Introduction to Part I

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The dumping of highly toxic PCBs (polychlorinated biphenyls) in Warren County, North Carolina sparked the first national protest by African Americans against environmental racism in 1982. In a special issue entitled “Water Contamination: Citizens Respond” in *Science for the Public*, a left-wing American magazine on science and technology which ran between 1969 and 1989, Geiser and Waneck (1983) published an article on “PCBs and Warren County.” The authors argued that the decision to site the PCB waste in Afton in Warren County was not only unjust; it was also unscientific. The landfill was located only 5 to 10 feet (1.5 to 3 meters) below the surface, close to drinking wells: “Only the most optimistic could believe that the Afton landfill would not leach into the groundwater. Unless a more permanent solution is found, it will only be a matter of time before the PCBs end up in these people’s wells” (Geiser and Waneck 1983, 17). The special issue also featured an interview with Reverend Bruce Young, a member of the citizens group For a Clean Environment (FACE) that was fighting to address toxic contamination linked to a childhood leukemia cluster in Woburn, Massachusetts. Reverend Young and other citizen activists conducted their own community health study in Woburn in partnership with public health scientists. Woburn became a model for “popular epidemiology” in which “laypeople detect and act on environmental hazards and diseases,” often with conflicts between lay and professional ways of knowing (Brown 1992, 268).

From its beginnings, the US environmental justice movement has involved community members in identifying local environmental and health problems, collaborating with scientists and other experts to find evidence of environmental racism, and using their research to advocate for community empowerment (Bullard 1990). Community-based participatory research (CBPR) has been at the forefront of research that connects environmental justice and citizen science (see Minkler and Wallerstein 2003; Corburn 2005; Israel et al. 2005; Wing 2005; Minkler et al. 2008; Wilson et al. 2018). This “collaborative approach to research equitably involves community members, organizational representatives, and researchers in all aspects of the research process” (Israel et al. 1998, 177). CBPR is used widely in public health, with roots in popular epidemiology. In the early 2000s, the “LA School” of environmental justice research embraced CBPR in a shift toward community-based and collaborative strategies (Morello-Frosch et al. 2002; Petersen et al. 2006; Cohen et al. 2012). Numerous community-based environmental justice organizations have engaged in community-driven research to address local issues of pollution, land use, and toxic exposure. Their research is based on a “framework that moves science from the realm of neutrality, seen in conventional social research, to the realm of values, which strengthens its utility” (Wilson et al. 2018, 283).

Phil Brown, Vanessa De La Rosa, and Alissa Cordner open this book with an incisive analysis of “toxic trespass” in environmental justice communities, where people are routinely exposed to contamination from industrial products and their waste streams. This builds on decades of community-engaged research from environmental sociologist Phil Brown, who coined the term “popular epidemiology” to describe residents’ efforts to link illnesses and toxic pollution in Love Canal, New York and Woburn, Massachusetts (Brown 1992). In this chapter, Brown, De La Rosa, and Cordner identify the case of per- and poly-fluorinated compounds (PFAS) as “perhaps the most visible class of chemicals now coming to public attention,” situating their community-based participatory research within the historical context of environmental justice and citizen science. The authors highlight the combination of the scientific and social discovery of PFAS contamination through community-based research and the need to push for protective government regulation and corporate reform. They argue that this work is particularly urgent in the Trump era, when “citizen science and community-based research face increasing attacks from industry and regulatory bodies attempting to undermine the use of and invalidate results from these studies.”

