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ARTICLE



## Environmental reproductive justice: intersections in an American Indian community impacted by environmental contamination

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### ABSTRACT

In order to fully understand the impact of contamination on Indigenous communities, this paper explores how intersectionality has been integral to the development of environmental justice (EJ) and reproductive justice (RJ), and how considering the ways in which these two frameworks then intersect with each other is necessary to more fully explicate how toxicants have threatened the reproduction of human beings and tribal culture. The concept of environmental reproductive justice (ERJ), or ensuring that environmental issues do not interfere with physical or cultural reproduction, involves expanding reproductive justice to include a deeper focus on the environment, and to include the reproduction of language and culture as concerns, in addition to the reproduction of human beings. ERJ also aims to expand the framework of environmental justice to more closely consider the impact of environmental contaminants on physical and cultural reproduction. Through the example of Akwesasne, a Mohawk American Indian community located downstream from industrial sites on the New York/Canadian border, this paper explores how the concept of ERJ can be utilized to understand the unique situation of American Indian communities who are arguing that justice necessitates going beyond equal protection.

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As I sat with an Akwesasne Mohawk woman at her kitchen table over cups of coffee, she stared past me out her kitchen window that overlooks the Saint Lawrence River, and the General Motors Superfund Site. A few years prior she stood in her front yard and watched men in 'moon suits' work to clean up the industrial site. 'They'd come in here in their space suits and take your water, a sample of it. If that's not alarming, then I don't know what is'. She described how 'we used to play in that dump. We used to go play in it. We would just scavenge in the junk and go sort through it, pick aluminum and stuff like that, play with paint'. She cut back on the family's fish consumption after the St. Regis Mohawk Tribal government issued advisories against eating locally caught fish, and after her husband started noticing changes in the fish. But she wasn't sure these changes came in time to protect their health. She had always wanted a big family, but several miscarriages made that impossible.

I had a similar conversation with a couple overlooking the same river, this time about a mile down stream. Even though it has been 20 years since they stopped trying to conceive and he gave up fishing, they were both on the verge of tears as the wife described how in their matrilineal culture, 'my clan can't continue from my part; I have no daughters'. Her

husband chimed in, 'the teachings, belief, culture from her mother is not passed on'. In this way the PCBs that leached from the GM plant threatened not only their desire to have a large family – 'we wanted five daughters and five sons' – but was also seen as a broader attack on their tribal nation – 'our genetics are limited and under attack', as the wife described. In addition, cultural and social practices linked to catching, trading, and consuming fish were limited by the threat of exposure to the contamination that these community members linked to their reproductive troubles and other health issues.

Akwesasne has been described as an environmental justice community – a population and a space disproportionately impacted by environmental contamination leaching from an industrial plant that did not benefit them, powered by a hydroelectric dam built on land taken unscrupulously from the tribe, and for which they were never compensated. But to fully understand the impact of contamination on this community, and other Indigenous communities, this paper explores how intersectionality has been integral to the development of environmental justice (EJ) and reproductive justice (RJ), and how considering the ways in which these two frameworks then intersect with each other is necessary to more fully explicate how toxicants have threatened the reproduction of human beings and tribal culture.

## Intersectionality

Intersectionality is a theoretical framework for understanding how multiple social identities such as race, gender, sexual orientation, socioeconomic status, and disability intersect at the micro level of individual experience to reflect interlocking systems of privilege and oppression (i.e. racism, sexism, heterosexism, classism) at the macro social structural level (Bowleg 2012, 1267). At this macro level, intersectionality as an analytic tool examines how power relations are intertwined and mutually constructing (Hill Collins and Bilge 2016, 7). As Hill Collins and Bilge (2016) explore in their recent book, the core ideas of intersectional frameworks focus on: (1) social inequality; (2) the organization of power relations; (3) relationality – in the context of the development of coalitions or relationships across social divisions, as well as through utilizing relational thinking that rejects either/or binary thinking in favor of a both/and frame; (4) the need to examine power relations in their social context; (5) the importance of analyzing the complexity in the world; and (6) the understanding that solutions to any social problem need to be complex in order to foster social justice.

Using intersectionality as an analytic lens helps us to understand how individuals are differently affected by outside forces based on the varying combinations of their identities – race, class, gender, sexuality, and citizenship to name a few (Hill Collins and Bilge 2016). Intersectional frameworks like environmental justice and reproductive justice, which will be explored in depth below, demonstrate how these identities can contribute to one's environmental exposures and the level of control one has over their reproductive life. Taking this a step further, this paper explores the ways that these frameworks intersect further in what we are calling Environmental Reproductive Justice, to describe how what constitutes EJ and RJ have been defined in Indigenous communities, and explore how environmental contamination has interfered with the ability of American Indians to reproduce physically and culturally.

## Environmental justice

Environmental justice (EJ) is the principle that all people and communities are entitled to equal protection of environmental and public health laws and regulations. The EJ movement expanded definitions of 'the environment' to include where people live, work, play and pray and has fought to institutionalize the 'fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies' in agencies like the United States

Environmental Protection Agency (USEPA 2004). Reports issued beginning in 1987 have confirmed that this is often not the case – people of color are disproportionately impacted by environmental contamination, and race is the most important factor in predicting where toxic waste sites are located (Mohai, Pellow, and Timmons Roberts 2009; Bullard 2000).

The framework of EJ is intersectional because of its emphasis on the interdependence of human health, ecological integrity, and social justice (Di Chiro 2006). Giovanna Di Chiro (2006, 99) notes that the politics of intersectionality are 'reflected in the connections made by activists in the EJ movement; the alliances being forged between movements for human rights and environmental protection clearly demonstrate that the survival of humans and the survival of the environment are interlinked objectives'. She notes that EJ activists, many of whom are low-income women and women of color, bring to light how intersections of specific economic, social and environmental conditions contribute to a community's ability to live in a clean healthy environment and actively participate in civic life. 'By joining together these diverse social, economic, and ecological concerns, environmental justice activists, much like feminists of color who challenged the single-mindedness of mainstream US feminism, engage in a politics of intersectionality, forging connections between issues that have not been recognized as properly "environmental" by the mainstream movement' (Di Chiro 2006, 99).

