Making Sense of Place:
An Ethnography of Toxicant Encounters in South Portland, Maine

A thesis submitted by

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in partial fulfillment of the requirements for the degree of Master of Arts

in

Urban and Environmental Policy and Planning

Tufts University, August 2023

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Abstract

South Portland is the second largest oil port on the eastern seaboard. For years residents have encountered “tank fumes.” When the EPA cited one of the operating facilities for violating its air emissions permit in 2019, community members demanded answers to the question ‘is the air safe to breathe?’ This thesis uses ethnographic research methods to explore the everyday lives of residents and manifestations of activism related to air quality in South Portland from 2021-2022. First, this thesis traces how residents experience encounters with tank fumes. Second, this thesis follows projects that residents employ to make sense of these encounters. Third, this thesis illuminates diverse forms of activism that emerge in response to encounters. Ultimately, I argue that community members who are most impacted by tank fumes should be (1) meaningfully engaged in technocratic efforts to define the problem, gather data, and generate solutions and (2) supported in their efforts to build worlds of care and connection.

Acknowledgements

I submit this thesis in deep gratitude for the last several years of learning with and through Tufts UEP and the community this program cultivates. I want to thank my thesis advisor, Dr. Kristin Skrabut. Kristin, you offered unending enthusiasm and encouragement for this work. Your energy and curiosity are infectious, and I firmly believe your direction helped me bring this thesis to new levels. Thank you also to Penn Loh who served as my reader. Your teachings and passion have opened new worlds in my practice, and for that I am incredibly grateful. This work would not be what it is without the trust and time of residents in South Portland who participated in this research. Thank you for your willingness to explore a place we love, together. I also want to extend a sincere thank you to the entire UEP community of peers and professors who together give me hope, inspiration, and guidance toward a future that is more just, empathetic, and critically conscious. Peyton Jones, you are an earth angel. Thank you to my colleagues outside of UEP, past and present, who supported my ambition to go back to school, allowed me space to experiment with new practices in real time, and offered me grace as I burned the candle on both ends. Julie Rosenbach, I would not be where I am without the opportunities you kindly shared with me. Thank you to my friends who have buoyed my spirits and endeavors through different seasons of life. Jacqui Holmes and Dylan Reffe, I feel the most comfortable as myself around you—you make the lives of everyone you encounter better. To the aunties on Walnut Street, I am eternally grateful for your intergenerational friendship. Thank you to my immediate and extended families who never ceased to offer encouragement, love, and sustenance. Eben Perkins, I promise that I am done with this project now and look forward to what free time holds for us again.

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Introduction

"It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what stories make worlds, what worlds make stories."

-Donna Haraway, Staying with the Trouble: Making Kin in the Chthulucene, 2016

In 2019, the US Environmental Protection Agency (EPA) filed a consent decree revealing that Global Partners LLC (Global), the owner and operator of twelve bulk petroleum storage tanks in South Portland, had violated its air emissions permit for at least seven years. Prior to the consent decree, residents had detected petroleum odors in the air. Some residents dismissed the smells with a justification that local and state government wouldn't place people in harm's way, while others had become habituated to the presence of these odors. With news of the consent decree, however, people who live, work, and play in the city started asking 'is the air safe to breathe?' To answer this question, state toxicologists and meteorologists turned to chemical compounds and windspeeds to build a story about air quality in South Portland; local officials described back-of-the-napkin carcinogenic calculations to substantiate statements about relative cancer risk in the city; and environmental activists demanded the installation of fence line monitoring and vapor recovery units as solutions they thought could assess and mitigate air pollution. Together, these stories, matter, and thoughts constitute a toxic world and public discourse in South Portland that is primarily grounded in scientific theory and understanding.

However, as I sit with Shaina in her living room on a cold December morning in the Pleasantdale neighborhood, I wonder if we need other kinds of stories to understand and mitigate apprehensions of residents who wake up in the middle of the night to a putrid smell of gasoline, experience headaches as they bike to work, or feel unsettled in their own home. These stories,

"stories otherwise", do not unfold on a technocratic terrain, but rather on a social and embodied register (Terranova 2016). Shaina and her Pleasantdale neighbors speak of the bulk petroleum storage facilities operating only blocks away as the "oil tanks" and they refer to the strong and undeniable odor in the air as "tank fumes" or more poignantly, "cancer fumes." They gather on Sundays in the street as their children start up a game of basketball and collectively worry whether the neighborhood is in fact a safe place to play and age. For Shaina and her neighbors, uncertainty about local air quality and pollution permeates their everyday lives and routine movements.

On the small television monitor, Shaina streams a crackling fire. Acoustic holiday music provides a festive soundtrack as we settle into the couches that feel as though they swallow me whole. A burning scented candle, somewhere out of eyesight, emits an overwhelming smell of warm baking spices. Shaina's son warms up his lunch in the microwave, which hums until the food is ready. Her kitten hops across our laps, stirring up trouble. We talk about daylight savings, the high cost of living, neighborhood gatherings, and the map of her daily movements. Shaina discusses the existential and everyday concerns she harbors about the bulk petroleum storage facility operating two roads away but does not dwell here. She describes the small acts of care that ripple from house to house on her road and the joy she gets from hearing her sons and their friends blast music from the car in the evenings. Shaina does not attend rallies for greater industry regulation that garner broad press coverage, but instead continues to live in and despite perceived air pollution, making a life amidst uncertainty about the air she breathes. Her unwavering commitment to the people, amenities, sensory experiences, and risks, showcases a lesser-known endurance of responses to tank fumes in South Portland.

I came to this research about "tank fumes" in South Portland with a curiosity about what the embodied and sensory experiences of residents can reveal about the mess we are in. This curiosity grows out of both personal and professional connections to the issue of tank fumes. I have lived in South Portland for seven years and worked for the City of South Portland during four of those years. This proximity makes this research feel both more meaningful and entangled in emplaced relationships. Through this thesis, I want to trace out ambient noises that escape from the scientific pursuit of chemical compounds and the conventional focus upon heroic acts of resistance. And above all, my goal is to repopulate the toxic world and public discourse in South Portland, quite literally to have residents and their experiences inhabit our collective understanding of local air pollution. Therefore, in this thesis, I explore the following research questions:

(1) How do community members of South Portland experience toxicant encounters?

(2) How do community members of South Portland then make sense of these experiences with toxicant encounters?

(3) How do toxicant encounters shape personal and community activism in South Portland?

Background

The City of South Portland's relationship with the petroleum industry dates to the late 19th and early 20th century when the newly chartered and formerly rural city sought to build a diverse tax base. In the years that followed, the city recruited Motiva and Texaco to establish facilities along the undeveloped waterfront. South Portland leadership at the time, as narrated by a local historian, "didn't have any idea what they were getting into." During World War II, the petroleum industry in South Portland expanded to absorb shipments unable to reach Canadian

ports because of a German naval blockade in the St. Lawrence River. With no refining capacity in South Portland, crude oil shipments arriving in South Portland were instead sent over the 236-mile Portland-Montreal pipeline to the Suncor refinery in Montreal.

With this infrastructure in place, South Portland quickly became the second largest oil port on the Eastern Seaboard. Mobil, Irving, Sprague, Gulf, Chevron, and Portland Pipe Line Corporation (identified by their current holding titles) collectively installed and operate more than 100 bulk petroleum storage tanks. These tanks can hold between 2- and 6-million-gallons of petroleum product. Refined products arriving in South Portland are transported through the Buckeye Pipeline to Bangor and provide 50% of all petroleum consumed in the state (U.S. Department of Homeland Security 2018). The arrival of crude oil to South Portland, often from Venezuela, ceased after 2016. This unrefined product, destined for Montreal, Quebec, and Ontario, could not compete with Canadian tar sands entering the market (U.S. Department of Homeland Security 2018). Today, bulk petroleum storage tanks in use hold #2 and #6 fuel oil, ethanol, kerosene, and petroleum (City of South Portland 2020). These products are largely imported from Saint John, New Brunswick. The Saint John refinery in New Brunswick processes up to 320,000 barrels per day of crude oil, the majority of which comes from state-owned oil companies in Saudi Arabia and other non-Canadian sources (Government of Canada 2023).

Figure 1 Aerial image of Forest City Cemetery and Sprague terminal in South Portland. Image courtesy of Inside Climate News.

South Portland Demographics	
Population	27,026
Percentage population 65+	20.4%
Percentage population with a disability, under age 65	8.2%
Median household income	$73,899
Race	88.4% White, 5.2% Black, 3.5% Two or More Races, 2.9% Hispanic/Latinx, 2.1% Asian
Percentage owner occupied	64.2%
Median gross rent (monthly)	$1,465

Figure 2 South Portland Demographics. Source: American Community Survey 5-Year Estimates 2017-2021.

The bulk petroleum storage facilities contribute a combined $1.4 million to the local tax roll, however, the industry's continued presence in South Portland is not without controversy (Harry 2013). This revenue supports, in part, the provision of public goods and services to a city of over 27,000 residents (see Figure 2). In 2014, the South Portland City Council adopted the Clear Skies Ordinance, which bans the loading of crude oil onto tankers in South Portland's harbor. The passage of this local regulation demonstrated a commitment among community

members and elected officials to protect residents and visitors from harmful air quality. Then in 2019, EPA's consent decree broke news that for at least seven years prior Global had emitted more than double the amount of volatile organic compounds (VOCs) allowed under the issued permit for heating and transporting bunker fuel and asphalt. VOCs are made up of Hazardous Air Pollutants (HAPs), which vary in their effect, but at high enough levels can precipitate both health and climate impacts (Shankman 2019). Encounters with VOCs can irritate the eyes, nose, and throat. Human exposure overtime can potentially damage critical organ systems, lead to asthma, affect developing fetuses and pregnant people, or cause breathing problems and cancer.

The consent decree surprised everyone: residents, elected officials, and local administrative leaders. News spread quickly and community members demanded more information about emissions from the bulk petroleum storage facilities. In April of 2019, staff from the Maine Department of Environmental Protection (DEP) attended a City Council meeting to hear the concerns of South Portland residents about odors and air emissions from bulk petroleum storage facilities. Following this meeting and formal concerns voiced by the neighboring City of Portland, the Maine DEP launched a robust and multi-phased air quality monitoring program designed to collect quantitative data and grow an objective body of evidence to empirically determine local air quality. In Phases 1 & 2 of this program, the Maine DEP distributed portable sampling platforms throughout South Portland. In Phase 3, which commenced in the new calendar year of 2020, the Maine DEP established additional fixed sampling sites with continuous monitoring systems at five sites around the city (see Figure 2). Through this program, scientific and professional measurement define the landscape. Our understanding of the issue unfolds in a calculative terrain as we are "tendering and transacting in data" (Zeiderman 2016; Shapiro, Zakariya, and Roberts 2017).

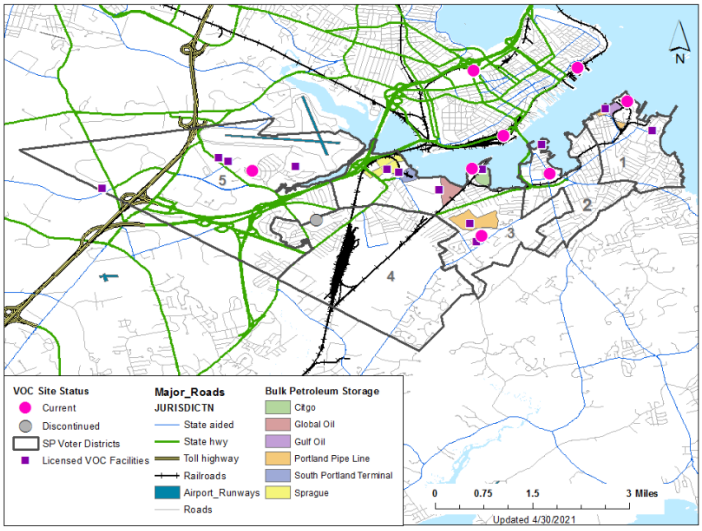

Figure 3 Licensed VOC Sources and 24-hour Sampling Site Locations. Map courtesy of Maine DEP.

Meanwhile Protect South Portland, a grassroots organizing group in the city, started knocking on doors in the residential neighborhood directly adjacent to the Global facility. They wanted to raise awareness about the violations among people at greatest risk and encourage these residents to submit comments to the state as public proceedings to approve the consent decree commenced. In the months and years that have passed since March of 2019, the organizing strategy and power of Protect South Portland precipitated notable local progress and state legislation. In October of 2019, with significant pressure from Protect South Portland, the city established a Clean Air Advisory Committee to make data-driven, timely recommendations for improving local air quality. Subsequently in 2020, Protect South Portland worked with state representatives to develop and advance a bill which directs Maine DEP to study methods to measure and control air emissions from bulk petroleum storage facilities. Protect South Portland complemented these critical contributions to existing systems and processes with efforts to translate and distribute air quality findings published by the Maine DEP. Through these strategic and other publicly visible efforts of Protect South Portland, tank fumes and air emissions remain present in local and state discourse.

This thesis strives to supplement unfolding technoscientific inquiries into local air quality in South Portland because by only focusing on the molecular realm, we collectively lose sight of the real problem; how people experience and are affected by toxicant encounters. Imagine changes that affect the science of the space but do not address the experiences of residents, visitors, laborers, and community members in that space. It begs the question, what is the point? This thesis argues that community members who are most impacted by tank fumes should be (1) meaningfully engaged in technocratic efforts to define the problem, gather data, and generate solutions and (2) supported in their efforts to build worlds of care and connection. It encourages any approach to figuring the problem of air emissions in South Portland to engage the totality of residents' experience and honor local knowledges. It calls on any approach to generating solutions to account for the ways in which affected communities are living with toxicant encounters. To this end, the research and findings expand our focus to include emplaced experiences, situated knowledges, and diverse activisms around toxicant encounters.

Methodology

Over the course of six months, from October 2021 to March 2022, I employed a qualitative methodology to answer my three research questions: (1) how do community members of South Portland experience toxicant encounters, (2) how do community members of South Portland then make sense of these experiences with toxicant encounters, and (3) how do toxicant encounters shape personal and community activism in South Portland. I conducted a historical document analysis of archived periodicals and personal histories gathered by the South Portland Historical Society, engaged in 30 hours of multisensory participation to share in and begin to empathize with the experience of residents, and carried out 18 interviews with community

members as a means of touching down in the issue of air pollution through several relevant identity vectors. The field of anthropology heavily influenced the consortium of qualitative methods employed in this research and provided a foundation for uncovering alternative ways of understanding and envisioning the social world.

Historical Document Analysis

With the hope of grounding research in a historical context, I started with a document analysis of archived periodicals and personal histories collected and maintained by the South Portland Historical Society. Two questions grounded this phase of the research to ask: (1) where and how does industry intervene in daily life, and (2) how do community members relate to the landscape. I relied heavily on the online museum and research library to identify relevant items in the Historical Society's collections and holdings. To navigate available materials, I used place-based and industry-specific search terms. I chose place-based search terms to identify information about the neighborhoods past and present that surround the bulk petroleum storage facilities in South Portland. I also employed industry-specific terms related to the material products or the names of companies with holdings in South Portland to gather items related to both the local petroleum facilities as well as the historical context of industry in the city. These search terms had varying degrees of return: petroleum (5 results), oil (81 results), Gulf Oil Corporation (2 results), Sprague (8 results), Mobil Oil (36 results), Texaco Oil Company (4 results), Portland Kerosene Oil Company (9 results), Portland Pipeline Corporation (0 results), Pleasantdale (326 results), Ligonia (173 results), Turner Island (0 results), Kaler (30 results). Search results included photos, newspaper clippings, manuscripts, and social programs, such as leaflets and pamphlets from theatre productions. I examined the language and prevailing themes

used to describe the physical infrastructure, social relations, and cultural context in each resource. I supplemented the text analysis through two key informant interviews with local historians who provided additional context to the results of my archival research. These conversations allowed me to embed static documents within the tapestry of everyday life in South Portland. Collectively, the insights and understanding gained from a historical document analysis effectively situate present moments of inflection along an expansive and connected spatial and temporal scale.

Multisensory Participation

Multisensory participation is a specific departure from the conventional ethnographic method of participant observation. Bernard explains that "participant observation involves going out and staying out, learning a new language… and experiencing the lives of the people you are studying as much as you can" (Bernard 2017). While an immersive approach to understanding the culture and everyday rhythms of a place, participant observation is critiqued by sensory ethnographers for giving preference to visual or auditory observation (Lee and Ingold 2006; Lund 2008; Pink 2010; Ingold 2011; Pink 2015). Multisensory participation notably departs from this conventional practice by asking the researcher to be in the world through all the human senses. In other words, the researcher and interlocutors share in activities and produce knowledge together through a "total system of bodily orientation" (Ingold 2000). Touching, smelling, tasting, walking, talking, looking, and listening are bound up together as parts of a multisensory experience. In this way, the use of multisensory participation allowed me to share in and begin to empathize with the embodied and emplaced experiences of community members living near the bulk petroleum storage facilities.

