., 2022; Paré, 2002/2018).

As a part of this, our projects foreground an approach to writing that acknowledges how texts are embodied in their production as well as ecological in their circulation and relationship to each other. As both Haas (2007, 2012) and Spinuzzi (2012) articulated, texts are interconnected through broader textual ecologies. Texts are thus a product of particular contexts as well as tools for recursively changing those contexts. Texts are also ecologically connected to one other. For example, within the Meduxnekeag watershed, the ecology of texts includes how the interview guide (Figure 2) led to the creation of other texts like interview transcripts and ultimately culminated in a technical report to be shared with our partners. So, given the capacity for texts to change the contexts within which they are produced, writing becomes an act that is full of responsibility in its capacity to shape research practices and highlight embodiment in those practices (Miller, 1979; Reynolds, 2007).

We argue that the process of writing is always rooted in some particular embodied context; a context that is physically inhabited by one’s body (Brooks, 2008; Madison, 2005; Reynolds, 2007; Weate, 2003). The farther back we trace the ecology of a given text, the more we see embodiment playing a role (e.g., hearing, seeing, and speaking information). An ecological framework for writing necessarily engenders an understanding of the integral role of embodied context in the assembly of texts. As Madison (2005) argued, writing is a performative and deeply embodied act in that “the body writes...[and] meanings and experiences in the field are filtered and colored through sensations of the body—that is, through body knowledge...in writing from our body, we are writing...of our embodied space and impressions” (pp. 195–196). Put simply, there is no text that is disconnected from the context from which it was created. In this way, the process of writing and the texts such processes produce are always already embodied through the physical and collaborative processes of writing or assembling information. Embodied and ecological contexts are woven into texts whether research acknowledges that embodiment or not.

Furthermore, texts that are prepared within collaborative and

transdisciplinary research contexts can be understood as boundary objects in how they help collaborators notice, name, and navigate differences. As noted above, early discussions of the eDNA knowledge map (Figure 1) focused on the multiple definitions participants used to describe eDNA. However, as the knowledge map shifted and grew, so too did the discussions about eDNA. Instead of only focusing on how to define eDNA, participants began considering how to practice eDNA science responsibly and ethically with diverse communities. Put simply, we posit that the boundaries of what eDNA science means to participants shifted and changed as they worked to define what eDNA science is and how it ought to be practiced through mapping. We argue that the very embodied and collaborative writing practices involved in assembling the knowledge map are what made this possible. The map itself is an ecologically-entangled suite of texts, in the form of multiple boxes with diverse connections, that visualize the boundaries between these concepts. At the same time, visualizing those boundaries also facilitated participants' ability to work across them to forge new relationships between them and co-produce knowledge and meaning.

Additionally, these embodied practices of writing have played an important role in shaping our projects amidst the COVID-19 pandemic. Within Jen and Bridie's work on the eDNA project, this meant navigating the assembly of a knowledge map, and the embodied processes of knowledge co-production, virtually. This means locating ways to listen to each other and connect ideas on the map while dealing with the affordances and constraints of a real-time digital mapping software, such as talking over each other, bumping into each other's text boxes, or getting lost within the extensive canvas area. Within Michael and Bridie's work in the Meduxnekeag watershed, most of the work for the project has taken place at a distance through the asynchronous preparation of a network of research texts that have shaped and guided our work. Most of these texts (a grant proposal, IRB application, interview protocol, briefs and technical reports, etc.) have been written, shared, collaboratively edited, and discussed from a distance using tools such as Zoom, email, and Google Workspace.

Across both projects, focusing on these writing practices is important for attending to embodiment as a theme and process. More specifically, our collaborative approaches to creating and editing such a network of texts—as well as the way they ultimately informed the direction of our projects—help exemplify Madison's (2005) concept of embodied and performative writing. Creating and editing those texts became one of the main processes by which a “relational dynamic” (Madison, 2005, p. 193) was formed between partners and participants on each of these projects. As such, this network of texts has played a formative role in deciding how to collaboratively define, design, conduct, and participate in these projects. Articulating embodiment as a process that unfolds within writing shows how the creation and maintenance of multiple texts can be thought of as a network of boundaries. Such networks give shape to how we attend to, and participate in, research and what ends that work makes possible. Thus, we position the creation of networks of texts as a key opportunity for in(ter)vention in how texts shape research genres through the types of action such texts make possible in future research.