Because of a diverse political history and unique relationship to the federal government relative to other minority communities, Indigenous communities in the US are impacted by environmental contamination in ways similar to, and unique from, these other communities. Tribal communities in the US live in close proximity to approximately 600 Superfund sites, and environmental mitigation for these communities is significantly behind non-tribal communities (USEPA 2004). Sites ranging from industry to mines to military bases, as well as places impacted by the release of pesticides and other agricultural by-products, negatively affect not only the surrounding environment, but also the health, culture, and reproductive capabilities of the Indigenous communities they border (Hoover et al. 2012; LaDuke 1999; Gedicks 1994). As Mascarenhas (2012) has described in his work with First Nations communities, neoliberal governance policies, especially concerning water (as we will also see in the case study of Akwesasne below) have contributed to Indigenous people having an increasingly difficult time securing access to clean water. But what sets the study and consideration of EJ in tribal communities apart are the unique historical, political, and legal circumstances (Ranco et al. 2011). As geographer Ryan Holifield (2012) notes, 'environmental justice in Indian country is intimately bound

up in the complex matter of tribal sovereignty', differentiating EJ cases in these communities from other racial or ethnic communities. As Mohawk midwife and reproductive health advocate Katsi Cook (2015) highlighted in a keynote speech to environmental health researchers:

It's important to understand that North American Indigenous are not a racial or ethnic minority, but are one of three sovereignties in the United States. These are the federal, state and tribal levels of government. And so our traditional cultural property is protected by whole body of case law and Supreme Court decisions, treaty rights, and has significance for the work that's being done to recover our community from this historic moment of the post-WWII economic boom and the development of the St Lawrence Seaway.

With this in mind, environmental issues in Indian Country need to be considered through the unique colonial history and relationship that tribes have with the United States.

Because of the unique history and political relationships between Native communities and the settler government, Native American Studies scholars have argued that achieving environmental justice for tribes necessitates going beyond 'equal protection'. As Akwesasne Mohawk scholars Arquette et al. (2002, 262) assert, 'Environmental justice encompasses more than equal protection under environmental laws (environmental equity.) It upholds those cultural norms, values, rules, regulations and policies or decisions to support sustainable communities', which might look different for Indigenous and non-Indigenous communities. Cultural as well as biological diversity have to be respected. In order to achieve this, different standards may need to be applied to the clean up of industrial sites, or the prevention of the locating of new sites, adjacent to Indigenous communities.

## Reproductive justice

In addressing issues of women's reproductive rights, the liberal feminist movement has focused largely on reproductive choice, through ensuring sufficient access to birth control and abortion. But definitions of reproductive choice might diverge for 'communities where people undergo nonconsensual sterilization, where toxic chemical concentrations produce infertility, or in which children are taken to be raised in boarding schools' (Shotwell 2013, 106). In these communities, women's ability to control what happens to their bodies is challenged by poverty, racism, environmental degradation, sexism, homophobia, and injustice (Loretta Ross quoted in Chrisler 2014, 205). SisterSong, a women-of-color-centered organization focused on reproductive justice, was founded in 1997 in an effort to address issues that they felt had

been left out of the white feminist agenda. As founding member Loretta Ross (2007, 4) describes,

For Indigenous women and women of color it is important to fight equally for (1) the right to have a child; (2) the right not to have a child; and (3) the right to parent the children we have, as well as to control our birthing options, such as midwifery. We also fight for the necessary enabling conditions to realize these rights. This is in contrast to the singular focus on abortion by the prochoice movement that excludes other social justice movements. The Reproductive Justice framework analyzes how the ability of any woman to determine her own reproductive destiny is linked directly to the conditions in her community – and these conditions are not just a matter of individual choice and access. Reproductive Justice addresses the social reality of inequality, specifically, the inequality of opportunities that we have to control our reproductive destiny.

She notes that providing the social supports necessary for women's individual decisions to be optimally realized includes government obligations to protect women's human rights and ensure that options for making choices are safe, affordable, and accessible. In the past 30 years alone, American Indian women's ability to conceive and raise children has been impacted by forced sterilization in Indian Health Services facilities (Lawrence 2000), and rampant adoption out of American Indian children into non-Indian homes (O'Sullivan 2016), following on centuries of outright genocide and forced attendance in boarding schools.

The reproductive justice framework, as 'a theoretical paradigm and an activist model' (Gurr 2014, 33) has been used to bring together social movements, as an intersectional approach seeking interventions into arenas of state violence, including policies related to child welfare, environmental regulation, health, immigration, and education, using an intersectional approach (Zavella 2016, 37). Specifically, the use of the term reproductive justice situates activism for reproductive rights within a broader social justice movement 'which is concerned with such issues as human rights, labor practices and conditions, peace, prejudice and discrimination, educational equity, poverty, and health and health-care disparities, all of which are fundamental to the achievement of reproductive justice' (Chrisler 2013, 206). Like EJ, RJ seeks to move away from a discourse on individual rights to a more expansive set of concerns for the conditions under which rights can be exercised, which include ecologies, prison systems, food systems, criminalization of drug use, and more (Shotwell 2013, 105).

## Environmental reproductive justice

In addition to taking similar intersectional approaches to better understand the root causes and impacts of social justice issues, the work of environmental justice

and reproductive justice activists frequently coalesce around the impact of environmental contamination on women's health. As medical sociologist Barbara Gurr (2011, 724) notes, 'reproductive justice activists and scholars specifically locate the bodies of women as one lynchpin between environmental pollution and community wellness, arguing that the impacts of pollution on women's bodies differs in important ways from the impacts on men's bodies, and further that the impacts of pollution on women's bodies has particular consequences for the community at large'. Environmental sociologist Michael Bell (2009) argues that to understand the social and physical impacts of environmental contamination on communities, the perpetual dialog between body and the environment, which he labels as the 'invironment', can be examined through the lens of health.