Over the course of research, I completed 30 hours of multisensory participation. I walked in neighborhoods adjacent to the oil tanks, along the Greenbelt Trail where residents recreate and travel by foot or bike to work, and through the Forest City Cemetery to a small yet popular community beach tucked at the rear of the property between two bulk petroleum storage facilities. These locations offered a window into the everyday lives, movements, and multisensory experiences of community members. I engaged in multisensory participation individually and in the company of interlocutors. When in the company of interlocutors, we pointed out unique features of the landscape that came to our attention as we moved through space. We crossed sensory thresholds together, noting when smells shifted. These unplanned instances of a shared multisensory experience offered a small opening to understand others' memories, curiosities, and explanations.

After each outing I produced fieldnotes that focused on my movements through space as well as the movements of other humans and nonhuman elements of the landscape (Ingold 2011). Imprints on the landscape evidenced the movements of others; bagged leaves and idling cars serve as rudimentary examples. My fieldnotes also captured my own embodied insights and reflexive feelings. Engagement with and in these routinely overlooked aspects of everyday life in South Portland through multisensory participation offered a unique vantage into how community members come to know and exist in a toxic landscape.

Multisensory Interviews

A series of multisensory, semi-structured interviews also contributed to a body of evidence used to answer the guiding research questions. I used multisensory interviews as an opportunity to gather a range of perspectives and touch down in the community through relevant

identity vectors including resident, activist, parent, community organizer, and business owner. Multisensory interviews also helped to prevent against a common pitfall of sensory ethnography, whereby the researcher presumes that their embodied experiences are the same as other people's. I focused my interviews among interlocutors who lived or worked in the neighborhoods directly adjacent to bulk petroleum storage facilities. Nonetheless, I interviewed interlocutors situated throughout South Portland out of deference for the reality that political, jurisdictional, and geographical contours do not enclose toxicants to a bounded area. I used one-step snowball sampling to identify interlocutors. This efficient approach introduced notable limitations to my research, which are worth noting before proceeding.

I identified initial interlocutors through public comments to air emissions license applications and state rulemaking processes, as well as through published interviews in local periodicals. The state rulemaking processes focused on degassing procedures of bulk petroleum storage tanks, marine vessels, and transport vessels as well as emissions monitoring of bulk petroleum storage facilities. In these contexts, public comments voiced concern over emissions, odors, public health, neurological impacts, in South Portland. Consequently, interlocutors identified through these comments and their networks of referrals shared similar levels of concern surrounding the potential health impacts from chemical exposure. Therefore, to achieve a representative sample, I probed for connections or linkages to neighbors, friends, or family irrespective of their stance on the unfolding air emissions issue.

Over the course of four months, I interviewed community members who described being directly affected by air emissions and community activists/organizers working for improved air quality in South Portland. Four interlocutors expressed being both directly affected and actively engaged around the issue, allowing for overlap between the categories. I conducted interviews in

interlocutors' living rooms and backyards, during a walk of the neighborhood, or over the phone to accommodate COVID-19 precautions. Questions asked of community members explored everyday activities, sensory experiences, and their social relations in place. Questions asked of community activists focused on action and intentionality, emergent communities and affects. When possible, field locations transformed the interview into a multisensory event during which I probed sensory experiences and engaged in embodied practice (Pink 2021). This expansive approach to interviews considered spoken word as part of the multisensory event but not all encompassing. Shared tactile experiences or invitations to listen and smell together moved the interview into a new octave and provided an opportunity for me to start to occupy, if only to a small degree, the interlocutor's world in a way that is familiar to them.

Throughout and at the conclusion of data collection, I used grounded theory to guide and streamline qualitative data analysis. As grounded theory has "evolved into a constellation of methods rather than an orthodox unitary approach" I gravitated towards Kathy Charmaz's approach to "study problems in the empirical world and… pursue unanticipated directions of inquiry into this world" (Charmaz 2008). This begins with active scrutiny and systematic analysis of the data to answer the simple question of what is happening here? (Charmaz 2008). Charmaz then goes on to describe an iterative process of creating and checking emergent categories or codes that describe actions in place and time. Throughout the coding process, Charmaz maintains allegiance not to a category (general or specific) but rather to the possibility for various explanations to materialize. This approach, while reflexive and time-consuming, yielded an engaged practice, an awareness of gaps in the data, and an arrival at new propositions for an emplaced environmental problem. The findings that follow are rooted in this analysis and communicated with the use of pseudonyms to protect the confidentiality of my interlocutors.

A Note on Place and Sensory Ethnography

I employed the principles and techniques of sensory ethnography as one means of answering the key research questions and accessing new dimensions of everyday life in South Portland. Toward the end of the 20th century, sensory ethnography emerged as a distinct subfield of anthropology. During this time, the practice of sensory ethnography evolved from a preference for listening and watching to a holistic, intersensory study which attends to all five senses through a full-bodied approach (Classen 1997; Howes 2003; Ingold 2011).

The growing applications of sensory ethnography are broad, reaching across film studies, medical practices, material culture studies, studies of sensuous geography, and history. This method is particularly valuable in understanding experiences of place. For instance, some scholars focus specifically on the connection between sound and place, proposing the notion of a "soundscape" rather than a landscape. Most notably, in his essay "Waterfalls of Song," Steven Feld employed local soundscapes to understand lifeworlds in Papua New Guinea. Through this study, he identified the reciprocal nature of senses and places. Put simply, "as place is sensed, senses are placed; as places make sense, senses make place" (Feld 1996). Susan Rasmussen explored the "aromascape" of the Tuareg of Niger, West Africa. Through her inquiry into the role of scents in human-to-human and human-to-spirit linkages, she found that aroma effectively "opens up boundaries and suggests new ways of interpreting experience" (Rasmussen 1999). These anthropological works and others with pertinence to the research at hand, including but not limited to Nicholas Shapiro and Steven Feld, demonstrate the place-making and place-disrupting capacity of sensory experiences (Shapiro 2015).

Sensory ethnography as a practice, introduces a systematic rethinking of research methodologies that not only study but also attend to the senses (Ingold 2011; Pink 2015). Attending to the senses in everyday lives requires an innovative, reflexive, and embodied practice. Laplantine describes this practice as "an experience of sharing in the sensible" through which "we try to feel along with [interlocutors] what they experience" (Laplantine 2015; Howes 2016). Activities such as walking, apprenticing, eating, and simply being there, open up new knowledges and understanding of community (Lee and Ingold 2006; Lund 2008; Pink 2010; 2015; Ingold 2011). In her notable work, "An urban tour," researcher Sarah Pink reflects on the collaborative sensory act of place-making that exists between herself and a research participant. Through moments shared with research participants preparing for, exploring, and photographing a Slow City event in Mold, Wales, Pink attuned to the potential for an embodied researcher to comprehend places of study (Pink 2008). Pink's work and that of others in this emerging field of practice begin to reconsider and reconfigure the linkages between theory, the role or presence of the researcher, and that of the interlocutors.

Following these theoretical and methodological principals, I enjoyed experimenting with emerging and innovative ways of coming to experience a place and answering the guiding research questions: (1) how do community members of South Portland experience toxicant encounters, (2) how do community members of South Portland then make sense of these experiences with toxicant encounters, and (3) how do toxicant encounters shape personal and community activism in South Portland.

Chapter Overview

I begin with a literature review and then organize this thesis into three chapters of analysis. The literature review explores the theoretical underpinnings of a toxic world. Political ecology and social movement theory bring attention to power and agency as I learn about and experience an emplaced environmental problem. This conceptual framework moves my analysis of a permanently polluted world beyond hegemonic narratives of harm and into expressions of desire and endurance. Each subsequent chapter of analysis then answers a research question through the stories and voices of South Portland community members. This approach reflects my intention of re-populating our collective understanding of an emplaced environmental problem. Each chapter builds upon the former, moving through the experiences of, sense-making projects for, and responses to toxicant encounters. This narrative arc follows the continuum I heard residents and community members describe as they smelled or had a physiological response to tank fumes, worked to understand what was occurring, and then acted upon this understanding.

"Toxicant Encounters" explores how residents experience toxicant encounters. The stories of Asther and Evelyn anchor the findings in this chapter. Asther, a new homeowner, and single mother is unsettled by sensory and physiological experiences of tank fumes. However, this discomfort stemming from local industrial activity is counterbalanced by a distinct sense of belonging she feels among the mixed-use and gritty neighborhood. Her story shows the paradox and complexity of experiences in place. Evelyn grew up in the Pleasantdale neighborhood in the 1940s and now resides with her mother in the same home she did as a child. Just like Asther, Evelyn is disturbed when she is first overwhelmed by the smell of petroleum as an adult and wonders what she has been exposed to throughout her lifetime. However she expresses a nostalgia for what once was as she notices demographic and social changes to the neighborhood.

These distinct stories texture our understanding of how residents experience toxicant encounters. With the concerns and aspirations of Asther and Evelyn as evidence, this chapter argues that experiences of toxicant encounters are more than chemical exposure; these experiences connect to a sense of belonging, the desire not to be displaced, and anxieties embedded within historicized and politicized local identities. Thus, to narrow our gaze on wayward chemicals misses the totality of human experiences among the landscape in Pleasantdale.

"Situated Knowledges" traces the creation and presence of three sense-making projects employed by residents of South Portland to understand their encounters with tank fumes. Fred, an environmental engineer, develops a multi-source Human Exposure Model to demonstrate the cumulative impact of exposure he experiences at home, surrounded by multiple bulk petroleum storage facilities. Cora shares a crowdsourcing application that she uses to log experiences with perceived air pollution and observe similar reports submitted by her neighbors. And Jean, who grew up in South Portland and lost her sister to cancer, uses her embodied, physiological responses to toxins senses to determine the potential for harmful exposure. Each sense-making project uses a unique form of reasoning to identify and navigate invisible and indeterminate chemical constituents in the landscape. The stories in this chapter advocate for an openness to the multiplicity of sense-making projects, especially those that exist outside of traditional and institutionalized norms of science, because acceptance and affirmation of deeply situated knowledges is tied to community members' self-conceptions.

"Complimentary Activisms" breaks open conventional tropes and narratives of activism by following both celebrated and life-enabling responses to toxicant encounters in South Portland. This chapter first follows Protect South Portland, a recognized community mobilization that successfully galvanizes public support through community events and navigates bureaucratic

spaces to advocate for regulatory reform on behalf of affected residents. The chapter then turns to focus on activism among people who are making a life among toxicant encounters. Their responses and activities are less about achievement and more about endurance. To illuminate this form of activism I share the story of Bill. Bill is a former community organizer, who shifts his energy from heroic acts of resistance to the 12-step process in recognition of embodied trauma and the need for self-care. Through these stories, Chapter 4 celebrates diverse forms of activism which collectively advance the potential for a livable present and future. Most notably, however, this chapter argues for the recognition of an activism based in ethics because these actions by residents form the building blocks of a healthy community.

While each chapter unfolds through distinct story lines, together, they add up to something larger. First, this work advocates for the employment of ethnography to illuminate less recognized subjectivities and perspectives in a permanently polluted world. Deeper understanding and alternative vantages into people's experiences, sense-making projects, and actions emerged only through probing sensory experiences, reflexively moving through a place with residents, and humbly being part of the landscape. Second, with the voices and stories of residents as evidence, I argue that community members who are most impacted by toxicant encounters must be meaningfully engaged in otherwise technocratic efforts to define the problem, gather data, and generate solutions. This approach re-populates our collective understanding of the issue and highlights heterogenous needs of and differentiated impacts among residents in South Portland. It values information that emerges from deeply situated, lived experiences and honors that knowledge as critical in problem-posing and problem-solving. And finally, by putting people back into the conversation, solutions can move not only toward

regulatory reform but also can support communities of care and connection that enable residents to endure through toxicant encounters.

A Note on Positionality

Before moving further, it is also worth outlining my personal and professional engagement with the issue of situated air emissions from the bulk petroleum storage facilities in South Portland. My house is located less than two miles from the Sprague, Global, and Gulf facilities. There are days when I step outside for a morning run and pick up a distinct smell of petroleum. I intuitively attribute this smell to industrial activity at the bulk petroleum storage facilities but continue along with the predetermined activity or routine. Any knowledge that I hold about the issue of situated air emissions is entangled with these embodied experiences with petroleum odor and conversations with neighbors, friends, and local climate activists who volunteer for Protect South Portland. It is through this lens that I approached the research, only to learn that there are knowledges, worlds and activisms that exist outside of the dominant discourse and visible responses to tank fumes in South Portland.

Further, prior to this research, I worked as the Sustainability Program Manager for the City of South Portland. The City of South Portland maintains a complex relationship with corporate owners of the bulk petroleum storage facilities, state regulating agencies, and the EPA—a relationship that I have not been privy to or briefed on in full. Administratively, the City Manager maintains oversight of any issues concerning the bulk petroleum storage facilities. Therefore, in my role as the Sustainability Program Manager, I did not engage directly with any parties involved in addressing air emissions or air quality concerns but became increasingly aware of the internally and externally political nature of any engagement with the six petroleum

companies operating in South Portland. I acknowledged the ways in which my personal and professional identities intersected with my research when interlocutors inquired, but otherwise deferred to my position as a graduate student. When necessary, I qualified my work for the City of South Portland and clarified that I could not make any promises that the municipal government would act based on my research.

Moreover, I was keenly aware that I was often not the first person to speak with residents about their experiences and will likely not be the last. Local journalists and organizers have knocked on doors to share and gather information from residents living near the bulk petroleum storage facilities. I worried that my research would tip the balance toward over-research or ask residents to reengage with a difficult topic yet again. However, at the close of several interviews, interlocutors expressed deep gratitude for spending time with and listening to them. I always found these exchanges meaningful beyond the scope of research and energizing, knowing that I offered interlocutors an empathetic ear and an opportunity to articulate their concerns, experiences, knowledge, and imaginings. The relationships I built with community members during this research instilled a reflexive tendency to ask "what will be the outcomes and effects of this research in and on our communities? [Am I] certain that the benefits will outweigh the costs?" (Tuck 2009). Thus, the ethical stance of this project is to account for distressing conditions, as well as the knowledges, desires, and agency of affected communities.

In what follows, I hope to step quietly out of the discussion and let the voices, stories, and activities of residents' step forward and add up to something. The residents themselves are the "primary actors" and the findings are best regarded as "by, for, and with communities" (Checker 2007; Tuck 2009). In fleeting moments, I share what I saw, heard, smelled, touched, felt, and how I learned to be affected. As the researcher and ethnographer I aspire to conduct both "dark

anthropology," a focus on the harsh dimensions of everyday life upon a backdrop of neoliberalism and "anthropology of good," which entails the everyday projects of love, care, resistance and change that promote alternative visions of the future (Ortner 2016). This multi-dimensional approach at once unpacks the structures that give rise to toxicity and leads us toward alternative understandings of the present that extends beyond "thinking of ourselves as broken" (Tuck 2009; Nading 2020). This work serves as a telling of home, people, toxicants, and the radical role of the emplaced body in discerning and reimagining social, political, and economic lines of connection that bind us together.

Chapter 1: Theorizing Toxic Worlds: A Review of the Literature

This work rests solidly on urban political ecology and social movement theory as grounding frameworks for examining lived experiences, diverse knowledges, and activism in South Portland, Maine. Moreover, the scholarly literature employed to scaffold this thesis takes an otherwise technoscientific discourse of toxicity into the anthropological realm. It brings explicit attention to concepts of power and agency, which encircle but can often be absent from local discussions of chemical harm and everyday activism. In doing so, this theoretical framework lifts the ethnographic descriptions that follow out of the register of damage-based research, a "flawed theory of change" whereby the sole focus on pain reinscribes the narrative of perpetually diminished communities in a permanently polluted world. When draped over urban political ecology and social movement theory, the voices, stories, and experiences of residents broaden the focus to include disturbances and transformations, outrage and desire, persistence and reconfiguration (Tuck 2009; Murphy 2016).

Urban Political Ecology

Political ecology may seem like an out-of-place framework to use for research into experiences with industrial by-products in an urban setting. Beginning in the 1990s, geographers employed political ecology as a framework to research political-economic processes and the unequal distribution of resources (P. Walker 2005; Blaikie 2008; Zimmer 2010; Robbins 2019; Bargielski 2020a). This research occurred strictly in rural and agricultural settings of developing countries. Following this boundary-laden line of thinking, examinations of nature in ecological spaces could be wholly contained and kept distinctly separate from "unnatural" society (Braun 2005; Véron 2006; Heynen 2014). Researchers focused on soil and environmental degradation,

tropical forests, biodiversity, access to water, and conflicts over protected areas (P. Walker 2005; Zimmer 2010). Political ecology effectively brought attention to economic, ecological, and political marginalization that resulted from human management of land. And yet, the predominant allegiance to what was considered natural impeded the opportunity to ask similar questions of marginalization and the inequitable distribution of resources and harms in more urban contexts.

