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Environmental Reproductive Justice, Indigenous Health Knowledge and Indigenous Women on the Climate Frontlines

Jessica L. Liddell[1] · **Sarah G. Kington**[2] · **Devin C. Wright**[2]

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Abstract
Place and the intergenerational transmission of cultural knowledge are deeply intertwined among Indigenous groups due to the significance of the environment and land within Indigenous ideologies, and the legacies of displacement wrought by settler colonialism. Little research explores this topic among Indigenous tribes in the Gulf South, who face unique environmental challenges related to climate change, land loss, oil extraction, and who depend on the coastal environment for cultural and subsistence resources. Scholarship on this topic among tribes that are not federally recognized is similarly limited. Using semi-structured interviews among 31 self-identified women members of a U.S. Gulf South tribe, we show how gendered and place-based knowledges manifest within the embodied and material experiences of tribal members, as well as the ways that those experiences and the transmission of knowledge are mediated by political and environmental changes through the example of traditional health and healing practices and knowledges. Key findings that emerged include: (a) Place-Based Concerns about Environmental Change and Displacement; (b) Concerns about Future Generational Changes in Knowledge Transmission; (c) Loss of Indigenous Health Knowledge. We suggest that there are significant impediments to the sociocultural reproduction of traditional health and healing practices and knowledges within the tribe brought about by environmental changes (e.g. saltwater intrusion, land loss, etc.) and the continuing influx of Western medicinal knowledge and practices. In contextualizing these findings within the environmental reproductive justice framework, we echo extant intersectional environmental research suggesting that environmental degradation and legacies of settler colonialism, by virtue of place-based and gendered knowledges and labor, disproportionately burden women, especially Indigenous women. We also note that

The authors thank the members of this tribe for their dedicated work and participation in this research.

Extended author information available on the last page of the article

despite significant material and cultural threats, tribal members demonstrate resilience and resistance to the macro-scale forces obstructing Indigenous ways of life.

Keywords Environmental justice · Reproductive justice · Indigenous · American Indian · Native American; climate change · Land loss · Settler colonalism

Introduction

The uneven geography of climate change impacts is well-known, as articulated in the Intergovernmental Panel on Climate Change (IPCC's) Sixth Assessment Report (IPCC, 2022). Communities on the climate frontlines, often referred to as "frontline communities," live or work in regions where the most direct, immediate, and harmful impacts of climate change are felt. These communities, tribes, and women are among those deemed most vulnerable to severe climate impacts. This unevenness has important implications for social reproduction, which Di Chiro (2008) defines 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" (p. 281). Social reproduction was a major topic within feminist geography and globalization debates in the 1990s and 2000s; it was recognized to be decidedly less mobile than productive practices or, put differently, more rooted in place and ecology (Katz, 2001; Rocheleau and Roth 2007). Here we reinvigorate the conversation surrounding social reproduction while maintaining a materialist lens, but suggest that there are cultural elements yet understudied and undertheorized, particularly in light of emergent socioecological changes.

Cultural reproduction is an issue of particular importance among Indigenous peoples in the United States. Barriers and threats to Indigenous cultural reproduction date back to the onset of settler colonial practices. These practices have included the process of forced relocation of Indigenous tribes from homelands and ecologies onto designated reservations as the US sought to seize and expand their territory (Wolfe, 1999), as well as the practices associated with the Indian Civilization Act of 1819, where children were forcibly removed from their families and sent to boarding schools, with the explicit goal of forcing cultural assimilation (O'Sullivan, 2016).[1]

Settler colonial practices to force cultural assimilation have a geographic component related to severing the ties that Indigenous peoples have with their traditional ecologies and territories. Land itself is imbued with meaning and recognized as an important feature of Indigenous identity. Land exists relationally and, through these relations, we create places and meaningful geographies that vary according to social position (Kermoal and Altamirano-Jiménez 2016; Little et al. 1988; Rose, 1993). Furthermore, Indigenous relationships with land are accompanied by situated knowledges that are based in both ecological and social contexts (Haraway, 1988). In this study, we explore the overlooked ways that place interacts with Indigenous women's

[1] Though the authors have chosen to use the term "Indigenous" throughout this article, "Indian Civilization Act" is referenced here as the official title of a US Congressional act.

cultural reproductive laboring by examining the ways that traditional health and healing knowledges and practices are being threatened by climate change-induced environmental degradation. Moreover, intergenerational knowledge transmission has been traditionally relent on tribal members physical proximity to one another. For example, the removal of children from their tribes has disrupted the passing down of traditional knowledge through oral storytelling and through older generations acting as models and guides to youth (Hausknecht et al., 2021). While physical separation has deeply altered the passing down of traditional knowledge, technology has been increasingly used to address this barrier and share stories through creative means (Cidro, 2012; Divarkarla et al., 2020; Hausknecht et al., 2021; Spiegel et al., 2020).

In light of extant feminist and environmental scholarship on women's disproportionate social reproductive labor and environmental activism, these threats to cultural reproduction and environmental justice are understood to be gendered (Krauss, 1993; Epstein, 1995; Taylor, 1997; Bell, 2013). Accordingly, we engage with feminist methods to center women's perspectives and stories, which highlight barriers to cultural reproduction as it relates to traditional medicine and healing practices. We situate the threats to cultural reproduction as described by Indigenous Gulf Coast women within the environmental reproductive justice framework, which allows for particular attention to the relational ways that cultural reproduction, as a gendered knowledge and labor, is impacted by environmental and political changes.