It is at the intersections of environmental justice and reproductive justice, or what I am exploring here as environmental reproductive justice, where we will best understand the scope of environmental impact on American Indian communities as not just a collection of individual bodies, but as social bodies. Mohawk midwife Katsi Cook (2007), who originated the term environmental reproductive justice, described that 'I see that reproductive justice and environmental justice intersect at the nexus of woman's blood and voice. Environmental justice and reproductive justice intersect at the very center of woman's role in the processes and patterns of continuous creation'. In examining the World Health Organization's definition of health as a 'state of complete physical, mental and social well-being, not merely the absence of disease or infirmity', as well as the ability to lead a 'socially and economically productive life', Katsi describes that she would 'add cultural well-being to this definition since ecologists have pointed out that biological diversity and cultural diversity go hand in hand' (Cook 2007). She notes that in her community of Akwesasne, which will be described below, the struggles for environmental justice and reproductive justice coevolved, and included understanding the impact of environmental contaminants on women's health as well as on language and culture issues (Cook 2007). The concept of environmental reproductive justice involves expanding reproductive justice to include a deeper focus on the environment, and to include the reproduction of language and culture as concerns, in addition to the reproduction of human beings. ERJ also aims to expand the framework of environmental justice to more closely consider the impact of environmental contaminants on physical and cultural reproduction.

Di Chiro (2008, 278) describes the position held by many eco-feminists that 'all environmental issues are reproductive issues', since efforts to protect the integrity of natural systems are struggles to maintain the

ecosystems that make all life possible. But what is considered 'reproduction' is often narrowly defined by the EJ and RJ literature, confined to the physical reproduction of humans. Marxists and feminist sociologists have most frequently used the term 'social reproduction' to describe unpaid or undervalued care work (for example domestic labor in households, teaching, nursing; see for example Katz 2001; Braedley and Luxton 2015). Expanding beyond this, Di Chiro (2008) and Mascarenhas (2012) focus on the aspect of social reproduction outside of the formal market exchanges involved in maintaining a household's condition. Di Chiro (2008, 281) defines social reproduction as 'the intersecting complex of political-economic, sociocultural, and material-environmental processes required to maintain everyday life and to sustain human cultures and communities on a daily basis and intergenerationally'. This encompasses conditions that both enable and disable biological reproduction as well as social practices, and relations of power, that are connected to socialization and the fulfillment of human needs. Mascarenhas (2012) defines social reproduction as the direct costs associated with the activities that maintain an individual's, household's, or group's condition. This cost could include direct monetary costs associated with child care, health care, etc., but could also include human resources and services that do not enter formal market exchanges, like 'the passing on of languages, knowledges, histories, and cultural practices from one generation to another, or training in specific subsistence practices such as the procuring of food, clothing, and shelter. Other nonmarket factors of social reproduction may also include the maintenance of particular social norms and customs, and the continuance of social networks' (Mascarenhas 2012, 7).

ERJ seeks to take up the work that scholars like Di Chiro and Mascarenhas have done in expanding social reproduction beyond undervalued gendered labor practices to include the social and cultural practices of women especially, but also men and other-than-human communities, and the role they all play in maintenance of relationships necessary for the reproduction of indigenous culture. In this article, I will explicate the concept of ERJ through the experience of Akwesasne Mohawks, whose food systems, culture, ability to physically reproduce, and ability to maintain relationships with other-than-human communities was interrupted as a result of living downstream from industrial sites.

## Methods

The bulk of the first-hand data in this article comes from interviews that I conducted with 64 Akwesasne:non (people of Akwesasne) in 2008, 2009, and 2014 as part of a broader project on community based



environmental health research in Akwesasne. That project was developed in conjunction with and approved by the Akwesasne Task Force on the Environment, in addition to being approved by the Brown University IRB.<sup>1</sup> The interview protocol asked about participants' participation in environmental health research, perceptions of change in the health and environment of the community, and their suggestions for how to improve the health of the community. These interviews are supplemented with presentations given by Akwesasne:non at community meetings, and publications by Akwesasne Mohawk authors (primarily Mary Arquette and Alice Tarbell). Selection of this particular topic of ERJ came out of conversations with, and presentations by, Akwesasne Mohawk midwife Katsi Cook, including her written work on the topic (Cook 2007), interviews conducted with her, conference presentations delivered by her on the topic (Cook 2015), and the group authored publication that came out of the symposium she hosted in Hot Springs, South Dakota (see Hoover et al. 2012). The purpose of this article is to further explore the concept of ERJ that was discussed at this symposium, by discussing how the concept has been articulated and developed in Akwesasne, and how it can similarly be used in the context of other Indigenous communities seeking to qualify damages incurred from exposure to environmental contamination.

### Environmental reproductive health symposium

In July of 2011, the First Environment Collaborative, headed by Katsi Cook, hosted the Environmental Reproductive Health Symposium and Retreat in Hot Springs SD, near the homeland of the Lakota Sioux. The purpose of the meeting was to explore common issues of exposure to environmental contaminants across a wide variety of Indigenous communities, and to facilitate partnerships among Indigenous community organizations, researchers, scientists, and health care providers. Among those present included representatives from several Indigenous communities who were attracted to the term ERJ because of the way they felt it encapsulated concerns around the impact of environmental contamination on their communities' abilities to reproduce both physically and culturally. Present, in addition to Katsi Cook from Akwesasne who facilitated the meeting, was a representative from Aamjiwnaang, an Anishnaabe First Nations community surrounded by 62 major industrial facilities that experienced a decline in the ratio of male births (Mackenzie, Lockridge, and Keith 2005), as well as other health impacts connected to contaminant exposure (MacDonald and Rang 2007), but also faced concerns about carrying out ceremonies and engaging in traditional food harvesting, both types of activities which entailed gathering materials from the local