It is only in recent years that the boundaries of political ecology expanded across disciplines and contexts, bringing new attention to ecological problems in urban landscapes. This growth of political ecology beyond the "natural" world emerged from Swyngedouw's conceptualization of the city as a hybrid. Drawing from Bruno Latour, Swyngedouw described the city as a place where society and nature are inextricably bound and inseparable (Swyngedouw 1996; Heynen 2014; Bargielski 2020b). In Latour's work, *We Have Never Been Modern*, he challenges the persistent separation of nature, culture, and discourse (or the communication about "these things") (Latour 2012). Further, Latour critiques the work of social scientists who reduce, disconnect, and erase connections that in fact, weave together nature, culture, and discourse. To this end, Latour encourages us in part to reorient our studies to involvements between society and nature through the work of translation, tracing that which links "the upper atmosphere, scientific and industrial strategies, the preoccupations of heads of state, [and] the anxieties of ecologists." (Latour 2012). Swyngedouw goes on to consider socio-ecological entanglements emblematic of urban political ecology through the theory of assemblages. Following this theory, landscapes are fluid; they emerge and reconfigure among a series of human and non-human interactions (Heynen, Kaika, and Swyngedouw 2006; Bargielski 2020b). Such an understanding of landscapes is salient to urban political ecology for two

reasons. First, assemblages reject the human-nature binary (Bargielski 2020b). Second, assemblages suggest that landscapes are made and remade through political, economic, and social processes (Heynen, Kaika, and Swyngedouw 2006; Bargielski 2020b). Upon this framework, studies of urban landscapes as assemblages can reveal relations and networks of power and effectively reinscribe environmental conditions and locusts of ecological struggle in a larger political and economic context.

While some critique the metamorphosis of political ecology as a disillusionment, anthropologists, sociologists, environmental scientists, and political scientists leveraged the opening and space to focus on urban issues anew (Blaikie 2008). The expansive application of political ecology encouraged researchers to map issues of urban air pollution, urban water quality, urban wildlife corridors, gentrification, insects and pesticides, gardens and food, and waterfront transformation onto a tapestry of hierarchies, power relations, and socio-ecological entanglements (Véron 2006; Buzzelli 2008; Zimmer 2010; Little 2012; Heynen 2014; Nading 2014; Robbins 2019; Bargielski 2020b). To make sense of these burgeoning research efforts (in both urban and non-urban contexts) that expose "forces at work in ecological struggle and document alternatives in the face of change," Paul Robbins proposed five dominant themes of political ecology: degradation and marginalization, conservation and control, environmental conflict and exclusion, environmental subjects and identity, political objects and actors (Robbins 2019; Bargielski 2020b). These themes effectively attempt to shift the narrative from environmental destruction to that of a socio-environment where humans and non-humans participate in constituting a place as agentic actors. The opening up of new lines of inquiry into urban political ecologies invites place-based investigations of "who produces what kinds of

conditions in whose interest" which can catalyze deeper and more radical action or responses, means of accessing and addressing the root cause (Zimmer 2010).

The Toxic World

Of particular interest to the research at hand is a growing body of anthropological literature unpacking what Alex Nading describes as the "toxic world" through the lens of urban political ecology. In this world, ubiquity and longevity characterize chemical exposure. Citing Sara Ann Wylie, the scholarly team of Liboiron, Tironi, and Calvillo capture the omnipresence of chemicals made possible through a diversity of industrial processes, noting "millions of metric tons of synthetic materials are created, processed, and released as effluent every year, built upon extractive industries and their pollutants" (Liboiron, Tironi, and Calvillo 2018). Moreover, persistent exposure to diffuse chemicals that endure through time contribute to a temporally expansive, albeit latent, legacy of the toxic world (Gray-Cosgrove, Liboiron, and Lepawsky 2015; Liboiron 2016). In naming these chemicals, several scholars propose use of the term "toxicants" in place of "toxins" (Ebeling 1940; Boudia and Jas 2014b; Shapiro 2015; Liboiron, Tironi, and Calvillo 2018).[1] To them, the term "toxins" focuses attention on the molecular scale, and in doing so, falls short of illuminating the extractive industrial process and global networks or power implicated in the production of polluted homes, bodies, and environments. The term "toxicants" draws attention to and frames investigations of how the toxic world is produced, maintained, and disrupted through encounters among beings, systems, and things.

Before moving forward, it is worth spending focused time on the notion of landscapes, introduced earlier through Swyngedouw's writing about the city as a hybrid, and apply such a

[1] I will use the term "toxicant" in the pages that follow, only relying on "toxin" when it appropriately reflects a narrowed focus upon the molecular scale.

framework to the toxic world. In similar terms to Swyngedouw's description of landscapes as fluid and constituted through interaction, Laura Ogden defines a landscape "whether swamps or cities or rural farmlands- [as] assemblages of collective species, the product of collective desires, and the asymmetrical relations among humans and nonhumans" (Ogden 2011). Moreover, in picking up the growing work of cultural geographers and anthropologists to study landscapes, Ogden encourages "an attention to the local, or localized, embodied experience of landscapes as well as a concern for how the local landscape practices intersect with various constellations of power" (Ogden 2011). This charge not only elevates the concept of a landscape beyond the register of a backdrop, but also follows Latour's charge to explore the knowledges, interests, justice, and power that weave our world together (Latour 2012; Bargielski 2020b). In his ethnographic study of the role of community health workers, *brigadistas*, in dengue fever prevention, Alex Nading describes this woven world through a series of attachments. Attachments among people, mosquitos, and the virus unfold on spatial, temporal, and material dimensions to bring these beings, systems, and things into each other's worlds (Nading 2014). Therefore, by attending to the histories, antagonisms, alliances, and relations in motion, we can both get a little lost in a landscape, conceptually, and see anew the networks at play in composing a landscape.

This notion of landscapes as dynamic enables an emerging line of inquiry into the toxic world and the emergence of "blasted landscapes". Blasted landscapes, such as the BP Oil Spill, Hurricane Katrina, or Fukushima, are characterized by disturbance and transformation (Kirksey, Shapiro, and Brodine 2013; Tsing 2015; Bargielski 2020b). Disturbances contribute to the heterogeneity of a landscape, a process that Anna Tsing articulates as creating a patch (Tsing 2015). Patches, as a conceptual framework, attune us to the assemblages that constitute a

landscape- human and non-human, local and global, expert and lay knowledge (Tsing 2015). Patches make histories present and tell stories of life and landscape. They reveal injustice and collective outrage alongside hopes and imaginations (Kirksey, Shapiro, and Brodine 2013; Tsing 2015). To that end, Anna Tsing encourages us to "acknowledge catastrophe while also imagining possibility" in a blasted landscape (Tsing, Mathews, and Bubandt 2019). Therefore, the stirring up of relations in a toxic world through toxicant encounters can in fact produce creative energy for alternative ways of living among and rearranging the landscape.

Living in a Toxic World

A growing body of literature exploring this toxic world has started to illuminate the many forms of toxicant encounters. Disasters stand as the most well-known and documented realm of chemical exposure. Events at Bhopal and Chernobyl anchor this register as punctuated moments of industrial catastrophe (Petryna 2003; Nixon 2011). In her ethnographic work *Advocacy After Bhopal*, Kim Fortun delves into the many and conflicting responses to the 1984 gas leak at the Union Carbine chemical plant. Fortun followed enunciatory communities, communities that emerge in response to disaster that are simultaneously "subjects of and subject to change" the systems in which they exist (Fortun 2001). Adriana Petryna employed anthropological methods to understand the consequences of the Unit Four nuclear reactor explosion at Chernobyl. Here, contests over measuring and defining exposure led to what Petryna described as "biological citizenship" whereby embodied suffering was used to claim rights and resources (Petryna 2003). Beyond these two industrial disasters, Fukushima's triple disaster on March 11, 2011 and the aftermath of radiation dramatically changed ways of knowing about "acceptable risk, notions of home and belonging, lived experience and practical knowledge, and historical knowledge itself"

(Onaga and Wu 2018; Onaga et al. 2021). Together, these toxicant disasters and respective inquiries into the circumstances prior to and following the infamous punctuated moment shed light on the ways in which communities shape and are shaped by chemical exposure.

Everyday cohabitation with toxicants constitutes another less dramatic, although more pervasive, form of encounter in a toxic world. Rob Nixon offered the term "slow violence" to appropriately describe "a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all" (Nixon 2011). Nixon used the concept of slow violence to describe and draw attention to otherwise invisible threats from climate change, toxic drift, deforestation, oil spills, and war that have disproportionate and compounding impacts for poor communities and communities of color. This nomenclature articulates the otherwise imperceptible and incremental experiences of chemical pollution. Absent terminology like slow violence these experiences beget incoherence because suffering cannot be easily tied to a specific event or disaster (Ahmann 2018). Therefore, the concept of slow violence helps both scholars and activists engage with incremental violence by retraining sensorial and temporal acuity.

Cancer Alley, Chemical Valley, South Baltimore, the Ecuadorian Amazon, and rural communities in Columbia subject to aerial fumigation are all sites of slow violence (Allen 2003; D. D. Jackson 2011; Ahmann 2018; Lyons 2018; Fiske 2018). Across these sites, toxicant encounters at home, places of work, centers of care, and underregulated expanses of industry are neither spectacular nor instantaneous (P. Brown 2007; D. D. Jackson 2011; Ahmann 2018; Tironi 2018; Nading 2020). Gradual attrition in unchanging conditions seemingly never "[add] up to happenings" (Ahmann 2018; Onaga and Wu 2018). As a result, the anesthetizing routine of exposure over time can make damage difficult to represent and cultivate action around. Thom

Davies offers a nuanced argument to this end, suggesting that slow violence persists not because of a lack of dramatic stories or images but because this evidence "[does] not count" among dominant politics (Davies 2022).

Of late, several ethnographers have explored emergent forms of kinship that make possible sustained collective action around experiences of slow violence and shared chemical exposure. Much of this work focuses on post-industrial landscapes in Midwest and Northeast white working-class communities. Richard Bargielski applies Shapiro and Kirskey's concept of chemosociality, how we become through chemical interactions, when studying the lived experiences of residents in his hometown of Ashtabula, Ohio. In this Rust Belt town, white working-class residents expressed anger and uncertainty over contamination from the nearby Fields Brook Superfund Site. Their shared feeling of precarity and frustration catalyzed a critical mass of outspoken residents and uniquely unified a community across the political divide toward collective action (Bargielski 2020a). When considered within the confines of this study, the concept of chemosociality offers a unique framework to explore the political potential for "reform or counterhegemonic social movements" in a predominantly white and post-industrial setting (Shapiro and Kirksey 2017).

When fused together, urban political ecology and toxic worlding bring into focus the legacies and present formations of power relations, political, and socio-economic processes that shape complex assemblages of beings, systems, and things in a chemically contaminated landscape. Moreover, with this theoretical framework we can ask localized questions of relation, identity, and community action without disconnecting from the global and historical processes that contribute to experiences in place. Urban political ecology and toxic worlding move me to

explore connections between South Portland's industry and the broader world as well as to dive deeply into personal and interpersonal experiences of toxicant exposure.

Social Movement Theory

Social movement theory further grounds an analysis of community action and mobilization. Social movement theory encourages researchers to consider the histories and contexts that shape the characteristics, tactics, framing, and goals of community organizing (Cole and Foster 2001; DeFilippis, Fisher, and Shragge 2010). In doing so, social movement theory provides a framework to investigate the emergence and anatomy of an individual movement. It closely follows how power is built, contested, and exercised through relationships to maintain the status quo or as a means for change (Smock 2004). The anti-toxics movement, as one of these enduring and evolving social movements, has a complicated anatomy. Nearly all scholars acknowledge the tactics of local resistance and a respectively galvanizing collective action frame of "Not in My Backyard" (NIMBY) as characteristic of the early anti-toxics movement (Szasz 1994; McGurty 2007). This process of struggle and rhetoric focused attention upon a specific site or undesirable land use, leading to demands that echoed across communities for local control and for hazardous waste facilities to "get the hell out of here" (Szasz 1994). The danger here, as acknowledged across the literature, lies in the question of 'if not here, then where?'

Critiques of the movement itself are more nuanced. On one hand, Andres Szasz holds the anti-toxics movement in high regard, as a success story of community organizing that led to fundamental regulatory changes in the form of pollution prevention. Szasz attributes this success to what he calls "radical environmental populism" in so far as the response to everyday encounters with toxic substances inspired a new wave of activism that animated formerly

apolitical community members and linked otherwise distinct movements fighting racism, sexism, and economic exploitation (Szasz 1994). For example, Love Canal motivated women who were not previously active in formal organizing to demand action out of shared concern for the health of their families, homes, and community. However, all scholars do not share Szasz's latter conclusion. Luke Cole and Sheila Foster step back to locate the anti-toxics movement as one of the metaphorical tributaries of the Environmental Justice Movement (others including the Civil Rights Movement, Native American struggles, the Campaign for a Just Transition, and modern environmentalism). By analyzing the origins, tactics, and demands of all the nourishing tributaries, Cole and Foster bring attention to the limitations of and potential for the anti-toxics movement. Specifically, the movement's understating of power focuses on "corporate power and the structure of the U.S. and the global economies" (Cole and Foster 2001). This focus separates the anti-toxics movement from other tributaries seeking systemic solutions, such as the Civil Rights Movement. They suggest further that this focus causes the anti-toxics movement to fall short of addressing environmental hazards as structural failings of the same economic and social systems that produce oppression and segregation. And yet, the shared nature of encounters with environmental hazards leaves open the opportunity to connect the anti-toxics movement to issues of social and racial justice. The question that remains then, is whether anti-toxics activists can unite in solidarity with others under a collective solution that expands well beyond conventionally narrow issue framing to instead dismantle and re-imagine oppressive social and economic structures.

Activism in a Toxic World

While social movement theory offers a broad framework for analysis, a narrower inquiry into activism in a toxic world illuminates the less celebrated ways in which communities organize and respond to toxicant exposure. In a toxic world, conventional tactics such as community science and emergent approaches in the form of slow, intimate activism contribute a "texture and expand concepts of agency" (B. Walker 2010; Liboiron, Tironi, and Calvillo 2018). Charismatic events and mundane yet life-enabling actions constitute the diverse tapestry of practices designed to evoke change and expand concepts of agency and activism.

The anti-toxics movement has commonly leveraged the practice of measurement as a means of building power and demanding human rights. Grassroots organizations design and participate in community science by collecting data that not only brings attention to exposure but also makes claims of injustice (Nading 2020). At Love Canal, Lois Gibbs set in motion a movement to conduct health surveys of local families and link the results to leaking hazardous materials buried under properties. In reflecting on these tactics of community science as a means of building power and influencing policy, Lois Gibbs explained 25 years later that "this is a movement that is as much about justice and human rights as it is about public health and the environment" (Gibbs 2002). Gibbs went on to suggest these efforts by ordinary citizens shed light on the unjust concentration of environmental harms in working-class, low-income, Indigenous communities, and communities of color. Today, communities with shared experiences of vulnerability continue to expansively employ similar tactics of participatory data collection around issues of water quality, air quality, and climate adaptation planning, to name a few (Verran 2010; Zeiderman 2016). The projects of local data collection provide an opportunity to document proof of harm, and at best, serve as a political act in a system of injustice.

Despite the prevalence and technological advances of community science, critiques of environmental monitoring illuminate the limitations of this conventional tactic. Wary of enumerative projects, Nicholas Shapiro, Nasser Zakariya, and Jody Roberts suggest that projects engaging in the use of science "cannot fully escape reproducing hierarchies of knowledge-power, type, and knower" (Shapiro, Zakariya, and Roberts 2017). For this reason, the Environmental Justice Movement has what Nading describes as a "love-hate relationship with toxicological science, in part because of this normalizing tendency" (Fortun and Fortun 2005; Nading 2020). While community science can effectively use the masters tools to illuminate environmental injustice, reliance upon science runs the risk of reinforcing data as a qualification for participation in political communities.