## CONCLUSION: A CALL FOR TECHNICAL COMMUNICATION

In the cases described above, we introduce how a thematic and processual focus on embodiment can challenge positivist logics of objectivity and detachment in research by (re)shaping how bodies show up in research designs, interactions, and writing. Our shared research experiences provide fine-grained details about the practices that constitute embodiment as a theme and process, and how research genres, research and interview question formation, and boundary practices like knowledge mapping center embodiment in ways that can (de)center positivist paradigms. To this latter point, two questions remain: in the context of myriad social-environmental changes, how does embodiment make a difference and how do these commitments come to matter; and, what role does technical communication play in facilitating those commitments?

To understand how embodiment comes to matter, we can look to the consequences of a history of embodiment not mattering—especially within research contexts and what that research makes possible. As we have argued above, there has been an historical and ongoing commitment to positivist paradigms built on values of objectivity and detachment within biophysical and social scientific research. Although these values have been useful for allowing research to follow focused paths (Kuhn, 1996), these values close down modes of attending to the consequences of their own commitments. Returning to Lincoln and Guba (1989), they noted: “[positivist] presumptions about the nature of reality reinforce—and indeed require—treating human subjects as though they were objects. Objectifying human beings in the process of searching for ‘truth’ has led ... to the depersonalization and devaluing of human life” (p. 224). It is this commitment to objectivity and detachment that motivates depersonalization and devaluing because there is a lack of embodiment within such methodologies.

Embodiment matters in scientific research contexts in part because ignoring embodiment within positivist paradigms entails a lack of ethical consideration for ‘human subjects.’ As others have argued (Burke, 1935; Davis, 2010; Hawhee, 2009) ethics is fundamentally embodied because it is only through our relationships with things, through our embodied presence with them, that we are called into ethical response-ability and relations (Davis, 2010). Put another way, our embodied interactions with entities (people, soil, water, knowledge, etc.) is what allows those to come to matter. Through relational entanglements, we come to understand myriad bodies not as distanced or devalued objects of study but as active entities within ecologies that are mutually influencing and through which we become trans-corporeal (Alaimo, 2016; Haraway, 2016; Propen, 2018).

This argument has important implications for technical communication. The rhetorical genres that shape research are a fundamental site through which particular types of action within research are undertaken and normalized. One place where these genres exert influence is within the realm of research writing. Through our reflections, we have attempted to structure such writing practices so that they can attend to embodiment as both a theme and process by which research is undertaken. Michael and Bridie's work in the Meduxnekeag watershed has helped center embodiment as a guiding theme for the types of conversations we are having—and setting our partners up to continue having—with farmers. Jen and Bridie's work on the eDNA knowledge map

centers embodiment as a fundamental process apparent within research and facilitates opportunities for continuing to attend to such processes by highlighting how the work was, and continues to be, influenced by processes such as knowledge mapping.

Given this approach to writing, technical communication scholarship becomes a way to attend to myriad ecological and embodied factors by seeking to preserve them throughout the research process instead of allowing them to be written out and rendered invisible. Specifically, technical communication, and its focus on research design, process, and writing practices, offers a way to reshape research genres by including embodiment in writing and texts prepared as a part of research. Miller's (1979) argument for teaching technical writing as "an understanding of how to belong to a community" highlights the capacity of technical communication scholarship to (re)shape research "communities" (p. 617). Further, Miller (1979) argued that technical writing and communication scholarship should "present mechanical rules and skills [for writing and research] against a broader understanding of why and how to adjust or violate the rules ... and of the ethical repercussions of one's word" (p. 617).

This framework can shape the production of texts by highlighting responsibility for what such texts make possible. In this way, technical communication scholarship helps us attend to texts differently in the content they aim to evoke, the processes by which they are created, and what knowledge and outcomes they make possible. Writing is always more than simply recording information (Haas, 2007; Miller, 1979; Paré, 2002/2018). Writing contributes to a larger ecology or network of texts that play an important role in enabling particular types of action or methodologies. As technical communication scholars working in transdisciplinary contexts where these themes are prevalent, we have a responsibility to use our rhetorical knowledge to encourage research design commitments that attend to embodiment in its fullest sense.

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Jennifer Smith-Mayo is a doctoral student in the University of Maine Communication and Journalism Department. She studies communication with/in interdisciplinary and transdisciplinary collaborations through engaged and critical approaches.

## ABOUT THE AUTHOR

Michael Clay is a doctoral candidate in the University of Maine Communication and Journalism Department where he studies ways rhetorical fieldwork and community-engaged methodologies can be designed as anticolonial approaches to research.

Bridie McGreavy is an Associate Professor in the Department of Communication and Journalism at the University of Maine and with the Mitchell Center for Sustainability Solutions. She uses engaged research to study environmental communication with coastal communities.