environment that were found to be contaminated by industry. Women from the Yupik community on St. Lawrence Island in Alaska and the Alaska Coalition on Toxics (ACAT) described how bioaccumulated persistent organic pollutants in traditional food sources have contributed to contaminant body burdens (Miller et al. 2013), leaving residents to decide if they should maintain traditional food practices, and all of the ensuing cultural activities surrounding them. A representative from Tewa Women United described how her community had been impacted by mining effluents as well as radioactive waste from the Los Alamos National Laboratory, the establishment of which also disrupted the local landscape and the ceremonies that had taken place there (see also Masco 2006). Women of All Red Nations (WARN), representatives from which also attended the meeting, have been organizing since the late 1970s around suspected links between Lakota health issues – especially the high rates of miscarriage and reproductive cancers among Lakota women – and the region's history of uranium mining (see Jarding 2011). For each of these cases of environmental injustices affecting these diverse Indigenous communities – spanning from New Mexico to Alaska, impacted by sources ranging from the military to industry, emitting contamination like radiation, heavy metals, volatile organic compounds, and persistent organic pollutants – what attracted these diverse representatives to the term environmental reproductive justice, and to this meeting, was the opportunity to highlight how they were not only disproportionately exposed to environmental contamination relative to the general public (environmental justice), and not only was this contamination impacting their ability to have children and raise them in a safe environment (reproductive justice), but also that, on top of these issues, their exposure to environmental contamination was impacting their communities' abilities to reproduce cultural and social practices and relationships through the maintenance of traditions that necessitated close interactions with the environment. In the following, I will detail specifically how ERJ played out on multiple levels for the Mohawk community of Akwesasne.

### Akwesasne

Akwesasne is a Mohawk community of about 15,000 people that shares a border with New York, Ontario, and Quebec. The community is bisected by the Saint Lawrence River, which was developed into the Saint Lawrence Seaway in 1954. The project appropriated Mohawk land, and included the construction of hydroelectric dams, which brought industry to the area; General Motors (GM), Alcoa, and Reynolds are all just upstream of Akwesasne. The creation of the seaway itself brought social, cultural and economic

changes to Akwesasne; as Salli Benedict, who lived on Cornwall Island, described to me, 'People were more connected before. Before the seaway people went fishing together and you pass on that stuff...Before the seaway people were more dependent on the land and the environment than grocery stores'. Mohawk scholars Mary Arquette and Maxine Cole (2004, 338–339) similarly described social changes precipitated by the coming of the seaway that fundamentally altered Mohawk families – a large number of men from the community worked on the seaway project, but 'when it altered the land and the river, these men were not able to return to their traditional land and water-based practices. Consequently, they maintained non-traditional jobs, which eventually led them to leave the community'. This led to social and cultural disruption, and the loss of a traditional economy. The transformation of the river into a seaway also had a dramatic effect on wildlife. Akwesasne elder Ernie Benedict, a resident of Cornwall Island, described to me how efforts to deepen the river destroyed the fish habitat:

[The blasting of rocks] affected the spawning grounds of fish, not only by the blasting but also because of when the blasting was done, they had to clean out all the broken bottom soil and then deposit it somewhere. And of course the easiest place to do it were the inlets and the bays, where there were spawning areas, and so for a long time fish couldn't make a living out there and so a lot of their work was not done. The fish, as you know, have sort of a cleaning action there in swimming – absorbing the water and taking in contaminants, depositing it down in the bottom of the river, so getting it out of the way. And so now we had to do without the fish for years.

His description of fish unable to 'make a living out there' in the same way they always had, similar to Mohawk people, highlights the connections among the multiple communities affected by this development.

The development of the Moses-Saunders Power Dam as part of the seaway project drew industry to the shores of the Saint Lawrence with the promise of cheap hydroelectricity, including Reynolds Metals and General Motors. The first large-scale environmental impacts from the industrial plants neighboring Akwesasne became apparent when the trees downwind from Reynolds began to brown, and cattle became crippled and died. Researchers from Cornell University confirmed that while local industries were emitting fluoride in compliance with NY state and federal standards, these standards were not based on sufficient research. As a result, the local farming industry collapsed, and residents were concerned about the potential long-term impact to their own health (Krook and Maylin 1979), even after scrubbers had been added to the factory's smoke stacks and the problem was considered ameliorated.

In 1981, two dormant sludge pits filled with polychlorinated biphenyls (PCBs) were discovered behind the GM plant, the industrial site directly adjacent to Akwesasne. Until they were banned in 1978, GM utilized PCB-laced hydraulic fluids that were periodically flushed from the plant and disposed of in reclamation lagoons, which were periodically drained and the sludge buried onsite. The lagoons were found to have flooded several times, contaminating the riverbeds of the Saint Lawrence River, Raquette River, and Turtle Creek, as well as groundwater (Grinde and Johansen 1995). The entire 270-acre site was placed on the National Priorities List as a Superfund site in 1984.

That same year, a Mohawk midwife from Akwesasne, Katsi Cook, invited New York State Department of Environmental Conservation (NYSDEC) Wildlife Epidemiologist Ward Stone to Akwesasne to test fish and wildlife – Mohawk food – that lived in the vicinity of the GM plant, which he found to be above acceptable standards for consumption. Cook then began to set the stage for scientific studies to demonstrate whether the PCB contamination found in their food source was impacting the health of mothers and their infants. One of Cook's main concerns was whether she should encourage mothers to breast feed their babies, as milk concentrates lipophilic pollutants. Mothers had contacted her asking, 'Gee, Katsi, these scientists are coming to my home taking samples of everything but me. Is it safe to breastfeed?' And I said, 'You know what? I don't really know. I wish I did' (Cook 2005).