Beyond community science exist "local, low resolution, uneventful, uneven, frustrated, desireful, ethical, appropriated, and incommensurable" manifestations of doings that bring into relief alternative forms of activism (Liboiron, Tironi, and Calvillo 2018). Scholars describe these "unspectacular yet life-enabling practices" as slow activism, hypo-interventions, intimate activism, and feeling-acting (Ahmann 2018; Lyons 2018; Tironi 2018). In this less-celebrated register, subdued manipulations of time, practices of care, and gestures of repair counter dominant tropes of activism. Slow activism offers a commensurate response to attritional and often imperceptible slow violence. Max Liboiron, Manuel Tironi, and Nerea Calvillo suggest that slow activism does not literally translate to a lethargic pace of doing. Instead, "the effects of action are slow to appear or to trace…slow activism does not have to be immediately affective or effective, premised on an anticipated result. It can just be good" (Liboiron, Tironi, and Calvillo 2018). Slow activism is not spectacular and stars no one. Theoretically, these doings encourage us to "rethink the phenomenology of activism" (Tironi 2018). Practically, they draw our

attention to ordinary acts that allow people to persist in a toxic world while also holding onto the possibility of an ethical otherwise.

Hypo-interventions and intimate activism take the form of subdued, everyday actions. These minute and often domestic doings demonstrate an ethical endurance and perseverance that allow people to live in spite of toxicant exposure and still hold on to the potential of living otherwise (Povinelli 2011; Liboiron, Tironi, and Calvillo 2018; Tironi 2018). Puchunavi, Chile, for example, is home to 14 industrial complexes and excessive levels of arsenic, benzene, toluene, ethylbenzene, xylene, sulfur dioxide, and sulfur trioxide (Tironi 2018). Here, residents sweep their terrace every morning to do away with sediment that accrued overnight; take great care in cleaning, protecting, and coming to know native plants that grow in their gardens; and gently nurse ailing spouses within the intimate walls of their home (Tironi 2018). On one register, these unspectacular acts render harm visible in the living spaces and bodies of Puchuncavi. However, when focusing on these domestic and purposeful practices as an act of ethic rather than effect, residents become agents in perseverance and existence (Liboiron, Tironi, and Calvillo 2018). It is important to note that Liboiron, Tironi, and Calvillo follow in the footsteps of feminist science studies to define an act of ethic (and to that end, activism based in ethic) "as the proposition of social projects in which life flourishes through obligations and solidarities among diverse collectives, human and otherwise" (Liboiron, Tironi, and Calvillo 2018). To put a finer point on it, Manuel Tironi situates the potential of ethical activism in the capacity of residents to persevere rather than the capacity to affect discrete outcomes (Povinelli 2011; Tironi 2018). This space of perseverance offers the greatest promise and persistent possibility of a good life (Derrida et al. 2006; Tironi 2018).

Feeling-acting (*senti-actuando)* is the everyday practice of remaking human-ecological relations. This form of slow activism allows people to both live with *and* transform the landscape. Kristina Lyons first brought forward the social movement concept of feeling-acting through her ethnographic study of Putumayo, Colombia. Between 2000 and 2015, crop duster planes spread "concentrated formula of Monsanto's herbicide, glyphosate, over illicit crops, and also forests, soils, pastures, livestock, watersheds, subsistence food and human bodies" as a part of a coordinated anti-drug program led by the United States and Colombia (Lyons 2018). The formula, Lyons notes, was 110% more concentrated than commercially-available Roundup (Lyons 2018). In the years that followed fumigation, small landholding farmers sought claims for chemically degraded land, soils, and crops but struggled to produce legitimized evidence of damage. During these indeterminant periods when farmers awaited state-mediated justice, they participated in everyday acts of retaining and remaking the landscape. Pedro Pablo, for example, preserved seedlings stunted by the fumigation campaign while also beginning a regrowth forest, whose good health was evidenced by a blossoming butterfly population (Lyons 2018). This labor of living with and transforming the land does not constitute the oppositional, remarkable, and dominant trope of social movements. Instead, it remakes Pedro Pablo's relationship with ecological beings (feeling) and effectively alters the material conditions of the toxic world (acting). Therefore, feeling-acting as an alternative form of activism toward justice "[inhabits] the time of now with actualizations of sustainable presents and futures" (Lyons 2018).

Conclusion

With this theoretical framework, I feel equipped to get a little lost—to explore the fluidity, complexity, and asymmetry of South Portland's landscape. Toxicants, assemblages,

patches, slow violence, and intimate activism, among others, serve as guideposts while I lean into Nading's anthropological instinct to "slow down and go through the mess" (Nading 2020). Thus, in the research and findings that follow, I set out to better understand the local landscape of South Portland with one ear oriented toward theoretical underpinnings and networks of power and the other attuned to experiences of community members who feel, endure, and contest toxicant encounters.

Chapter 2: Toxicant Encounters

Volatile Organic Compounds, Polycyclic Aromatic Hydrocarbons, Hazardous Air Pollutants, sampling locations, and continuous particulate matter monitoring system have recently become part of the lexicon in South Portland. These words fill the air in standing-room-only public hearings and cascade down the webpages of state and local agencies tasked with mitigating point source and fugitive emissions from bulk petroleum storage facilities. They place scientific methods and chemical compounds at the center of the pursuit to assess and improve air quality in South Portland. And in doing so, this terminology both reproduces and reinscribes a technocratic approach to understanding and addressing residents' concerns about the safety of the air they breathe.

Put simply, language matters; it functions to define a problem, establish a mode of analysis, and create a narrative of action. In South Portland, a focus on scientific methods and the molecular scale reduces the line of inquiry to "wayward particles behaving badly" (Liboiron, Tironi, and Calvillo 2018). It employs technologies to assess conditions, set thresholds, and make objective determinations about how people experience a place. This framing is problematic for several reasons. A technocratic approach narrows the aperture through which we can understand an embodied concern by focusing narrowly on the molecular scale. Consequently, people and their experiences of toxicant encounters are de-coupled from the problem. A technocratic approach also focuses primarily on damage and risk reduction. While undeniable components of a toxic world, this orientation ignores the multiplicity of experiences and the agency of different actors (Tuck 2009). Residents in South Portland are complicated, with paradoxical desires for their futures. And finally, a technocratic approach reduces toxicant encounters to toxins, measuring chemical levels without considering the systems or ideologies

which create and sustain exposure to intended toxic byproducts (Ebeling 1940; Boudia and Jas 2014b; Shapiro 2015; Liboiron, Tironi, and Calvillo 2018). This narrow lens constrains the ways we think to respond to localized concerns and the range of alternative future we can imagine for residents.

In this chapter, I start to re-populate our understanding of air quality so that concerns about the chemical composition of a place do not eclipse the stories, experiences, and desires of South Portland residents. To do so, I trace two residents' toxicant encounters through the routines and rhythms of their daily lives. The following stories of Asther and Evelyn individualize toxicant encounters among residents in South Portland but are not meant to individualize their behavior (Roberts 2017). Each story is illustrative of more than one person's experience; they pick up on refrains shared by residents in the neighborhood. This approach achieves two critical aims. First, their discourses situate concerns about tank fumes within descriptions of activities, social relations, and the sense of belonging. Second, the stories of Asther and Evelyn effectively complicate our understanding of toxicant encounters in South Portland. Honest, unfettered conversations with residents and emplaced multisensory observations reveal a multiplicity of concerns and aspirations among the bulk petroleum storage facilities in South Portland, and more fully capture the wholeness of lived lives (Gordon 1997; Tuck 2009). Desires for belonging, housing security, and local identity are paradoxically related to collective pleas for improved air quality. As a result, this chapter shows policymakers how concerns about air quality are entangled in experiences of place and broader narratives of society.

Asther – Paradoxical Aspirations

Asther moved to South Portland in 2017. She and her former husband wanted to own their own place, have more space for a family, and enjoy time outside in a backyard. They found a house they could afford in Pleasantdale, a quiet neighborhood in South Portland with mixed-density housing and easy access to a cross-town, multi-use path. Asther, an artist, loved the "different kinds of visual things and different environments" that living in Pleasantdale had to offer. In this setting, Asther felt like she could be herself and fit in without standing out. Unmanicured lawns, "pretty dilapidated homes and peoples' cars at all different levels of good and shitty" lined the road. She was drawn to its quirks and texture; the fact that it was "kind of neat, mixed-use, a little bit grungy, maybe a little dangerous." The heterogeneous appearance of homes and the socioeconomic diversity of the neighborhood provided Asther a sense of comfort. Pleasantdale felt lived in, quirky, and vibrant; Asther felt authentically herself and at ease here.

Asther established routines with her son in their new home and neighborhood. Most mornings, they make breakfast and "bum around the house together." On warmer, spring days they enjoy gardening in the yard. They ride her bike along the multiuse path and walk around the neighborhood, visiting waterfront perches and watching boats pass into the harbor. When her son is in daycare, Asther spends weekdays working as a printmaker, illustrator, and picture book author out of a studio in her basement. At the end of the day, she routinely picks her son up from daycare and makes dinner before heading to bed. On temperate summer evenings, they sleep with the windows open and appreciate the breeze rolling in from the bay. Through these rhythms, Asther has come to love her home in Pleasantdale. The "briny and wonderful" sensory experiences she shares with her son are joyful and simultaneously make toxicant encounters evident and jarring.

Asther vividly remembers her first encounter with a smell she described as “weird and funky” soon after moving in. Asther described “it was a beautiful morning; I was feeling good. And then I stepped outside and was like ‘uh oh.’ It took me down a couple of notches.” In place of the briny sea, Asther smelled what she described as “petroleum fumes.” As she attuned to sensory disturbances, Asther noticed that this smell regularly came and went. On “tank fume days when the goopy air rolls in” Asther and her young son stay inside and close all the windows around her house. Nonetheless, she experiences headaches as well as irritation in her throat and lungs. Asther worries about raising her son “in an atmosphere that is essentially poison.” Over time, repeated encounters with petroleum odors started to “feel like an attack. Like I was being attacked in my home by my own neighborhood and it was very strange.” The accrual of unsettling sensory and physiological experiences brought Asther’s awareness to the permeability of hallowed spaces and precipitated an abnormal place experience, wherein it is more difficult for her to “readily accept home as home.” The perceived arrival of toxicants temporarily disrupted and displaced Asther’s feelings of belonging and solace, instead instilling a sense of discomfort and intrusion (Albrecht 2005; Albrecht et al. 2007; Brant 2008; Feld 1996b).

Asther speaks candidly about where her mind goes after experiencing toxicant encounters. She plays out the possibility that the tanks no longer exist and operate along the waterfront. The air would smell “briny and wonderful all of the time.” While Asther loves that sensory potential along with the improved air quality it would afford her family, she also worries how her relationship to the neighborhood would change. Asther doubts she could afford her house “if someone waved a magic wand and [the oil tanks] were gone.” The tanks seem to function as a buffer to redevelopment; in Asther’s own words “you can’t gentrify that!” In this way, the presence of the tanks operates as a “saving grace” because the neighborhood is “always

going to be a little shitty because of that." And while the presence of the oil tanks is "objectively a negative thing," Asther is uncertain that she would even want to live in Pleasantdale anymore without them at the end of her road. The "texture" they contribute to the landscape is what Asther really loves about the area.

For Asther, there is no singular feeling of being in or relating to the neighborhood. She is critically conscious of toxicant encounters and desires the sustained presence of the oil tanks in Pleasantdale. These conflicting and paradoxical feelings demonstrate the complexity of residence in Pleasantdale; whereby there must be more than one dimension of understanding Asther's and other's experiences with petroleum fumes (Gordon 1997; Tuck 2009). To regard Asther's living situation as unfortunate disregards her sense of place attachment enabled through the presence of industry. Moreover, to view the presence of oil tanks as merely damaging ignores the opportunity for homeownership and wealth building provided to Asther which may not otherwise be available in South Portland. Receptivity to this nuance illuminates new levels of what residents experience, sensory disruptions, *and* complicated relationships to home, as well as what residents desire, to breathe clean air *and* to avoid displacement *and* to enjoy a sense of belonging.

Evelyn – Nostalgia

Evelyn described her upbringing in the Pleasantdale neighborhood during the 1940s, 1950s, and 1960s as innocent and idyllic. "There was always someone to play with and always something going on." During her childhood, Evelyn roamed free with friends through the nearby woods and played hopscotch in the street until late at night. They walked everywhere in the neighborhood, spending ample time outside. Nobody's yard was off limits to games and no home

was unwelcoming to a young visitor in search of lunch. Children enjoyed exploring along the railroad tracks or dangling their feet in the water off the end of the neighborhood peninsula. At school, Evelyn and her peers cheered for Portland Pipe Line Corporation employees as they retrieved errant balls that sailed over the playground fence and onto the facility's private property. These watchmen who patrolled the facilities often lived in the neighborhood and maintained friendships with the families living adjacent to the bulk petroleum storage tanks. Residents co-existing with industry in the neighborhood never once assumed "any bad stuff" could happen. Through her recollections, Evelyn paints a romanticized image of childhood in Pleasantdale.

Figure 4 Photo of Elm Street on Turner Island in 2020, with Citgo bulk petroleum storage facility to the east. Image courtesy of Inside Climate News.

As Evelyn moved into adulthood, her fond memories in Pleasantdale endured. She spoke of the neighborhood as a "friendly place to live with the original families of South Portland. There was a sense of knowing everybody. It was a wholesome, blue-collar community." The longevity of families and sustained friendships across generations in Pleasantdale contributed to

Evelyn's own sense of security at home. She felt comfortable and at ease among people who were all "of the same ilk." Neighbors maintained similar routines; they "went to work, came home, made dinner, and went to bed early." During their free time, adults gathered at local meeting spots. Elm Street Church, for example, hosted Methodist services as well as the local cub scout and girl scout troops. The drug store on the corner of Elm Street and Broadway, brought neighbors together as they huddled around the soda fountain. Together, these experiences contributed to the idea of Pleasantdale as a "homey, warm, and welcoming neighborhood" for Evelyn.

However, this all changed after a jarring encounter with petroleum fumes that disrupted previous understandings of and connections to her home and neighborhood. During an early morning drive home from the hospital after dropping her mother off at the emergency room around 3:00AM, Evelyn noticed a "putrid smell." She recalled "I thought that it was just disgusting, frightening. I wondered what it was doing to people." After that encounter in the "wee hours of the morning," Evelyn started to routinely notice the same odor most evenings while watching television at home. A "rank smell of oil" would get "stronger and stronger to the point of where it is inside of your house and overwhelming you." With the accrual of these sensory experiences, Evelyn had a realization. She described "then it hit me. It was like I was asleep for decades and decades and decades in relation to the petroleum industry's presence." Sudden and recurring encounters with tank fumes, "undermine any sense of security at home. Home no longer feels safe. It is not the community [she] once knew." Evelyn often tries to busy her mind with daily activities but finds concern and distress lurking in the background of her thoughts; like others, she remains deeply concerned about her safety and wellbeing.

As Evelyn recounted her experiences with tank fumes, it quickly became evident that her concerns about local air quality are not unfolding in isolation. Evelyn's anxiety about staying in place is not only rooted in changing sensory experiences of unexplained toxicant encounters but also maps onto changes in the neighborhood. Evelyn blames the presence of industry for a perceived decline in the condition of houses in her neighborhood. She explained that "as the industry grew, it gave people less of a reason to be down here and to keep their homes up." When I asked her to describe the neighborhood today, she chronicled residential buildings that formerly held multi-generational families "going out of vogue" in favor of apartment buildings that people "aren't as willing to invest in." She laments the departure of "normal, middle-class" families that lived in the neighborhood over decades and the subsequent influx of "transient" and "undesirable people" such as "migrant workers and different kinds of people" who moved into the neighborhood and made the area "less neighborly." Through this language we see that Evelyn connects subjectively undesirable and deteriorating qualities of the community to the growing presence and byproducts of the bulk petroleum storage facilities.

Further, Evelyn's use of this subtly coded, racialized language challenged my ability to listen to residents with empathy and neutrality. Nonetheless, the rearticulation of this language among several interlocutors compelled me to wrestle with its meaning because this emplaced environmental issue exists in their worlds too. Residents, who like Evelyn grew up in Pleasantdale during the mid-century, similarly narrated neighborhood change. They connected the whiteness of the neighborhood during their childhood to feelings of safety, congeniality, and community. They then went on to link recent racial and ethnic diversity in the area to the perceived loss of community in the same neighborhood. This coded language marks working class people of color now living in the neighborhood as 'other' and 'separate.' The act of

othering is particularly notable in the context of toxicant encounters because it effectively counteracts the potential for bridging, solidarity, and chemosociality. Research on similarly affected communities in a permanently polluted world posits unified communities across difference as a powerful antidote to slow violence and shared chemical exposure (powell 2017; Bargielski 2020). In these communities, shared feelings of precarity, frustration and vulnerability bridge and bind people outside of familiar groups towards more livable conditions and conditions that solve problems (powell 2017). Therefore, the tendency among Evelyn and similar interlocutors in the neighborhood to turn inward and toward othering politics at best stymies otherwise fertile ground for solidarity and at worst fails to recognize their neighbors' shared humanity.