While community-based participatory research has been conducted in different places around the world (Mosavel et al. 2005; Conrad and Hilchey 2011), CBPR is most prevalent, particularly in an EJ (environmental justice) con-

text, within US scholarship and activism. Moving beyond the US context, yet remaining in dialogue with it, Barbara Allen's chapter reflects on the results of her community-based participatory environmental health (CBPEH) research study conducted in the Étang de Berre industrial region in the south of France. A renowned scholar of science and technology studies (STS), Barbara Allen's earlier work focused on "citizen–expert alliances" in Cancer Alley, the infamous petrochemical corridor of environmental injustice in Louisiana (Allen 2003). Allen brings her experience in the USA of working with citizens, experts, scientists, and CBPEH methodologies (alongside epidemiologist Alison Cohen, who worked on CBPEH with environmental justice communities in California) to develop an "extreme" or "strongly participatory" form of citizen science in France. As Allen explains in her chapter: "Strongly participatory science is knowledge-making that is collaborative all the way down – from the problem definition, methodological considerations and data collection, to the final analyses." Contrasting this robust, community-led participatory science with the "deception and demagoguery of populism and post-truth politics," Allen concludes her chapter by arguing that the inclusion of embodied public knowledge about environmental health in the Étang de Berre case led to more relevant and effective science, including significant impacts for local policy.

In the next chapter, Bhavna Shamasunder and her co-authors discuss the results and implications of their community-based participatory research study of the public health and environmental justice consequences of oil development in LA. The Los Angeles basin hosts one of the highest concentrations of crude oil in the world, including more than 5,000 active oil wells situated among a dense population of more than 10 million people. Poor communities and communities of color bear the greatest burdens of this incredible concentration of oil wells; they are located in closer proximity to the wells and have outdated emissions equipment. Shamasunder and her co-authors used a community-based participatory research approach involving bilingual Spanish and English surveys of 205 residences within a 1,500-foot (457 meter) buffer of the wells, alongside low-cost sensors to measure methane emissions in the area. Their research showed spikes of methane emissions and significantly high rates of asthma in the local population, yet relatively low levels of local knowledge about the oil wells or the mechanisms for seeking environmental regulation. The research offers an important first step in efforts to examine potential health impacts on residents who live close to oil wells and to support community organizing around "crude justice." It also underscores the "epistemic injustice" (Fricker 2007, 1) that occurs "when a gap in collective interpretive resources puts someone at an unfair disadvantage when it comes to making sense of their social experiences."

In another excellent community-based study, Sarah Rhodes and KD Brown, together with their scholar-activist co-authors, build on the legacy of the “people’s professor” Dr. Steve Wing, an epidemiologist who was a founding member of the North Carolina Environmental Justice Network. Throughout his life, Wing (2005, 61) was committed to the creation of a “science of environmental justice,” which he defined as “a science for the people, applied research that addresses issues of concern to communities experiencing environmental injustice, poor public health conditions, and lack of political power.” The authors carry forward Wing’s commitment to community-based participatory research to the environmental injustices of the hog industry in North Carolina. There is a heavy concentration of industrial hog operations in North Carolina, with close to 3,000 hog farms that are disproportionately located in communities of color. Affected communities are exposed to antibiotic-resistant bacteria from industrial hog operations, which are associated with a number of health problems. Residents, activists, and researchers also face significant backlash from the powerful livestock industry and the state. Drawing on years of collective scholar-activist experience, this chapter offers reflections on historical legacies, lessons learned, and future challenges for CBPR in relation to entrenched corporate interests and environmental injustices in North Carolina.

This first part of *Toxic Truths* demonstrates the extraordinary potential of CBPR for environmental justice advocacy, from the public discovery of emerging contaminants, to the policy impacts of “strongly participatory” environmental health research in a contested French industrial region, to the enduring struggles over environmental justice near concentrated toxic industries in Los Angeles and North Carolina. In a post-truth era, these movements continue to thrive, even as they meet with resistance. All of the authors in this section share a commitment to participatory, community-based science, both as a necessary tool for advocating for environmental justice and social change, and as a form of research that is strengthened rather than undermined by local participation in the research process. As Robert Bullard (1990, 152) argued in his classic environmental justice book *Dumping in Dixie*, communities “should be prepared to remain in environmental justice struggles for years and possibly generations to come,” but it is also important for grassroots groups to know that there have been citizen victories.

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