In the first large-scale CBPR project in the Nation with a Native community, Akwesasne Mohawks partnered with SUNY Albany to determine the health impacts of exposure to PCBs. Studies conducted through a Superfund Basic Research Project (SBRP) grant connected levels of PCBs in participants' breast milk and blood to fish consumption (Fitzgerald et al. 1998), which decreased as community members began heeding fish advisories published by the Tribal government (Tarbell and Arquette 2000; Hoover 2013). This decrease in fish consumption proved a complex trade-off, as community members and scientists would later cite how the substitution of affordable foods for fish has contributed to other health problems (Schell, Gallo, and Cook 2012), as well as culture loss. As a midwife, Katsi's first concern had been for community members at the top of the food chain – breast-feeding infants. She named her research group the First Environment Research Project, in acknowledgement that the womb is the first environment that we are exposed to, and that the contamination of this environment is a significant human transgression, impacting the sacred relationship between mother and child, and the ability for a Nation to properly reproduce itself.

SUNY Albany and Akwesasne acquired a second SBRP grant (1996–2000), which enabled them to conduct studies that began to document health impacts in community members with higher PCB body burdens. These impacts include a greater propensity for diabetes (Codru et al. 2007); higher levels of total serum lipids, which contribute to heart disease (Goncharov et al. 2008); abnormal thyroid functioning in adolescents (Schell et al. 2004; Schell and Gallo 2010); affected cognitive function in adolescents (Newman et al. 2006); and affected cognitive function in older adults (Haase et al. 2009). There were also studies that eventually corroborated local concerns that the PCB contamination could be impacting reproductive abilities, through impacts to sex hormones for both adolescents and adults. Among adult men, testosterone concentrations were found to be inversely correlated with total PCB concentrations, but especially with the types of PCB congeners found in fish (Goncharov et al. 2009). Similarly, among adolescent boys, researchers found that exposure to the more highly persistent congeners of PCBs in particular were associated with lower testosterone levels (Schell et al. 2014). During a community presentation, SBRP principal investigator David Carpenter joked with the audience that if the men had to take Viagra, they should blame PCBs, although he quickly followed, ‘Is this significant enough change to really be a disease? No! But it’s a way that PCBs interfere with our normal bodily functions’ (Carpenter 2014). Researchers also found that higher levels of certain estrogenic PCB congeners found in Mohawk girls led to earlier menarche among those girls by about half a year (Denham et al. 2005). In addition, preliminary results of a more recent study examining the impact of PCBs on reproductive hormones in adult women have found that higher levels of PCBs decrease the likelihood that a woman will have the type of regular cycle necessary to conceive and maintain a pregnancy (Gallo et al. 2016).

During interviews I conducted with Akwesasne community members, when I asked people what they saw as some of the health impacts of environmental contamination, several mentioned what they saw as a disproportionate number of miscarriages and other reproductive issues in the community. Women reported not being able to have as many children as they would have preferred, and saw this as an extension of the era of forced sterilization. Katsi initially became concerned about the potential impacts of the site when she began hearing about more and more about reproductive difficulties in the community. She notes, ‘I don’t have an environmental engineering degree, I don’t have anything like that, but what I do have as a midwife and as a Mohawk woman moving through the small world webs of the community, I would hear this one had a miscarriage, that one

over here is sick with this’ (Cook 2008). This ‘situated knowledge’ as Haraway (1988) calls it, which draws on ‘epistemologies of location, positioning, and situating’ to make knowledge claims, gave Katsi insight into a portion of the community who felt as though they had been overlooked by previous studies and by health professionals.

What the research determined was that traditional food practices – which entail a web of language, culture, family and interspecies relations in addition to the nutrition provided – were delivering contamination from the industrial site to the bodies of Akwesasro:non. PCBs leached from the GM site into the river, where then were taken up by fish that were then eaten by Mohawk people. From dinner plates, these PCBs made their way into Mohawk bodies, into their fat, into women’s breast milk, which was then passed on to the most sensitive members of the community. In her book *Tainted Milk*, Maia Boswell-Penc (2006, 12) notes that breast milk is ‘symbolic of the most essential human connection’, and when breast milk is contaminated, that ‘should be a wake-up call’. Boswell-Penc (2006, 169) demonstrates ‘how child sustenance becomes a figure for the oppressive frameworks at work in any historical juncture’, and this is seen in Akwesasne, where Indigenous women have been instructed to abandon their traditional food practices in order to prevent accumulating more PCBs that would then be transferred to their children. In this case, an Indigenous community suffering from environmental injustice was instructed to abandon their traditional food practices in order to prevent accumulating more PCBs that would then be transferred to their children. In communities impacted by environmental contamination, residents are often encouraged to avoid the source of contamination – to practice risk avoidance to make up for the regulatory agency’s and industry’s lack of risk reduction – in lieu of cleaning up the source (Hoover 2013).

### Reproduction in a Mohawk context

In Mohawk culture, women’s reproductive capabilities are closely connected to those of the land. In the Mohawk creation story Sky Woman (also known as Otsitsisohn, ‘Mature Flowers’) fell through a hole in the sky caused by the uprooted celestial tree. She plummeted to the watery world below, her fall broken by a flock of geese that laid her on the back of a giant turtle. The muskrat brought up mud from below the water to make the surface softer for her, which Sky Woman then used to create the earth we now rest on. Seeds that she had grabbed from the sky world on her descent dropped from under her fingernails onto the turtle’s back and started to grow. Sky Woman gave birth to a daughter, who matured and became pregnant, but then died in the process of giving birth



to twin boys. Sky Woman buried her body, and from it sprang corn, beans and squash – the staples of the Mohawk diet. The broader creation story demonstrates the importance of women's bodies not only as the basis of all human life, but also as the source of original foods. The story also highlights the close reliance of humans on non-human communities – the birds, turtle, muskrat, and food plants that contributed to the survival of Sky Woman, and all humans who would follow her. Ceremonies recognizing these relationships are practiced in Haudenosaunee longhouses, many of which are based on the horticultural cycle, celebrating events around maple sugaring, seed planting, strawberries, string beans, green corn and the fall harvest. Environmental contamination, especially the fluoride emitted from Reynolds Metals in the 1970s and 80s, as well as concerns about how the PCBs leaching and volatilizing from the GM plant, discouraged some Akwesro:non from planting gardens, because of the uncertainty they felt about whether the food they grew would be safe. As respected community leader Jake Swamp described:

People are now afraid to go and plant crops anymore and also to make a living off of the land because you don't know what's there. That's the hard part about it, is not being sure, not being certain anymore, what you're eating or what you're coming in contact with... The whole community just came to a complete stop, especially during the early seventies, because the information that they were getting is that the whole area is contaminated. So these guys would think, well if I plant crops, will I be eating contaminated food? So it was the fear that was driving us.