Evelyn's language is also paradoxical in that an aspirational return to the idyllic, "wholesome" past ignores the collective harm of human industrialism. For years, the kerosene, shipbuilding, and petroleum industries provided employment to residents and contributed to a diversified tax base in South Portland. The presence of industry and local benefits offered a sense of economic stability to residents and a culturally assumed right to comfort (Okun 2023; Young 2023). Evelyn romanticizes this industrial past and the prosperous, safe, and secure life it enabled in Pleasantdale. However, her imagination disregards the fact that suffering under human industrialism, structural inequality, and white supremacy is in fact ordinary and enduring (Rosa and Bonilla, 2017). Toxicant encounters are prescient evidence of embodied and pervasive harm. The unbounded quality of tank fumes enables these byproducts of industrial processes to cross borders and thresholds regardless of race or class identity.

This deep analysis into Esther's perspective and experience calls for historicized and politicized orientation to toxicant encounters. The subtly coded and paradoxical language used to

describe her feelings and anxieties illuminates the systems at work. Evelyn's aspiration for the preservation of local identity and the struggle for who belongs is rooted in white dominance (Young 2023). Meanwhile her persistent nostalgia for years past is anchored in systems of extraction, advantage, and oppression. Therefore, by putting people like Evelyn back into inquiries about tank fumes, we can identify, wrestle with, and begin to address the origins of shared harm which reach beyond activity at bulk petroleum storage facilities along the edges of Pleasantdale.

Conclusion

This chapter gives more life and texture to an otherwise one-dimensional, technocratic discourse about air quality in South Portland. The voices, common refrains, and unique perspectives of residents allow us to fixate on the problem and the landscape in the ways it is experienced. The stories of Asther and Evelyn put the human back into community. While their stories are distinct and unfolding on unique trajectories, they illustrate the intricate dimensions of life amidst tank fumes. Asther experiences toxicant encounters as harmful to her and her family's health. She also experiences the local presence of industry as a key contribution to her sense of belonging and habitability in South Portland. The paradox inherent in Asther's story suggests that scientific interventions to mitigate toxicity won't mitigate dangers of displacement and feelings of marginality. Begging the question, then what is the point of focusing only on the science of the space? Evelyn experiences tank fumes as dangerous to her and her aging mother's wellbeing. She also longs for a wholesome community and the maintenance of a racialized local identity, both predicated on a romanticized history of industrial activity. The historicized and politicized analysis of Evelyn's story presented here suggests that interventions to mitigate

toxicity won't undo the past legacy, present expansion, and future longevity of environmental degradation. Begging the question, to what end do scientific interventions consider the complexity and totality of experiences in a place? Asther, Evelyn, and other residents of Pleasantdale are not simple beings. They are an assemblage of experiences, ideas, and ideologies which complicate our understanding of personhood. You or I may not agree with their perspectives, anxieties, or aspirations. Nonetheless, this chapter suggests we must consider them to define, assess, and fully address air quality concerns—by disrupting multiple systems that come into relation with lived experiences in Pleasantdale.

Chapter 3: Situated Knowledges

The Clean Air Advisory Committee (CAAC) gathered on the second Thursday in April to receive an update from the Maine DEP on a two-year VOC air quality monitoring program in South Portland. Would this be the moment that residents and local leadership would get an answer to their question 'is the air safe to breathe?' Volunteer committee members joined the meeting from their living rooms and home offices in South Portland. Their faces slowly and silently appeared alongside the City Manager and a paid facilitator in the virtual grid of meeting participants. The facilitator called the meeting to order and opened the conversation with a debt of gratitude to the State Toxicologist, Air Quality Meteorologist, and Director of Air Quality Assessments for their presence. His words reflected an anticipation shared by community members for the forthcoming number crunching, whisker plots, and wind roses prepared by the meeting's highly awaited guests.

Seven months after the EPA filed a complaint against Global Partners LLC and notified elected officials of air emissions permit violations, the City of South Portland established the CAAC. City Council Order #52-19/20, set forth a method and process by which committee members would develop a timely yet comprehensive determination of air quality issues and standards based in "reliable principles and methods… generally considered accepted in the governmental, regulatory, scientific, or medical community, as may be relevant" (South Portland City Council 2019). This charge set out a conventional and institutionalized pathway for rendering the toxic world visible.

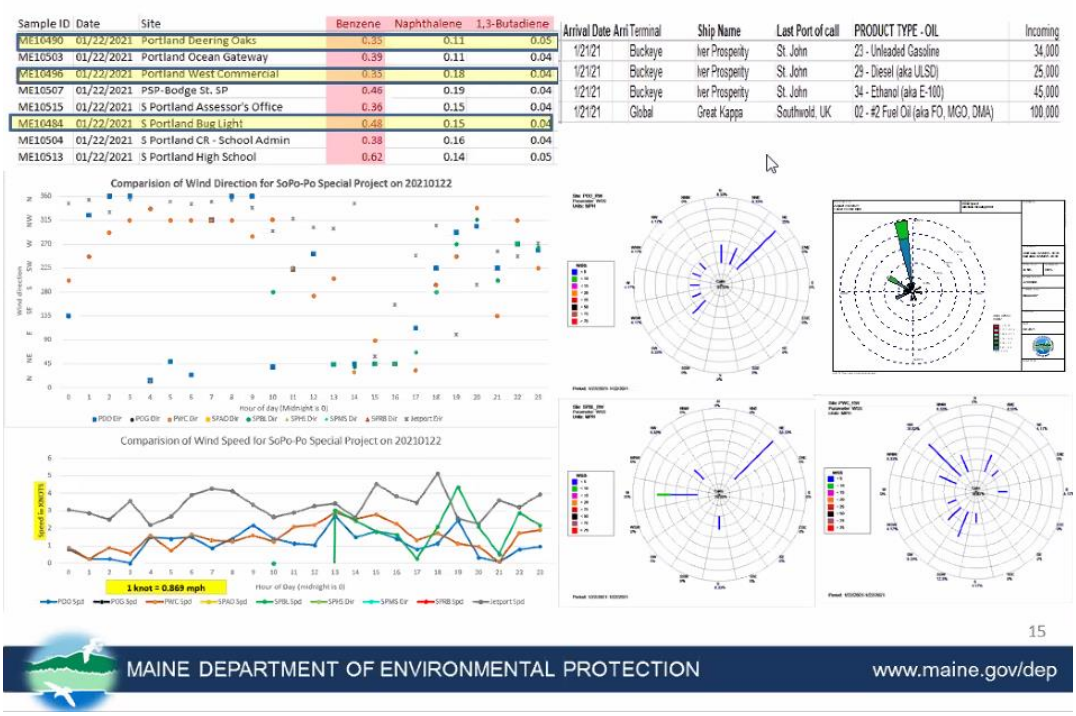

Figure 5 Screenshot of DEP Presentation for Clean Air Advisory Committee Meeting, April 14, 2022. Air quality monitoring samples are displayed at the top of the slide, accompanied by meteorological data.

The State Toxicologist provided the first update of the April meeting. During this meeting, his analysis of the data focused on a suite of sixteen volatile organic compounds assessed through the state's air quality monitoring program. As he began his presentation, the tenor of the virtual room took a technical and statistical turn. The State Toxicologist methodically moved through an acute and chronic health risk assessment for the area. Scatter plot after scatter plot contained hundreds of dots, graphically placed above or below the minimum risk level and relative to lifetime exposure guidelines. Wind roses provided a strikingly beautiful depiction of meteorological conditions affecting the dispersion patterns of toxins (see Figure 2.) The State Toxicologist and the Air Quality Meteorologist narrated the figures appearing on the screen, assessing acute and chronic health risks. As this scientific story built through the presentation, I reflexively noticed a growing sense of awe within me. Here we were, community members and viewers listening to a crescendo of information, hanging on to every

word and figure. According to these data, none of the sixteen chemicals exceeded acute toxicity values during 24-hour sampling periods and only two chemicals appeared consistently above Maine Bureau of Health's Ambient Air Guidelines (AAGs).

The meeting closed an hour later with a public comment period and notably, the flustered voice of Claire calling in from her home less than 4 km from the facility cited in the consent decree. She apologized for her tardiness and explained she had been preoccupied with putting her two young children to bed in the same home where she first smelled the "tank fumes." The data and analysis shared during the April CAAC meeting frustrated her. She fervently shared her perspective with the CAAC, explaining that while the quantitative data suggested there might be little cause for concern, she knew the odors she encountered in her home or while dropping her children off at daycare were not good. Claire explained that benzene and other known carcinogenic compounds posed serious health risks to developing fetuses, pregnant people, and people with compromised health. She stated clearly, "South Portland has an air pollution problem." To that end, Claire expressed that the presented calculations did little to capture the intense spikes in toxicity she noted through her sensory and embodied experiences.

As evidenced through the presentations and exchanges during this CAAC meeting, two simultaneously occurring understandings of toxicity coexisted in the same conversation. One understanding was rooted in the measurements espoused by the governmental, regulatory, and scientific communities. Another understanding was rooted in lived experience, which in turn, operated outside of conventional terrain of knowledge production. The imbalance in time and power of these two knowledges during the meeting was evident. Legitimized and institutionalized forms of knowledge presented by accredited scientists took up much of the conversation. Committee members and concerned residents with lay forms of knowledge rooted

in lived experience and alternative calculations were welcomed into the conversation either as questions to the scientists or in contained public comment periods. This stark power imbalance had me wondering, how do *community members* attempt to understand their experiences of toxicant encounters? And to that end, how do these lay projects shape collective understandings of local conditions in South Portland?

The chapter that follows seeks to answer these questions, diving into three residents' projects to make sense of toxicant encounters. Through the voices and activities of Fred, Cora, and Jean, I unveil a series of expansive sense-making projects unfolding in South Portland. Fred created a multi-source Human Exposure Model (HEM3) for the city. This model includes both Hazardous Air Pollutants and Volatile Organic Compounds, and uniquely calculates the cumulative effect of multiple permitted emissions sources in the area. Cora shared a crowdsourcing application, Smell MyCity. Smell MyCity allows residents to report pollution odors and makes that information publicly available, building a community-sourced map of toxicant encounters. And Jean uses her senses and reflexive observation of physiological changes to attune to the presence of toxicants in the atmosphere. Based on these embodied experiences and observations, Jean navigates her daily routines and alters her behaviors to avoid encounters and minimize risk.

Collectively, these projects demonstrate diverse forms of reasoning used by residents to make sense of invisible chemical constituents in the landscape. They utilize unconventional methodologies, produce new data points, and identify patterns of disturbance. These expansive forms of knowledge production are also important expressions of agency in a toxic world, whereby community members provoke new ways of doing science, and affirm shared experiences with toxicant encounters (P. Brown 1992).

Nonetheless, through these stories, I suggest that persistent power imbalances result in "compromised agency" (Liboiron 2017). Sense-making projects designed and employed by community members exist in relation to institutionalized systems of knowledge. Community-generated data, tools, and findings must be validated by regulators and state agents, a practice which ultimately reinforces existing norms of legitimacy (Wylie, Shapiro, and Liboiron 2017). The stories of Fred, Cora, and Jean call us to interrogate this enduring knowledge hierarchy, not only for its potential to limit a shared understanding of place but also for its potential to affect community members' self-conceptions.

Fred – Multi HEMS-3 Model

Fred and his wife moved to South Portland twenty years ago. They found a house with high ceilings that accommodated his height, a stained-glass window, and a fireplace; all things they wanted when relocating from Maryland. The home was situated less than a quarter mile from two bulk petroleum storage facilities. They thought little of this proximity to industry at the time or the occasional odor in the air. There was always a good breeze and certainly, "the state wouldn't permit something harmful." Once settled in the neighborhood, Fred started to explore the myriad biking trails near their new home. Come winter, he took to cross-country skiing and enjoyed the open spaces that were less abundant and often more crowded in Maryland. After a few years in the neighborhood and with young children of his own, Fred joined the local elementary school committee charged with closing the achievement gap after reauthorization of the No Child Left Behind Act of 2001. The work of the committee tested his patience for navigating an entrenched bureaucracy that reached far beyond the school system and into local

zoning policy. Fred's frustration with an impenetrable apparatus grew as he tried to balance civic engagement with much-needed home improvements, childcare, and a demanding job.

For his day job, Fred works as an environmental engineer. He specializes in the construction, implementation, operation, and evaluation of remedial treatment systems for soil and groundwater contamination. In brief, he "helps companies that polluted to go back and correct past mistakes with a variety of technologies," many of which Fred designs himself. Fred's focus on soil and groundwater contamination often brings him into contact with "air work" and "air treatments" as contaminant emissions in the atmosphere dissolve into water bodies. Therefore, while his focus lies tangential to issues of air emissions, Fred knows how to technically approach the design and assessment of air remediation systems.

When the EPA released the consent decree, notifying the City of emissions violations, Fred decided to dive deeply into better understanding what was going on. Unlike previous professional endeavors to remediate contamination, this one was unique in that "he had skin in the game." He lives two streets away from the cited bulk petroleum storage facility. As we talked over the phone, Fred recounted a particular toxicant encounter, describing that "the fumes were astounding. I kind of lost it and wondered if my family could live here any longer." Fred also added humbly that he has a background in engineering that can help him understand the issue more readily than others.

In the days and nights that followed the consent decree, Fred began to spend all his spare time on "the air stuff." He started by studying emissions permits issued to the violating facilities. He subsequently found their emissions statements to the DEP and looked at what the companies declared, how they calculated their emissions, and the results of any relevant emissions tests. This initial research confirmed the facilities had been in violation of their permits. After

approaching the issue facility-by-facility, Fred turned his attention to the totality of emissions from all industrial activity in South Portland. He wanted to assess the potential health impacts and combined effects of Volatile Organic Compounds emitted in South Portland. He evaluated air models employed by the petroleum industry, DEP, and EPA to estimate the emissions from industrial facilities and decided to build a multi-source Human Exposure Model (multi HEM-3) for South Portland.

Over the course of many nights of laborious work after his children had gone to bed, this project helped Fred make sense of and communicate to the public his own sensory and embodied experiences with byproducts of nearby industrial activity. Importantly, Fred's sense-making project effectively redesigned the regulatory methodology used for diagnosing environmental hazards and mapping patterns of exposure (Wylie, Shapiro, and Liboiron 2017). Fred made an intentional departure from the DEP model which does not consider the cumulative effect of multiple permitted emissions facilities in a limited area. Fred explained "South Portland has three 'major' emissions sources and six 'minor' emissions sources permitted to discharge a cumulative total of 696 tons/year of VOCs. Their combined discharge would constitute a 'major' source." The multi HEM-3 assesses the total impact of discharges on adjacent population health, considering both VOCs and Hazardous Air Pollutants. (The DEP does not include HAPs in their air model.) Once shared, Fred's model would contribute to an ecosystem of accountability tools. But first, Fred had to appeal to authorities that had in fact permitted the conditions which he sought to contest.

Finally, with the multi HEM-3 model complete, Fred went before the Clean Air Advisory Committee to summarize his results. He had two minutes during the public comment period to "build [his] credibility, have people look at the data, and get [his] points across," many of which

challenged the rigor and thoroughness of preceding hour-long presentations by the DEP. He wanted to show that the State was not considering cumulative impacts or thoroughly testing all the compounds in petroleum. However, he walked away disoriented. “I felt a little bit like I was going crazy, like an anti-vaxxer. I was taking a very scientific approach. But the DEP was considered the expert and I was just sort of a crank from the community.” Audience members and elected officials doubted Fred’s objectivity. They assessed his work in comparison to the DEP and doubted his methodology. In turn, Fred questioned if anyone understood the profound findings that resulted from hours of his work. This experience left Fred disoriented, doubting his own rationality and sensibility. The feeling of being irrational was unsettling and continues to give Fred pause; today, he is careful and reluctant to engage in public forums around this issue.

Fred’s attempt to model multi-source ambient air quality impacts and make sense of his embodied experiences was incongruous with institutionalized forms of knowledge. Fred reflected “it’s really hard to overcome the bureaucracy and the entrenched mentality of all that… [E]xpertise has come up a lot.” The politics of knowledge creation constrain the potential of institutional outsiders like Fred to challenge norms of what counts as data and how science is done (Kimura and Kinchy 2016). Meanwhile, established authority systems like the DEP, which leverage similarly enumerative and scientific methodologies, are perceived as “essential in the identification and characterization of toxicants as well as in the public legitimization of different policies” (Boudia and Jas 2014b). Thus, through Fred’s story, it is evident that traditional, institutional science remains central not only to the creation of knowledge but also to one’s own understanding of both place and self. The rejection of his scientific methodology and findings by state and elected officials destabilizes the confidence he has in his own process, capacity, and expertise.

Figure 6 View of Global Partners LLC from the Forest City Cemetery beach at low tide.

Cora – Community Science

Most mornings, Cora likes to walk in the Forest City Cemetery located ten minutes from her house. Throughout the 97-acre cemetery, overgrown grass and trees are interspersed among the gravestones. Neighbors wave to each other as they loop the cemetery on windy fall afternoons. Cross-country ski trails weaving throughout the property mark the path of recreational visitors in the winter. Global Partners LLC's bulk petroleum storage facility flanks the cemetery on the eastern side, to the north a tucked away beach provides ample room for dogs to roam at low tide, and Sprague's facility lies just beyond the tree line to the west. Clark Road, with a steady stream of tanker trucks arriving and departing from the Global facility, bisects the cemetery. The sound of pumping brakes and sliding chain-link gates mix among bird songs and rustling leaves. Pipes running from Global's storage facility out to an active terminal contribute

to the grittiness and endearing quality of this “secret little industrial beach”. The cemetery provided a “beautiful, quiet place” for Cora to gather herself (and her dog) before the day started.

When things started to smell bad in 2012 and Cora later learned of Global’s emissions permit violations, suddenly “everything looked kind of different.” The Forest Hills Cemetery where she found respite and peace was “potentially causing harm.” As she tried to make sense of the odors and risks of living and moving among the bulk petroleum storage facilities, Cora learned of Smell MyCity. As we sat in her backyard on a brisk fall morning, Cora leaned over in her chair, unlocked her phone, and tapped through several screens to open the application. She explained that Smell MyCity is a crowdsourcing program designed by Carnegie Melon for individuals to report experiences with perceived air pollution. Smell MyCity prompts users to rate odors on a scale of 1 (Just fine!) to 5 (About as bad as it gets!), describe the smell, and list any physical symptoms. The application then color codes each report from green (Just fine!) to dark red (About as bad as it gets!), geolocated on a map, and made publicly available for download as an Excel file.

The act of logging toxicant encounters and patterning experiences gives community members a chance to inform and participate in decisions made by and within traditional authority systems. Smell MyCity transforms subjective perceptions of odor into seemingly objective quantitative data points that become mobilizing measurements. Any user can calculate, analyze, and map the frequency, location, and severity of crowdsourced air quality reports. As reports increase in quantity, orange and red data points start to overlap on the map. The outline of one triangle is lost among a multitude of triangles and the base image of South Portland is patterned by the products of participatory data collection and the multiplicity of toxicant encounters. This

sense-making project is unique in its ability to report en masse the experiences of residents and demand recognition in regulatory determinations of risk (Zeiderman 2016).

As we hunched over her smartphone and shielded the screen from the sun, Cora narrated the map we were seeing on her phone; "as you would expect, the bulk of the complaints were in residential neighborhoods west and southwest of the facilities. That is where the wind blows from the direction of the tanks." With this data, Cora and other residents asked the DEP to relocate air quality monitors near people who live closest to the bulk petroleum storage facilities. However, reluctance by regulatory agencies and elected officials to heed such a request illuminates the persistent limitations of this crowdsourcing data project to reclaim power in decision-making spaces; they did not want to "target the tanks." Thus, the determination by institutional regulatory systems of what counts as data and how data is collected sustains traditional methods of understanding environmental hazards, which have historically excluded local knowledge and included the influence of industry (Wylie, Shapiro, and Liboiron 2017).

While those in positions of power may not regard the crowdsourced data project as legitimate, it does provide another critical function for users. Cora shared that she learned about the application for a local community organizer, Zadie. Cora was initially hesitant to use Smell MyCity because she did not want to "see how much [she] was logging how bad it smells." However, it did not take long for Cora to begin using the application often and noticing her neighbors' engagement with the tool as well. Cora shared "every time I log on, and I still log on, I always see other people logging too. That is like, phew, it is not just me." In this way, Smell MyCity legitimizes otherwise invisible toxicant encounters through a shared process of quantifying and reporting odors in the Pleasantdale neighborhood. The opportunity for collective sense-making allows community members to experience encounters in relation to one another,

build shared knowledge, and cultivate a network fused around a collective living condition (Zeiderman 2016). In this way, Smell MyCity provides an opportunity to connect, share and leverage lay knowledge to "question the state of things" (Fortun and Fortun 2005; Liboiron 2016; Wylie, Shapiro, and Liboiron 2017).

Jean – Embodied Knowledge

As I embarked on this research, everyone said that I needed to talk to Jean. She had compelling stories to tell about this emplaced environmental problem. Jean grew up in a catholic household in South Portland and headed north to Orono for college at the University of Maine. Following graduation, Jean left Maine. She visited thirty-five countries, ran a flyfishing lodge, and established an algal bloom data sampling methodology for Lake Okeechobee in Florida. Later in life, Jean returned to South Portland with her husband to build a home in the Ferry Village neighborhood in the early 2000s. From and within this home, located about a third of a mile from one of the bulk petroleum storage facilities, Jean's understanding of South Portland transformed.

I met Jean for a walk at Bug Light Park on a cloudy and damp early spring day. I pulled into the parking lot alongside lunchtime regulars who sat in their parked cars observing the grey coastline. We found each other at the Liberty Ship Memorial in the park. Steel beams recreate the image of a dry-docked ship and loom 35-feet tall over passersby. The memorial serves as a nod to the City's history of industrial activity. The New England Shipbuilding Corp., which reached the peak of its activity during World War II, produced more than 200 Liberty Ships and employed over 30,000 people in South Portland. I asked Jean where she wanted to head on our walk, and she didn't hesitate to direct us away from the bulk petroleum storage tanks enclosed by

a six-foot-tall chain link fence on the opposite side of the park. Jean carried herself with conviction. She spoke with the imagination of a former science teacher and the candor of an affected body (Latour 2004). She suggested that even though we could not smell the "cancer fumes," she preferred to get some space from the tanks. Jean explicitly and adamantly used "cancer fumes" to describe the air emissions in South Portland and to reflect how chemical compounds made Jean and her loved ones ill for decades. Jean also intentionally incorporates this language into written communication with the DEP and in her activism with Protect South Portland. As I strive to ethnographically tell this story in the words of community members, I also elect to use their lexicon and terminology as appropriate. Therefore, I intentionally employ "cancer fumes" when retelling or discussing Jean's toxicant encounters.

Jean's sister, who schooled, lived, and worked in South Portland passed at the age of 46 after being diagnosed with cancer (Department of Environmental Protection 2020). Jean believes that living near the tanks may have contributed to her illness or impaired her ability to fight it, but she will never know for certain. Despite Jean's inability to draw lines of causality between the loss of her sister and years of life spent near the bulk petroleum storage tanks, Jean's anxious demeanor demonstrate her ongoing attentiveness to the potential toxicity of a dynamic landscape. On hot summer nights, sometimes three nights a week, Jean wakes up to the cancer fumes entering her home through open windows. The jarring smell alerts her to the intrusion of invisible toxicants. Over the course of repeated encounters with cancer fumes, Jean became sensible to difference such that specific odors now elicit different behaviors (Latour 2004). When Jean senses coexistence with cancer fumes, she rushes to seal the windows. When the smells are particularly strong and overwhelming, she puts on a gas mask indoors. For Jean, present cancer fumes register with personal memories of exposure and loss (Csordas 1993; Lock 1993; Shapiro

2015). The resulting cognitive connections contribute to a subjective and embodied knowledge that provides a roadmap with which Jean moves through and persists within the world.

As Jean and I finished our walk at Bug Light Park, we stopped at her car to conclude a conversation that might have continued for hours. The Gulf bulk petroleum storage facility to our backs reminded her of one more story she felt compelled to share. A few weeks prior she joined a site walk for a proposed development on a 30-acre vacant plot of land immediately adjacent to the Gulf facility. The developers plan to integrate several land uses throughout the property, including "housing for people of different ages, incomes and backgrounds" as well as "community facilities, institutional facilities, and public assemblies" (Forecaster 2022; Packard 2022). Through the colocation of people and services, they aspire to create a "climate resilient, diverse, walkable, environmentally responsible development" while simultaneously addressing a local shortage of affordable housing (Crane Associates 2022; Packard 2022).

The site walk, narrated by the team of developers, moved along the perimeter of the property, and stopped in front of a 3-million-gallon bulk petroleum storage tank filled with a blend of distillate and residual fuel oil. Aware of Jean's personal history and engagement with a local organization working to address the issue of cancer fumes, the developers asked her for any thoughts on the proposed project. As she responded, Jean started to feel sick because of her multiple chemical sensitivity. She paused, and in a matter-of-fact tone, explained the reaction taking place in her body and brought explicit attention to her body's proximity to the bulk petroleum storage facility. She then politely excused herself from the rest of the walk. Walking away from the group, Jean wondered how developers can continue to promote and be permitted to pursue residential and multi-use development near oil tanks after witnessing her physiological response to toxicants in the air? Jean reflected to me that "no one should have to live there"

(Reno 2011). With her body standing as evidence, Jean hoped to bring awareness to embodied effects of toxicant encounters and encourage others to re-consider the proposed development.

This deeply felt toxicant encounter offers an alternative to toxicological assessments of the area; bodily-based knowledge provides a new approach to conventionally technical and enumerative projects (Scheper-Hughes and Lock 1987). Presently, there exists no data in scientific, regulatory, or governmental realms to suggest that Gulf has violated their emissions license in the ways Global and Sprague did. The absence of such professionalized data led one prominent local official to suggest there is "no evidence that it is dangerous or harmful to put [housing] units there. There is no public health reason not to build them." As a counterbalance to this kind of assertion, Phil Brown suggests "many people who live at risk of toxic hazards have access to data otherwise inaccessible to science" (P. Brown 1992). Jean's reaction to ongoing, low-level cancer fumes is just one example of "data otherwise" which advocates for a more radical conception of data and acceptable knowledges to understand the totality of experiences in place.

Conclusion

This chapter traces multiple sense-making projects employed by residents of South Portland. Fred's multi HEM-3 model, patterns of toxicant encounters on Cora's crowdsourcing app, and Jean's reflexive observation of sensory and physiological changes all demonstrate through their respective methodologies the possibility that residents "know something is not right" (Gibbs 2002). These sense-making projects demonstrate the potential for residents to create, socialize, and engage their own data in determining exposure. Simultaneously, they cannot cease to exist in relation to traditional and legitimized forms of scientific data, a

relationship which makes it difficult for community-led projects to disrupt norms of knowledge production and "pushing back against the smoothing out of standard impact statements" (Onaga and Wu 2018).

Such realizations are a similar refrain to scholarly reflections on the predominance of traditional science and technology projects as well as the asymmetrical power distribution with lay forms of knowledge (Brown 1992; Boudia and Jas 2014; Kimura and Kinchy 2016; Liboiron 2017; Shapiro, Zakariya, and Roberts 2017; Wylie, Shapiro, and Liboiron 2017). A critical implication of these findings lies in how residents' sense-making process, and community acceptance or rejection of that process, affect an individual's sense of self. Fred internalized the interrogation and dismissal of his sense-making project despite his deployment of conventional scientific assessments. In a common refrain among interlocutors, Fred questioned whether he had gone "crazy." Meanwhile a noticeable patterning of exposure in her own sense-making project buoyed and affirmed Cora's experiences. Data gathered through Smell MyCity provided a sense of solidarity, shared experience, and validation. And finally, Jean's firm belief in the efficacy of her own sensory and physiological experiences reinforced their function as a sense-making project (Levi-Strauss, 1963). Her reflexive awareness attuned Jean over and over to the presence of toxicants and the necessity of embodied tactics to avoid exposure. These stories ask us to be open to and take seriously the multiplicity of sense-making projects and the possibility of reasoning differently because acceptance of these projects is intimately linked to one's own sense of self (Whatmore 2013).

Chapter 4: Complimentary Activisms

I embarked on the final facet of this research with the intention of better understanding the social, political, and historical conditions that contributed to an intense and impassioned community mobilization in South Portland following the consent decree. This immediate groundswell of activism built upon years of frustration channeled toward the local petroleum industry. I was particularly curious to dig into the dynamics and politics of a noteworthy and tireless campaign for industry regulation. How did the slow violence of toxicant encounters shape the form of activism in South Portland? In what ways did community members of South Portland become agents in a permanently polluted world?

To answer these questions, I had every intention of working with and learning from Protect South Portland, a powerful and visible collective of local leaders demanding immediate action to monitor and mitigate air emissions from bulk petroleum storage facilities in the city. "The ladies" of Protect South Portland, as they are affectionately called, are both a force and a family with the organizational capacity to coordinate a community-wide mobilization. Their activism is an easily recognizable form of activism based in effect. Protect South Portland coordinators define success as the achievement of regulatory change (Fortun 2001; Liboiron, Tironi, and Calvillo 2018). Protect South Portland is present in and at the forefront of community events, local conversations, and state legislation dedicated to the issue of air emissions at bulk petroleum storage facilities in South Portland. Their work is persistent, at times technical and at other times relational, but nonetheless charismatic. Therefore, my gaze initially narrowed upon this form of local activism, a celebrated, labor-intensive, and productive movement.

I later realized the diversity of responses that constitute activism in South Portland. Simple acts of checking in with neighbors, caring for air-purifying plants, sustaining a meditation practice, and attending to personal traumas add depth to visible forms of activism. Illustrators, science teachers, artists, printmakers, photographers, journalists, animators, business owners, psychologists, and parents have all established unique practices to create conditions within which they can thrive in a toxic landscape. These rather unspectacular doings allow residents to maintain and endure in a cherished way of life despite polluted conditions (Liboiron 2016; Liboiron, Tironi, and Calvillo 2018; Tironi 2018). Here, an activism based in ethics exists "below the sight of the public, too modest to appear in the 'public domain'" (Tironi 2018). This activism is less about the amendment of permitting requirements to include emissions monitoring and odor mitigation technologies. Rather, this activism is about making life in this place livable.

Recognizing the plurality of activities that constitute responses to slow violence in South Portland, in this final chapter I explore the diversity of provocations, strategies, and obligations that characterize activism among residents (Fortun 2001). First, I follow the aforementioned collective of local leaders, Protect South Portland. Protect South Portland activates on behalf of the city's most vulnerable residents, children, and elderly who are exposed to toxicants. Then, I illuminate the small acts among residents who are making a living among toxicant encounters. In these small acts, uncoordinated and unspectacular responses to toxicant encounters allow those living near the oil tanks to heal, persevere, and build solidarity. I hope that by making room for the less celebrated and known forms of activism, we can truly support the endurance of the residents at the center of this story.

Together, the manifestations of activism traced in this chapter assert that there is no one way to respond to toxicant encounters. The responses of Protect South Portland on behalf of an affected community and the responses of community members making a life through exposure are all part of the collective and enduring activism amidst an emplaced environmental problem. The stories that follow illuminate the diversity of situated responses to toxicant encounters, some seeking to fix the world as it is and others constructing worlds of care and connection which form the building blocks of a healthy, enduring community. They also demonstrate the co-existence of different imaginations for a livable present and future. I use a binary framing to draw out distinctions between the activism of Protect South Portland and the activism of residents most impacted by toxicant encounters. But I also show that these forms of activisms are not distinct from one another; they exist on a spectrum, and each reflects relational practices to human and non-human beings which sustain the movement itself. As such, these many iterations and expressions of activism open up many possibilities for what we can build upon and expand in supporting affected communities.

Protect South Portland - Activism Based in Effect

The Protect South Portland meetings started during 2013 in Madison's house at the top of Meetinghouse Hill. She reached out first to acquaintances at the local synagogue and through her community at Elders for Future Generations. Madison then followed a trail of connections she had with fellow volunteers at the food pantry, the soup kitchen, and the wild bird rehabilitation center. Each time she called someone, they kindly told Madison who else to contact. When all was said and done, fifteen or so women arrived for this first meeting at her house and huddled into the small living room. They discussed a proposal by Portland Pipe Line Corp. to export Tar

Sands at their waterfront terminal in South Portland. Madison had read quite a lot of books about Tar Sands in Alberta and picked up additional information through Facebook. She "learned the fish had cancer, Indigenous people had cancer, and the boreal forests were being cut down." That reality deeply affected Madison not only because she had already battled cancer four times in her life but also because the deciduous trees and conifers characteristic of the threatened forest "grabbed her heart."

Together, the women attending the first meeting all brought complimentary skills and the motivation to build a groundswell of opposition to the proposed project along the South Portland waterfront. Madison was shy and uncomfortable in the act of smiling, waving, and approaching strangers in public; but she could coordinate behind the scenes. Others in the room like Zadie took naturally to standing on a street corner and asking passersby for signatures. Zadie's father was a community organizer and Zadie grew up with great interest in other people, even those who she did not know; "it was in [her] blood." Beyond Madison and Zadie, Joan liked to plan events, Pam "was good with language," and Miranda could easily maneuver spreadsheets. With everyone in the room together and the combination of their skills, they started to think, 'okay, we can do something."