Even in areas that might be safe, the concern remains when people consider planting. As Henry Lickers noted, 'There's that inkling in the mind – is it good stuff? Is it good food?' This uncertainty has not only disrupted the food system in Akwesasne, but also the relationship that people have with traditional food crops, and those they develop with each other while planting, tending, and harvesting gardens.

In addition to demonstrating the interconnection between humans and other communities necessary for the reproduction of Mohawk culture, the creation story has also been utilized as a metaphor for the female human reproductive cycle. Beverly Cook is a nurse practitioner (now elected chief) who uses this story to explain fertility to Mohawk girls as part of the Ohero:kon rites of passage ceremony, a four-year process that brings adolescent cohorts together to develop a health understanding about what it means to become a Mohawk adult. One January afternoon, Bev stood in front of a group of girls who were in the second year of the Ohero:kon ceremony who had gathered at the longhouse for her presentation. As they sat on the wooden benches facing her, she described to them, 'this is why women are the land,

women made that land, women made that initial life that grew here on this earth. Her knowledge translated into every single woman descended from her'. Bev used the creation story to explain the process of ovulation to the young women, describing how the journey that the egg makes from the fallopian tube to the uterus is that same journey that Sky Woman made from the sky world carrying seeds. Each month the uterus develops a soft lining, similar to the way the muskrat brought mud to Sky Woman to create a soft layer on the turtle's back. Bev described to each of the girls how similar to the way that Sky Woman brought her seeds with her, when a woman is pregnant with a little girl, that female fetus carries all of her eggs with her, and hence each mother carries not only her daughter but her grandchildren as well. 'These little girls inside womb already contain ovaries with the little eggs that she will use her entire life. Women who carry daughters are already making pathway for their own grandchildren. That transmission of those seeds that Sky Woman brought here, every woman brings those here'. For this reason, she described to the girls the importance of taking care of their bodies, and creating a safe and protective environment for themselves and each other.

In describing her midwifery work, Katsi (2015) notes, 'Human health, language and culture begins in the prenatal environment. Therefore health systems revision and revitalization of culture and language must focus on puberty, pre-conception and prenatal critical windows of development... the natural development from the recovery of midwifery practice in Iroquois communities necessarily tells us that prenatal care is too late. That we need to begin at puberty'. For these reasons, the Ohero:kon rites of passage ceremonies have been developing in Akwesasne, as a means of providing a safe space for adolescents that promotes Mohawk culture. These ceremonies will contribute to a healthier community seven generations down the road, as youth come to better understand their reproductive powers and the parallels between their health and that of the environment.

### Cultural reproduction

Concerns about interrupted reproductive capabilities in Akwesasne extended beyond the ability to physically reproduce to also include concerns about the ways in which cultural reproduction had come under attack through the promotion of risk avoidance vs. risk reduction strategies to prevent contaminant exposure. The promotion of fish advisories as a means of preventing PCBs from entering Mohawk bodies led to concerns from community members that the cultural and social relationships around catching, cooking, and eating fish would be disrupted. Henry Lickers, the long-time director of the Mohawk

Council of Akwesasne's environment program detailed how fish advisories have helped to prevent continued exposure to PCBs, but have also prevented the sharing and inter-generational transmission of culture. He described how the language and culture around tying knots in nets, as well as the social interactions that occurred around the process of creating these nets are all lost when there is no longer a use for those nets. Similarly, the language around the names and descriptions of certain fish is lost. As Henry describes,

No one will eat it or buy it. And I'm not going to feed it to my kids or my wife, because she says no, that might be poisonous to me. So suddenly, the fisherman cuts his nets down, and they fall on the ground, and there's no fishing. What implication does that have? Well, it has an implication, in that over the years, people forget, in their own culture, what you call the knot that you tie in a net to make a net. And so, a whole section of your language and culture is lost because no one is tying those nets any more. The interrelation between men and women, when they tied nets, the relationship between adults or elders and young people, as they tied nets together, the stories that – tying nets is awful boring. And so, the stories were always there to keep you amused, and people talking, and so on and so forth. So that whole social infrastructure that was around the fabrication of that net disappeared. And you get to a point, in history where, if you go out probably today and ask a person "What is the name of that knot," no one can tell you, because nobody needs it anymore.

As another older man described to me, 'A lot of that has been forgotten, and the fish names in our language. Because a lot of the fishermen, when they go fishing, they talk about their Indian names to them, there is no English part of it, but that has been sort of forgotten now'. An article written by members of the Akwesasne Task Force on the Environment highlighted that, 'Everyone in the community must engage in culturally important activities, not just talk about them. Pollution discourages young people from spending time on the river and engaging in subsistence activities so important to the culture' (ATFE 1997, 283). Avoiding the culturally important act of fishing in order to protect themselves and their families from exposure to contamination then led to a diminishment of fishing culture, and the reproduction of family roles and connections. In addition, the alternative diets that people adopted when they were instructed not to eat local fish consisted mainly of affordable foods high in carbohydrates, which contributed to rising rates of diabetes and other metabolic disorders (Arquette et al., 2002; Schell et al. 2004). In this way, collateral damage was caused by the contamination: even when residents avoided contaminated food to prevent exposure to PCBs, their physical and cultural health was still impacted.

## Reproductive justice for mother earth

With these intersections in mind—between the health of women's bodies and that of the land – environmental reproductive justice was also a concept that was extended beyond just human relatives to the land itself, personified as Mother Earth. On 26 June 1991, the EPA hosted a public meeting in Hogansburg NY, in the Akwesasne Mohawk community, to discuss cleanup plans for the GM site. In response to GM's plan to leave the largest mass of PCB contaminated waste because it would be too expensive to remove, Jim Ransom, who at the time was on the staff of the Tribe's environment division, and a member of the Akwesasne Task Force on the Environment, beseeched the EPA and GM staff to think of the land as a human relative suffering from cancer:

I ask at this time to think of your mother, how she gave birth to you, nourished you and provided for you. She fulfilled the responsibility and duty given to her by the Creator. Now, think of our Mother Earth. She is the giver of all life. She continues to perform her duties as she was instructed. We the people, the animals and the plants are for the children, we have a responsibility and a duty to live in harmony with one another and other living things. One day your mother comes to you and tells you that she has discovered lumps in her breasts. You arrange to have tests done and find that both lumps are cancerous. What do you do in this situation? One lump is smaller than the other, so do you just have the smaller lump removed because it was less expensive? The other lump is much larger, it will cost more to remove. So do you decide to leave it and cover it with a Band-Aid and hope the cancer won't spread any further or do you have both lumps removed so that your mother may be healthy again? Now, it is our Mother Earth that has cancerous lumps in her breasts. The GM dump and East Disposal Area at the General Motors Central Foundry Superfund Site are the larger lump and the rest of the GM site is the smaller lump. The cancer in the form of PCBs and other chemicals have spread into – into our Mother Earth's blood, the waters of the earth, and that's spread to her children; the fish, wildlife, plant life, and people. EPA has decided to remove the smaller lump from our mother earth so that she may be healthy again. However, for the larger lump, the Industrial Landfill and East Disposal Area, General Motors thinks that we should place a Band-Aid over the cancerous lump because it is too expensive to remove the cancer. EPA says well, you should remove part of this lump and place a big Band-Aid on the rest so we keep our children away from its contamination... So, from a traditional Mohawk viewpoint, you are asking us to leave a cancer in our Mother Earth and to trust you that it will not spread. This is unacceptable to us (p 60–62 of public meeting transcript).

Mother Earth and her other-than-human children that Jim describes were not included in the agency's health risk assessment – most conventional risk assessment processes do not consider this extended system of non-human relatives. For this reason, the

Akwesasne Task Force on the Environment (ATFE) has been critical of these processes, expressing that ‘all peoples, including plants, animals and the earth herself must be included in defining environmental justice’ (ATFE 1997, 268; Tarbell and Arquette 2000, 95.) This connects back to the core ideas of intersectional frameworks laid out by Hill Collins and Bilge (2016) at the beginning of this article; the importance of considering relationality – in the sense of considering different types of relationships, as well as utilizing relational thinking that rejects either/or binary thinking. Health risk assessments conducted in Akwesasne noted that with the decrease in fish consumption, body burdens of PCBs also decreased. From the perspectives of toxicologists, this defined a success, but from the perspective of Mohawks they were being forced to make necessary concessions to protect their own health while their environment and other communities – namely the fish – were still suffering. As two ATFE members describe, ‘In classical models of toxicology, there is no risk if there is no exposure. Conventional risk assessments are severely limited in their application to Native peoples because they fail to adequately value cultural, social, subsistence, economic, and spiritual factors’ (Tarbell and Arquette 2000, 102). As Whyte’s (2013) work in Indigenous communities highlights, this includes the way in which the relational responsibilities between these communities that are not valued or taken into consideration when conducting these conventional assessments.

These authors demonstrate how Mohawk philosophy espouses a precautionary approach, which is more protective of a wider range of ‘community members’. Overall, ATFE suggests a new paradigm of holistic risk-based decision-making: bringing together community health, risk assessment and environmental restoration and including community-specific, culturally informed definitions of health, risk and restoration. This more inclusive model would contribute to the development of more protective environmental policy, designed to better prevent contamination, ensure more thorough site cleanups that would be more protective of a wider definition of ‘community’.

### Reproductive justice and seven generations

Ensuring that a wider definition of community is considered, and that Indigenous concerns about environmental reproductive justice are taken into account entails more than just employing terms and rhetoric familiar to Native people. In exploring clean up options for the Superfund site, part of ensuring ERJ for community members was working to make the region safe for ‘next seven generations’ of Mohawk people. This concept is employed in making decisions

about the future that are understood to have impacts beyond the lives of current decision makers.

In the cleanup of Superfund contamination on tribal lands, tribal ARARs or ‘Applicable or Relevant and Appropriate Requirements’, can be developed by tribal environment divisions, and are treated consistently with state requirements. In 1989, the SRMT Environment Division developed ARARs for PCBs of 1 ppm for soil and .01 for sediment, which was 10 times more stringent than the state and federal standards that were applied on land outside of the Tribe’s jurisdiction (10 ppm for soil and 1 ppm for sediment). In reflecting on the process by which the Tribe chose the standard, Jim Ransom described,

We decided on the numbers based on our community’s reliance on the natural world to support subsistence life styles. Our hope was that by setting on reserve cleanup standards that were more stringent than state or federal, it would help lead us back to the natural world. It fits in with our seven generations philosophy that states we have to have confidence that the people seven generations from now can look back and say we made the right decision in evaluating the decisions we make today.<sup>2</sup>

Because of Akwesasne’s status as a federally recognized tribe, and thereby a sovereign entity, EPA was bound by law to follow the stricter standards for cleanup that occurred on Mohawk land.