One meeting turned into two, three, and four as Protect South Portland quickly transformed into a grassroots movement that spread throughout the community. During that time, the group determined a governance style rooted in consensus. All decisions required agreement through dialogue. Meetings took longer as conversation over challenging topics ensued and meandered slowly towards agreement on specific actions. However, this style "worked well for [the ladies.]" No one functioned as the leader. Instead, meeting participants began rotating among roles, such as facilitator, notetaker, and timekeeper. Protect South Portland effectively

created a meeting space rooted in dignity. Members were welcomed as their full selves, with histories, identities, and responsibilities outside of the group. They acknowledged one another's accomplishments and challenges. In conversation, they moved as a collective toward mutual understanding, giving time and space for each member to express their opinions and experiences. And through their actions, the ladies of Protect South Portland practice accountability to one another. They make amends for wrongdoings and take responsibility for their behavior or language in meetings. This relational practice in meetings set a strong foundation for effective organizing with partners and on behalf of residents in the city.

Guided by a mission to protect the environment, health, and welfare of South Portland, Protect South Portland set out to ensure that permits would never be issued for a Tar Sands oil project in the South Portland and that a local land use ordinance would codify this aim. The ladies began "cultivating" City Councilors and recruiting residents to speak at City Council meetings in support of Protect South Portland's demands. They distributed a community newsletter, organized door-to-door canvassing, letter writing, phone banks, letters to the editor, and local demonstrations. With a full court press on those in power and a robust demonstration of community support, the City Council requested staff develop a legally defensible ordinance through an open and transparent process. This ordinance, which became known as the Clear Skies Ordinance, passed the City Council in 2014 by a vote of 6-1. This victory for Protect South Portland not only demonstrated their organizational capacity, but also established the group's role as a well-connected "force" in local politics, particularly on issues at the intersection of public health and the petroleum industry.

Therefore, when the EPA released the consent decree citing Global Partners LLC's emissions permit violations, Protect South Portland "had to do something." The ladies, most of

whom had no scientific background, quickly came up to speed on the chemical, legal, epidemiological, and regulatory terminology central to discussing and addressing the violations. This proved to be laborious "brain work." Madison, who liked doing research, started to learn about Volatile Organic Compounds, Hazardous Air Pollutants, vapor recovery units, benzene, naphthalene, acrolein, aromatic, aliphatic, fixed roofs, and floating roofs. Zadie set up at her dining room table and got busier than she ever was during her career as a social worker. She worked tirelessly between Protect South Portland meetings and called Madison for hours on end from the dining room table to work through challenging terms together. By sharing what they learned with the group, Madison and Zadie were able to bring the other Protect South Portland coordinators up to speed on the meanings and applications of this new, technical vernacular. This foundational knowledge helped the ladies translate technical details and communicate with and for a concerned community.

Two of the Protect South Portland coordinators brought their children to a daycare in Pleasantdale and others have experienced toxicant encounters living near bulk petroleum facilities dotting South Portland's more eastern coastline. However, none of the Protect South Portland coordinators live in the neighborhood directly adjacent to Global Partners LLC. Therefore, to activate on behalf of the Pleasantdale residents, Protect South Portland needed to "hear complaints and receive input" from those most directly affected. Madison and Mary went door-to-door to gather stories and raise awareness among residents living near the Global Partners LLC facility. Protect South Portland also organized large community gatherings "to hear what it is like to live there" and figure out "what [they were] going to do." They posted bright yellow fliers around the city and planned out the precise agenda, "who would introduce, what they would say, how long the public could talk" from the same living room where it all

began. When the meeting came around, the ladies walked into an unexpectedly full community center gymnasium. Madison described what ensued at the event as intense. She was "shaken up" to learn of the ways families described living among the emissions. The coordinators felt uncomfortable and wary of their position in this and similar meetings in directly affected areas of South Portland because they did not share the lived experience of these residents. As a result, they were astounded by what they learned from teachers, joggers, parents, and daycare workers. The stories motivated the ladies to "raise emissions permit violations as an issue for people who have been experiencing symptoms or impacts."

With this motivation, Protect South Portland decided to focus their advocacy on the tank fumes towards a politics of correction and mitigation. As a unified front, they admit the tanks probably will never be removed from South Portland because 50% of the petroleum consumed in Maine enters through terminals in Portland and South Portland (U.S. Department of Homeland Security 2018). The coordinators can, however, imagine and demand a future in which the installation and operation of continuous monitoring and mitigation technologies improves air quality in the city. In pursuit of this future, Protect South Portland designed and continues to this day to implement a disciplined, multi-pronged organizing strategy.

Figure 7 Protect South Portland and No Toxic Tanks Coalition rally at James Otis Kaler Elementary School on April 23, 2021. Image courtesy of Bangor Daily News.

As part of this strategy, Protect South Portland holds community events to mobilize support for their demands. On a breezy day in April, they organized a rally at Kaler Elementary School that Evelyn (Chapter 2) attended as a child. The event wove together art, music, and specific points of action. Residents stood around with signs that read “Stop Cancer Fumes” and “Safe? Let’s Test!” A wooden frame over a speaker’s podium displayed a painting of skeletons emanating from storage tanks in the background and floating towards three children playing on a swing set in the foreground (see Figure 5.) Over the blustery wind, the Ideal Maine Social Aid and Sanctuary Band “brought joy to the rally” in the form of brass music. Madison stepped up to the podium and reminded rally-goers of the exemplary potential for positive change, calling up the Clear Skies Ordinance as a demonstration of previous success. Another speaker encouraged attendees of the rally to use Smell MyCity. Jean, formerly mentioned in Chapter 3, spoke of her neighborhood as a sacrifice zone, invoking the environmental justice term used to describe

fenceline communities of low-income and people of color living adjacent to polluting industry and therefore, shouldering a disproportionate burden of harm (Scott et al. 2008).[2] Zadie closed the event standing alongside elected officials. She called for better regulation of bulk petroleum storage facility operators, noting that current federal and state regulations allow facility operators to "emit certain amounts of air pollution" and "self-report emission levels."

To put specific demands into action, the ladies and their network maintained a steady presence in regulatory and legislative arenas. They worked with state representatives to advance bills through the legislature, organized residents to attend state hearings, and participated in the Bureau of Air Quality rulemaking. Protect South Portland's activism required people power and capacity to endure bureaucratic processes and navigate local politics. This endurance, which was an asset to the movement, became harder to maintain as slow violence persisted years after the consent decree. For Zadie, it felt like "running a marathon and then realizing there [were] 12 more miles." Madison reflected that the issue of air emissions "kind of monopolized our time. We have done this so long and that has been hard." Nonetheless, Claire reminded coordinators working at this for years of the meaningful progress over time. She expressed that "*you* got the legislation done with [state representatives] who are paying attention. *You* brought them up to speed, sat down with them, provided the history, and had a conversation about it.'" And as a result, Protect South Portland successfully targeted and communicated with people in power to

[2] I inquired about this use of the term "sacrifice zone," particularly as it applied to a predominantly white working-class community in South Portland. Residents and members of Protect South Portland spoke to the issue of air emissions on both a local and state level. They questioned why the Department of Environmental Protection refrained from implementing proposed changes to the operation of local bulk petroleum storage facilities for the health and wellbeing of the neighborhoods out of concern for increased fuel costs and the "trickle down effects for taxpayers and the construction industry, ultimately." Nonetheless, others acknowledged the deeply situated frustrations in South Portland should be considered in relation to greater injustice near oil refineries, oil fields, and oil mines which are often placed in Black, Brown, and Indigenous communities.

create a window of opportunity for exemplary progress along a journey of incremental change (Beck, Lash, and Wynne 1992; D. Jackson 2020).

Today, Protect South Portland sustains a focused campaign with clean air, community welfare, and environmental health inscribing its orbit of operation. This orbit is an essential part of activism in a permanently polluted world. Their disciplined execution of a campaign for clean air makes measurable and necessary progress in the pursuit of "evidence-based decision-making" (Boudia and Jas 2014b; Liboiron, Tironi, and Calvillo 2018). Moreover, the care and affirmation extended between members helps to sustain their passion, purpose, and participation in the challenging work of fixing the world as it is. Nonetheless, this activism based in effect focuses on accomplishing regulatory change and does not fully capture "how environmental problems materialize on the ground" (Fortun 2001).

Bill & Others- Activism Based in Ethic

As conventionally recognized forms of activism based in effect grind on, residents of South Portland continue to live with and despite perceived toxicant encounters. Through ordinary acts of endurance and care, residents direct their energy toward life-enabling relations and practices (Murphy 2016; Tironi 2018). These acts secure residents' existence in a livable present and promise the existence of a sustainable future (Fritsch 2002; Tironi 2018). This activism, described as an activism based in ethic, is "not necessarily about changing the system (though [it] can be)" but rather is about an "obligation and desire to maintain a way of life" (Liboiron, Tironi, and Calvillo 2018). And as such, the non-heroic acts of residents represent a form of agency that is obscured by one-dimensional narratives of harm and victimhood (Tuck 2009; Liboiron, Tironi, and Calvillo 2018).

For some residents, this activism based in ethics takes the form of quotidian relations between neighbors. These relations as informal social projects allow community to flourish in backyards, on porches, and in the middle of the road on a Sunday afternoon. As a result, residents in Pleasantdale describe the neighborhood as a "wonderful place to live" and their deeply connected street as "amazing" despite cohabitation with toxicants from surrounding bulk petroleum storage facilities. Fred and his wife visit the newborn baby next door, marveling at precious new life. Meanwhile, Fred's elderly neighbor drops pies and cookies on the stoop of a new family, inviting them to dinner as they settle in. And Cora's neighbor Shaina, endearingly known as the "mayor of the street," exchanges pleasantries with visitors from her porch each morning. Shaina started spending a few hours each day on her porch after returning home from a month in the hospital. During that time, her neighbors cared for her two children and built a ramp to make the entrance to her apartment accessible with a wheelchair. Now on disability and unable to work, Shaina passes the time by sitting in her chair at the top of the porch through all seasons. She says hello to everyone that walks or runs past and marvels in her own persistence to "kill the local scrouge with kindness." Even as the pandemic pulled people indoors, Shaina sat on her porch. She met a veteran who walks his service dog, Waffles, each day. They now talk for 30 minutes. "It's these relationships that stand out" to Shaina. They occur spontaneously across lines of difference and contribute to the reasons why Shaina "loves it here." New and strengthened connections build a sense of solidarity and collective endurance among residents of the neighborhood (Fortun 2001; Liboiron, Tironi, and Calvillo 2018). These forms of life are not defined or essentialized by a notion that this place is contaminated but rather characterized by the obligation to maintain a habitable and hopeful way of life (Tuck 2009; Liboiron, Tironi, and Calvillo 2018).

For other residents, this activism based in ethic takes the form of self-care practices which offer routine and stability as they suffer through slow violence. Despite the risk of toxicant encounters, Cora continues to visit Forest City Cemetery each morning and find peace as she starts a new day. Even as Asther finally "lives the life [she] always wanted" in a welcoming neighborhood, she continues therapy to "work out [her] own shit and open [herself] up mentally and in [her] heart." And Jean's meditation practice helps her cope and be ready to challenge institutional power by offering a space for mindfulness, forgiveness, and regeneration. She uses meditation to "let it go and simply walk away," preserving her mental health and wellbeing, and moving beyond despair (Tuck 2009). Jean also turns to meditation in preparation for action, calming and grounding herself as she exists in and confronts a system that she believes harmed her and her family. In her sardonic yet authentic manner, Jean joked that she would need to "meditate to Yugoslavia and back" before participating in a meeting with terminal operators and the Maine DEP. Collectively, these intimate routines of self-care and community care, which fall to the peripheries of conventional activism in response to industrial damage, are a fundamentally different mode of being affected and agentic in the landscape (Liboiron, Tironi, and Calvillo 2018).

Among the diverse and low-resolution forms of self-care in South Portland, Bill's trauma-informed practice lies at the core of expanding conventional tropes and configurations of activism among the tank fumes. As a resident trying to make a life among the toxicant encounters, Bill could not and chose not to continue participating in charismatic and confrontational acts of resistance characteristic of environmental politics and community mobilization. He instead focused his attention on self-care, healing, and adaptation, enduring in a new way that supported his relationships and enabled life in the local landscape. His story is one

not of giving up or moving away but trying to remain within, endure, and live well. As such, Bill's story shows that healing in and among the landscape can unfold in myriad ways, some confrontational and spectacular, others unsuspecting and intimate, but all productive towards a livable present and future.

Bill moved to South Portland 12 years ago. He and his girlfriend bought a house on the hill overlooking Forest City Cemetery. "It was and continues to be exactly the place [they] want to be living. It is a great community for a lot of reasons." Shortly after setting down roots in South Portland, Bill launched deeply into local environmental activism and began to build a coalition of regional partners motivated by "issues with the fossil fuel industry." Together, they successfully led public campaigns accented by large events and heroic demonstrations. This activism, described by Bill as "nose to the grindstone," proved to be effective in some ways and destructive in others.

On a cloudy afternoon, I met Bill at the picnic tables in Bug Light Park. We rubbed down the benches that were wet from a morning rainstorm and together appreciated the vista. As we sat down, Bill acknowledged the coastal scenery, which was at once "quiet and active." He proudly pointed to Portland Pipe Line Corp.'s terminal to the east and remarked "it may be unattractive, but it isn't operating. It is a manifestation of community, as bumpy as it was along the way." During his leadership of 350Maine, Bill encountered "difficulties and intensities and struggles." He started to recognize underlying traumas which contributed to a culture of animosity within the organization and became an impediment to effective activism. In response, Bill shifted his attention away from the daily operations of 350Maine and toward a healing-informed practice addressing histories of trauma and abuse. In his own words, he "stepped back from direct activism and really committed to the work to take care of [himself.]" Bill found a

new community in a 12-step program and came to better understand the link between trauma and addiction. Principles of honesty, integrity, humility, forgiveness, maintenance, and service which ground the 12-step program helped to re-reorient Bill's relations to the people and world around him. "In that realm, real healing is exciting and possible." In the program he came into conversation with like-minded and unlike-minded people, learning the critical importance of vulnerable conversation and open-minded negotiation. Bill's activism and being were both transformed by this new community and self-care practice.

Today, Bill follows the issue of air emissions in South Portland as a "private citizen" while sustaining his connections to the 12-step community. He relies upon the "family of Protect South Portland to do the work" of fixing the world as it is through regulatory and political channels. And this new distance from that public, heroic, and consequential form of grassroots activism "has felt good." On a recent 'Day of Action', he chose not to visit the Maine State House as he once regularly did, carefully honoring his boundaries. Bill purposefully invests his time and energy in self-care and what he described as "other-care." He offers compassion to himself and those around him rather than insisting on relentless forward progress toward specific regulatory achievements.

In this way, Bill's trauma-informed practice is emblematic of an activism based in ethic. His actions do not result in scientific projects, scaled-up material change, or measurable outcomes (Liboiron, Tironi, and Calvillo 2018; Povinelli 2011; Tironi 2018). Neither do they engage with toxicity in the realms and languages of capitalism, governance or science (Boudia and Jas 2014a). Rather, his commitment to the 12-step process is slow and subtle; he endures in a different way. In Bill's words, with "gentleness and empathy and compassion and time… the potential is enormous, and people really do incredible things." In his imagination, the cultivation

of a space "where everyone feels like they have a place, whatever that might be" constitutes such incredible future things. And only through an openness to Bill's experience as a form of activism can we then support and build toward this possible future. Ultimately, an openness to the diversity of activisms expands our collective awareness of and ability to nurture the many presents and futures imagined in South Portland.

Conclusion

As both a scholar and resident of South Portland, these different stories expanded my concept of activism and my imagination of alternative futures in a toxic world. Protect South Portland's activism can agitate in council chambers and state capitals where legislation and amended regulation slowly remake systems of governance, leaning upon a rhetoric of reform and proximity to power to enable accomplishments. Their visible forms of activism can also manifest at elementary schools and public parks where publics charismatically rally and express desires for "not anymore" (Tuck 2009). Meanwhile, activism can also flourish in "just the ongoingness of life" through which residents form the building blocks of a healthy community (Tironi 2018). Bob, Cora, Asther, Shaina, and others make a habitable, safe, and supported life in Pleasantdale through simple and mundane actions. Their stories show us that activism in a permanently polluted world is also about living with and enduring through experiences of toxicant exposure. These plural ways of change-making in South Portland show that there are responses to emplaced environmental problems that seek to make technocratic governance more responsive and there are also communities of care and connection which are flourishing in relations between neighbors and community members. Moreover, the many forms of activism are not separate or

distinct from one another but rather unique iterations of relational politics that collectively work towards enabling conditions to live well.

After following the many manifestations of activism in South Portland, the mundane and the spectacular, I am productively challenged to "[listen] for what escapes explanation by science, law and other established discourse. [Account] for what established systems dismiss as noise" (Fortun 2001). Only by doing so, can this project be a pluralist one, which broadens the scope of what "counts," not only as a figure of the activist, but also as an articulation of the situated problems and solutions that centers and supports the responses of those exposed to toxicant encounter.