But land outside of the Tribe’s jurisdiction was still cleaned up to state and federal standards, standards which regulators worked to try to convince tribal members were safe. In an effort to alleviate fears of Akwesasro:non, and hence their resistance to clean up plans, General Motors attempted to co-opt the language of the seven generations framework in order to convince the Mohawk people they had their interests in mind. At a community meeting hosted by the EPA in Akwesasne in June of 1991, Doug Primo, Environmental Coordinator of the General Motors Central Foundry site at Massena, was pushing for a clean up plan that required less excavating and more capping in place of contaminated media at the site, and utilizing recovery wells instead of a slurry wall to prevent the migration of contaminated water. He stated, ‘General Motors believes the plan they have proposed for the entire site is a permanent remedy for the tribal lands and will be protective beyond seven generations (USEPA 1991, 42)’. The Mohawks in the audience were quick to censure him for attempting to co-opt their ideology in defense of a clean up plan that would leave behind more contamination. For example, as one woman, Kim Hathaway Carr, contended, ‘The representative from GM can get up there and implicate that he is concerned about seven generations of my family. Well, they were not concerned about my Mohawk family in 1959 and the years that followed it. They poisoned the lands, they

poisoned the water and they poisoned us. So, I'm sorry to the representative from GM, I cannot believe that you are concerned about our safety and our health, of my Mohawk family for seven generations to come' (USEPA 1991, 92–93). Ensuring ERJ for communities impacted by environmental contamination takes more than borrowing language associated with philosophies designed to protect future generation, it requires collaborating with those communities to develop and adopt standards and policies that ensure social reproduction over economic gain.

## Conclusion

In fully understanding the impact of environmental contamination in an Indigenous community like Akwesasne, issues of environmental justice have to be considered alongside issues relating to the physical reproduction of Indigenous people, as well as the reproduction of culture. In reflecting on the process by which her community began to tackle this issue, Katsi Cook (2007) describes,

Our story and unique context as a designated environmental justice community coevolved our struggle for reproductive justice. The restoration of culture-sustaining practitioners such as midwives and doulas (who provide woman-centered, continuous childbearing and child birthing support) were always included with strategies for the restoration of the holism of our environment in the protection of women's health over the life span. We understood that many other aspects of women's health were at risk from exposure to industrial chemicals in our environment.

Environmental Reproductive Justice (ERJ), developed through work by Katsi and others in Akwesasne and increasingly in other Indigenous communities, brings together the concept of reproductive justice and environmental justice, and includes ensuring that a community's reproductive capabilities are not inhibited by environmental contamination. This includes considering the impact of environmental contamination on the reproduction of humans, as well as the reproduction of knowledge and culturally informed tribal citizens. As noted above in critiques about conventional risk assessments, this also includes extending protections to, and considering the reproduction of nonhuman relatives.

Community and tribal government leaders in Akwesasne fought for a seat at the regulatory table, to develop their own policies and regulations, to have a voice in the research and clean up processes. But what some are calling for is a step beyond achieving equal inclusion in the political process. They are calling for what Whyte (2011) refers to as *recognition justice* – which requires that policies and programs fairly represent the culture and values of affected parties. Akwesasne Mohawks are calling for the

recognition of how features of their community intersect – as a matrilineal Indigenous community fighting against industry, settler governments, and economic concerns – to make them a distinct and sensitive group that does not want to receive the same treatment as, for example, white middle-class suburbanites. Because of subsistence lifestyles, spiritual practices, and other cultural behaviors, Indigenous people often suffer multiple exposures from resource use that result in environmental health impacts disproportionate to the general population (Hoover et al., 2012). 'Exposure scenario designed for suburban activities and life-styles are not suitable for tribal communities', and for this reason, Stuart Harris and Barber Harper (1997), in their extensive work around developing Native American exposure scenarios and risk assessment tools, argue that risk needs to be calculated differently in Indigenous communities. Potawatomi environmental philosopher Kyle Whyte (2013) asserts that the maintenance of 'relational responsibilities', necessary for tribal 'collective continuance' includes relationships between family and community members, and across human communities, but also relationships across species and with features of the land (like rivers or mountains) and ecosystems. Members of the Akwesasne Task Force on the Environment have published multiple articles demanding that their community be recognized as a distinct tribal community and culture, with a relationship to the natural world, and culturally based lifestyle that is different from other Americans. In Mohawk communities, good health for humans exists at the intersections of a thriving culture and a clean environment. As Mohawk scholars Arquette et al. (2002, 262) note,

Health, then, has many definitions for the Mohawk people of Akwesasne. Health is spiritual. Health is rooted in the heart of the culture. Health is based on peaceful, sustainable relationships with other peoples including family, community, Nation, the natural world, and spiritual beings. Health is supported by the solid foundation of a healthy natural world.

They go on to describe how protecting future generations is central to ensuring a healthy community, and this requires not only protecting their physical health and ability to come into this world, but also through passing on of Indigenous language. 'Language is also critical for good health, as it maintains our connection to community and to the natural world. Language is a living part of one's being, and as such is inseparable from culture. Within the Mohawk language, for example, we clearly find a cultural philosophy that is relational, integrated, holistic, and female focused' (Arquette et al. 2000, 262). For these reasons, it is important to integrate Indigenous beliefs and practices into definitions of



environmental and reproductive justice and health, and ensure that policy and programming reflect these definitions.

In her work with environmental justice and reproductive justice activists Di Chiro (2008, 280) describes how these women reframe environmental and reproductive rights issues in terms of the necessities for sustaining every day life, what she has referred to as social reproduction. Di Chiro (2008, 294) calls for a coalition of intersectional movements, to generate 'dynamic, living environmentalisms that may well compel people to join together and take stronger action to curb problems.' Environmental reproductive justice (ERJ) is the framework under which this coalition of intersectional movements could be housed, in an effort to recognize and address the impact of environmental contamination on physical, social and cultural reproduction in affected communities.

## Notes

1. For a full exploration of how research has impacted Indigenous communities, and the importance of CBPR in this and other research; as well as the broader methods employed in this research, see Hoover (2016) and Hoover (2017).
2. Jim Ransom, email communication, 9 June 2015.

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