Conclusion: Toward a Re-Population of the Problem

In *Making Sense of Place*, I explored the experiences, sense-making projects, and actions of residents in South Portland as they encounter and respond to tank fumes. I attempted to bring together the thoughts, descriptions and stories of residents in South Portland so that they can add up to something (Haraway 2016; Ahmann 2018). Thus in its simplest forms, this thesis is an elaboration and a provocation; it expands what counts in local dialogues about tank fumes, recenters people in the technocratic issue of air quality, and prompts consideration of the thoughts, data, and imaginations of residents, teachers, writers, artists, activists, parents, illustrators, and volunteers that exist beyond this technocratic world. I argue that community members who are most impacted by tank fumes should be (1) meaningfully engaged in existing efforts to define the problem, gather data, and generate solutions and (2) supported in their efforts to build works of care and connection in South Portland if we want any interventions to be right-sized, comprehensive, and just. This thesis is only the start of "[slowing] down and [going] through the mess" in South Portland, but I hope that it will catalyze deeper inquiries into what is necessary and possible in a permanently polluted world (Nading 2020). In this conclusion, I will first reiterate the main points from each chapter before moving towards policy recommendations that can serve as a vehicle for shifting focus and power towards community-oriented decision-making.

Overview of Chapters

In Chapter 2, I examined residents' experiences with toxicant encounters. I conducted and analyzed multisensory interviews using grounded theory to consequently identify patterns in the stories of those most impacted by tank fumes. With these patterns identified, I elevated two

emblematic stories in the landscape. Soon after moving into the Pleasantdale neighborhood, Asther was taken aback by the smell of tank fumes. As these experiences persisted, punctuating summer nights with the windows open or time out in the garden with her young child, Asther began to worry about their health and wellbeing living within eyesight of the Citgo and Global bulk petroleum storage facilities. However, Asther also feels uniquely at home among the industrial infrastructure and gritty character in the neighborhood. Moreover, she feels sheltered from the risk of displacement in an area marked by potential hazards. Evelyn grew up in Pleasantdale during the middle of the 20th century. She remembers her youth fondly, crediting a sense of safety and kinship among a deeply rooted, hardworking, and homogenous community. Her first experience with tanks fumes while driving home one night was jarring. Then as these same overwhelming odors permeated nightly meals by the television, Evelyn began to draw her own connections between experiences of tank fumes and observations decline in the neighborhood. Asther and Evelyn's experiences of toxicant encounters undoubtedly unfold on separate trajectories but nonetheless illuminate that chemical exposure is connected to rather than isolated from aspirations, ideologies, and systems which complicate personhood and shape the landscape.

The stories in this chapter suggest that experiences with toxicant encounters are about and determined by more than chemical exposure. Certainly, sensory, and physiological events alert Asther and Evelyn to the presence of toxicants. However, experiences of toxicant encounters are also wrapped up in subjective discourses of neighborhood change and a resident's feelings in a place. Broader narratives about society and individual ideologies or aspirations influence what concerns toxicant encounters raise and what aspirations the presence of tank fumes challenge. This finding effectively complicates toxicant encounters as more than chemical

exposure. It provokes us to engage with and inquire about the totality of resident's experiences in a place and with its people.

In Chapter 3, I probed the three projects employed by residents to make sense of their experiences with toxicant encounters. Again, the findings in this chapter grew out of multisensory interviews as well as multisensory participation, whereby I engaged in my own sense-making projects while spending time alone and with interlocutors in the neighborhoods near bulk petroleum storage facilities. The chapter highlights three residents of South Portland who seek to understand their experiences with toxicant encounters. Fred, a resident of the Pleasantdale neighborhood, father, biker, and environmental engineer, created a multi-source Human Exposure Model of South Portland. When Fred shared his model with local and state decision-makers, he received skepticism and hesitation; these then feelings reverberated internally as Fred questioned whether he was irrational. Cora uses a crowdsourcing application, Smell MyCity, to log experiences with toxicant encounters as she moves through her daily routines. The sum of entries from Cora and her neighbors generates patterns in the data which validate and help her make sense of her own experiences. And Jean, who grew up in South Portland and lost her sister early to cancer, returned in her later years to make a home with her husband near the Gulf bulk petroleum storage facility. Jean takes careful note of her sensory and physiological responses to cancer fumes to build an embodied index of exposure with which she navigates the world around her.

Each sense-making project is a noteworthy and unique contribution to the abundance of knowledges present in South Portland. These projects and the knowledges therein can expand traditional scientific notions of what counts as data and how we understand the experiences of community members living, working, and moving among the tank fumes. Nonetheless, the

stories in this chapter remind us that the persistent relation of these projects to institutionalized and professionalized systems of knowledge reinforce existing norms of legitimacy. The greatest contribution this chapter makes to our collective understanding of both deeply situated sense-making projects in South Portland as well as the broader ecosystem of community science is a recognition of the impact that affirmation and repudiation of emplaced knowledge have on one's sense of self.

In Chapter 4, I illuminated activism that emerges in response to experiences with toxicant encounters, as well as the tactics and imaginations therein. This begins with Protect South Portland, a visible and recognized mobilization of community members on behalf of residents most impacted by tank fumes. Protect South Portland has grown the capacity and power to affect regulatory change through a series of successful campaigns buoyed by public demonstrations of support and experience navigating bureaucratic processes at the local and state levels. Their strategies are carefully developed and executed in pursuit of specific demands for the installation and operation of continuous monitoring and mitigation technology; thus, this mobilization constitutes an activism based in effect (Liboiron, Tironi, and Calvillo 2018). The chapter then takes a turn, focusing on less visible responses which form the building blocks of an enduring community; neighbors gather on Sundays, leave pies on front steps, build handicap accessible doorways, and jubilantly blast music from cars. Acts of self-care and the tending to emplaced relationships allow residents to make a habitable, safe, and supported life in neighborhoods near the bulk petroleum storage facilities. As such, this mobilization constitutes an activism based in ethics (Liboiron, Tironi, and Calvillo 2018). To close this chapter, we learn about Bill's transition from an activism based in effect to an activism based in ethics. His story shows that

healing among the landscape can unfold in myriad ways, both heroic and intimate, but collectively toward a more habitable existence.

The stories and analysis in Chapter 4 break open dominant notions of what constitutes an activist's response to toxicant encounters: public, heroic, and rooted in the achievement of regulatory change. This chapter acknowledges the endurance required to navigate bureaucratic processes and sustain a grassroots community organization on behalf of affected residents. This chapter also recognizes the endurance involved in persisting among tank fumes through mundane acts of care and connection. This activism among residents who reside in closest proximity to the bulk petroleum storage tanks includes the acts of making a life and building together despite toxicants in the atmosphere.

Recommendations

As an elaboration and a provocation, this thesis pushes me to approach my work in a permanently polluted world with new and expansive mindsets. It moves me to be open to the many dimensions and complexities of the human experience. It holds me accountable to people's stories and experiences not as anecdotes but as insights into emplaced environmental problems. It reorients my generative energy toward the strengths and solutions that already exist in place. This thesis instills within me a commitment to lead with listening. It prompts me to move slowly, be present, and notice the many articulations of agency, endurance, and resilience in place. And it requires the making of time in a context where time feels scarce, capacity is thin, and progress is urgent.

While these new permeations of my own practice feel almost undeniable, the integration of new and expansive mindsets into technocratic systems feels more challenging to affect. How do I communicate the value of not overlooking important local perspectives, innate paradoxes, and worlds of care? How do I make sure that the stories, voices, and experiences of residents add up to something? To have no clear answer here feels a little sheepish. To suggest that it takes merely the addition of an ethnographer or environmental anthropologist onto a project team sidesteps the need for a collective reorientation within and movement beyond technocratic processes. As I wade through this tall task, I will hold tight to Grace Lee Boggs' assertion, "transform yourself to transform the world." Larger scale change can start small and within individual capacities to listen with all the senses of the body and to embody the futures we long for (brown 2017). Because ultimately, this small practice and the intimate, authentic relationships forged in community can impact and shape change across whole systems (brown 2017).

Departing from this indulgent reflection, I also want to offer practical approaches that can improve the meaningful engagement of community members who are most impacted by toxicant encounters in any efforts to define the problem, gather data, and generate solutions. It would be disingenuous to suggest that this crux of my thesis emerged only from the research findings; I arrived at this project and moved through its analysis with a firmly held belief in the importance of inclusive public processes. I believe that the participation and sharing of power with people who live, work, and recreate near the bulk petroleum storage facilities allows more to be said, known, and imagined about life in South Portland. The recommendations that follow introduce two techniques to re-populate an issue otherwise unfolding in scientific and molecular terrains. I chose these specific techniques for their capacity to honor my findings—to engage the totality of

residents' experiences, incorporate local knowledge, and support the acts of residents to live with toxicant encounters.

Community Peer Review

Before state officials publish and present results from air quality monitoring in South Portland, they ought to provide community members with an authentic opportunity to affirm or contest the findings. Doing so gives those who are most affected by tank fumes as well as the cascading regulatory implications of any published results power in the processes of research. Therefore, my first policy recommendation is for the use of community peer review in air quality monitoring projects to gather consent or refusal for both publication as well as specific aspects of the study (Liboiron, Zahara, and Schoot 2018). The work and leadership of Max Liboiron and the Civic Laboratory for Environmental Action Research (CLEAR) inspires and informs this policy recommendation. CLEAR designed this methodological tool to integrate ethics among environmental science, honoring community consent and self-determination (Liboiron, Zahara, and Schoot 2018). Their practice is based in Audra Simpson's method of ethnographic refusal, which recognizes that community members know best whether research will cause harm or good in the local context (Simpson 2007; "Community Peer Review" 2017). Here, community consent is voluntary agreement and refusal is generative; a 'no' provokes scientific research to align with community values and reflect lived experiences, knowledges, interests, and concerns.

In the following steps, I will briefly apply CLEAR's community peer review to the unfolding scientific project in South Portland. The steps appear as they are outlined and recommended by CLEAR. The supporting detail is my proposal for city and state officials to concretely apply this methodological tool.

- **Step 1: Hire someone from the community**. Residents and community members of South Portland have unique and lived insights into the paradoxical experiences, historical and political context, local knowledges, and acts of endurance. Bring a paid resident onto the team of state officials conducting South Portland's air quality monitoring project as a full member who participates in staff meetings as well as community peer review. The creation of this position accepts and honors the reality that residents like Fred have "skin in the game" but must equally be protected against the potential to be tokenized or coopted for technocratic ends.
- **Step 2: Understand social, cultural, and economic context of the community.** A fuller knowledge of the community, beyond the molecular constituents, is critical for three reasons; this knowledge will help state officials grasp the weight of their research, situate data analysis within the local context, and provoke them to consider institutionalized power (Liboiron, Zahara, and Schoot 2018). State officials who do not already share life experiences with affected residents should read local press, grey literature, historical documents, and consider engaging an environmental anthropologist who can bring attention to human dimensions of the landscape.
- **Step 3: Identify your community.** The ability to identify specific and affected communities ensures the community peer review engages appropriate constituents. This could start with a geographic radius around the tank farms. State officials should ask 'which groups of people will air quality monitoring impact and who belongs to these groups?' ("Community Peer Review" 2017; Liboiron, Zahara, and Schoot 2018). If the project team does not have deeply situated or emplaced knowledge of South Portland,

they ought to work closely with the paid resident to identify specific individuals, organized, or semi-organized groups.

- **Step 4: Ensure skills for community-based discussion & deliberation.** Facilitation, consensus-oriented decision making, and ethnographic notetaking are important skills for a safe, ethical, inclusive, collaborative, and responsive community peer review. The City of South Portland has already engaged a facilitator to lead Clean Air Advisory Committee meetings. City and state officials should explore whether this facilitator has experience leading groups to consensus and moving through generative refusal. The addition of a team member with ethnographic experience will further help officials recognize more subtle acts of refusal that may take place during the community peer review (Liboiron, Zahara, and Schoot 2018).
- **Step 5: Call the community peer review meeting.** Community members should feel welcome, supported, and respected at a peer review meeting. This means meeting people where they are, based on lessons from Step 2. City and state officials should take care to convene the community peer review meeting in a place that is familiar, at a time that is accessible, and in a way that honors community preferences (Liboiron, Zahara, and Schoot 2018). It is likely that a community peer review meeting will not take place at City Hall. Members of Protect South Portland may also have insights to offer as they successfully organized community meetings and rallies in the affected areas of the city—posting information on telephone polls and gathering after school/work in community centers.
- **Step 6: Conduct the meeting.** This is the opportunity to gather consent or refusal. To avoid a yes/no binary and allow for subtleties, city and state officials should approach

this step with the intent to gather input from community members, ask questions of those with lived experience, and explore alignment with experiential knowledge (Liboiron, Zahara, and Schoot 2018). Offer a full summary of the project in accessible terms and multiple formats. Use of community peer reviews by CLEAR suggest the efficacy of talking in a circle rather than lecture-style presentations ("Community Peer Review" 2017). Save the rest of the meeting for questions, discussion, and observation of nonverbal cues toward consent or refusal. At the end of the meeting, make a survey available for those who have more to offer or who choose to communicate through written text. Finally consider what the input you received means in the local context, again working in close partnership with the paid resident ("Community Peer Review" 2017).

Popular Education and Spiral Model of Learning

The complexity of personhood demonstrated throughout this thesis suggests that a study of air quality alone cannot account for the totality of lived experiences and concerns in South Portland around toxicant encounters. Moreover, the persistence of power and privilege differentials in the relations among community members and government officials limit the creativity and expansiveness of sense-making projects. Therefore, I recommend a genuine reorientation to how residents and activists make sense of and respond to the issue of tank fumes by adapting the Spiral Model of Learning from popular education. Popular education, used in liberatory community organizing, recognizes that all forms of knowledge are valuable and situates affected communities with deeply felt experiences of harm or inequality at the center of efforts to name the problem (Nixon-Ponder 1994). Popular education also brings people together to challenge existing structural inequities and power dynamics toward transformation. Education

settings, community planning, public health, and public policy fields have all applied frameworks of popular education to their respective pedagogies and practices.

In the following steps, I will briefly and further apply relevant (but not all) elements of the Spiral Model of Learning to activism in South Portland. The steps appear as they are outlined by Rick Arnold and others in *Educating for a Change*. The supporting detail is my proposal to concretely apply this collective learning technique. It will undoubtedly feel like a different and untrod process for Protect South Portland members and residents who practice an activism based in ethic. These groups of people have not co-conspired or worked intentionally across difference toward collective action. Therefore, to safeguard the wellbeing of all participants careful thought should be given to protect the emotional impact of sharing experiences with others (Arnold, Burke, et al. 1991).

- **Start with the experience and knowledge of participants.** This work opens with questions that invite dialogue and reflection among community members who have experienced, worked to make sense of, and acted in response to toxicant encounters. This dialogue builds on what is already known among residents to uncover the problem and identify root causes. Protect South Portland members should welcome and follow experiences related to public health, housing insecurity and belonging that can situate discourses of tank fumes among other social and structural challenges (P. Brown 1992).
- **Look for patterns.** After community members share their experiences, participants look for similarities, differences, and commonalities to build new theories about encounters with tank fumes in South Portland. Patterns may emerge around the characteristics of toxicant encounters (what, when, where, and who) as well as barriers or supports to living well and enduring through these conditions. This process should be a work of collective

analysis, developed by residents living with tank fumes and Protect South Portland members acting on behalf of affected communities.

- **Integrate new information and theory.** Following this analysis, participants can introduce new information and create new theories of change in South Portland. Strategies and tactics of community mobilization, data from community science inquiries, and additional stories of endurance can come into balance with what has been shared and emerged from Steps 1 and 2. Step 3 may also be an opportunity to learn from other communities that live in close proximity to petroleum infrastructure and experience similar issues (Arnold et al. 1991).
- **Apply in action and reflect.** Shared learning and new theories lead to action for social change rather than maintaining conditions which created the problem or tending to individual solutions (Arnold et al. 1991). The power granted to participants to make change through popular education means that action may include the installation of continuous monitoring and mitigation technologies supported by Protect South Portland, it may include intimate practices which improve health-related outcomes and living conditions, and it may grow into another alternative future not yet known (Wiggins 2012). A reflection at the end of this intensive process will garner helpful next steps and important adaptations for ongoing activisms, while also providing closure on the exercise.

With the employment of the Spiral Model of Learning and/or Community Peer Review, city and state officials might begin to find a different way of figuring the problem—one that accounts for the complexity of personhood, takes seriously the plurality of emplaced knowledges, and comprehensively supports the endurance of residents while also facilitating more radical and just

solutions which protect communities that are most vulnerable to pollution in present and future generations.

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