Theoretical Underpinnings of Cultural Reproduction: Environmental Reproductive Justice, Structural Violence, and Geographies of Slow Violence

Environmental reproductive justice (ERJ) emerged as a framework to bring together the issues of environmental justice (EJ) (the idea that protection under environmental and public health laws is entitled to all people and communities, with "the environment" defined as all places where people live, learn, and work (US EPA 2020) and reproductive justice (RJ) encompassing three principles: (1) the right to have children; (2) the right not to have children; and (3) the right to parent those children in healthy environments (Ross et al., 2016), emphasizing their interrelationships. In addition to the physical reproduction of peoples as a defined right, Environmental Reproductive Justice calls attention to the reproduction of culture as influenced by environmental changes. The origins of cultural reproduction and Indigenous ERJ are rooted in instances of Indigenous women calling attention to environmental reproductive harm. In particular, Katsi Cook spoke out against the profound impact of environmental pollutants on Akwesasne mothers' desire to eat fish. The presence of heavy metals in local water sources and fisheries led to increased toxins in breast-milk amongst tribal members, impacting both physical health and the willingness of women tribal members to uphold these traditions (Arquette et al., 2002; Cook, 1997). Research highlighting the experiences of women Akwesasne tribal members has led to conceptualizations of cultural reproduction integral to the ERJ framework (Arquette et al., 2002; Cook, 1997; Hoover et al., 2012[2]; Liddell & Kington, 2021). While the RJ frame does not explicitly emphasize relations to EJ, there are obvious

connections between the principles of RJ and concerns of EJ. For example, environmental toxins can lead to fertility issues and hinder the ability to have children (principle 1), and compromise parental/communal ability to provide children with a healthy environment (principle 3) (Liddell & Kington, 2021; Hoover et al., 2012). The issue of climate change also brings up Malthusian debates which promote controlling and limiting the reproductive rights of marginalized women (principle #1), blaming climate change on perceived "over- population" of these communities, while the data consistently shows this not to be the case. Likewise, instances of climate change, such as more severe and more frequent hurricanes, make parenting in a "safe and healthy environment" more difficult (principle 3) and present major barriers to accessing timely and effective contraceptive care (principle 2) (Loewen et al., 2022; Strid et al., 2022).

[2]Drawing on the concept of intersectionality which emphasizes how interlocking axes of oppression and identity (for example, race, class, immigration status, gender, etc.) manifest in lived experience (Crenshaw, 1989), environmental reproductive justice (ERJ) combines and builds upon both EJ and RJ to create an integrated framework (Hoover et al., 2012). Importantly, the ERJ framework emphasizes that the environment impacts issues of physical as well as cultural reproduction, including (but not limited to) practices involving language, food, and the primary focus of this study: traditional medicinal practices. Similarly, Di Chiro (2008) offers the concept of "living environmentalisms" to analyze how environmental and reproductive justice movements articulate a coalitional and intersectional politics based in shared struggles for social reproduction that transect the western human/nature dichotomy. By focusing on cultural reproduction, we are able to attend more acutely to the everyday and subtle ways in which knowledge production and reproduction practices are a site of negotiation between macro-scale dynamics, material circumstances, and micro-level everyday individual resistances (Cook, 1997; Hoover, 2012).

Many of the historic and ongoing impacts and events of settler colonialism can be interpreted through an ERJ framework (Cook, 1997; Hoover, 2012; Liddell & Kington, 2021). Settler colonialism is distinct from other forms of colonialism in that the goal is to settle and take control of the land, and as such the practice has involved the goal of eliminating people native to colonized land through a combination of forcing Indigenous persons to relocate, genocide, and cultural genocide via practices of forced assimilation. By emphasizing the importance of settler colonialism in the ERJ framework, we can more clearly see how the issue of cultural reproduction relates to historical forms of cultural genocide, and the ways that contemporary issues of cultural reproduction work to continue the settler colonial project. This study focuses on traditional medicinal knowledges and practices whose reproduction is threatened as a result of climate change-induced environmental degradation. These environmental changes stress the material resources necessary for Indigenous cultural reproduction in the day-to-day and intergenerationally (Collins, 1991).

[2] We include the work of Elizabeth Hoover and her colleagues because of its importance in conceptualizing the integration of the reproductive justice and environmental justice frameworks into the environmental reproductive justice framework, and to the concept of cultural reproduction, but also find it important to acknowledge the immense harm that has come from Dr. Hoover's previous claims to having an Indigenous identity when she is not an Indigenous person.

The theories of structural violence, and geographies of slow violence help to explain the mechanisms through which these violations of ERJ take place. Structural violence theory asserts that we must look "geographically broad"—recognizing the interconnectivity of the world— and "historically deep" – taking into account not only the historical power dynamics which may have set up contemporary inequitable situations, but also the generational abuses and exploitations that have occurred to marginalized communities over time (Farmer, 1996, 2004). The corporate exploitation of the Gulf Coast region as a "frontline community" disproportionately experiencing the impacts of climate change cannot be understood without asking questions about who benefits; the burdens of climate change and environmental degradation caused by wealthy corporations (in this case, oil and gas) and affluent patterns of consumption are borne by "sacrifice zones," typically occupied by historically marginalized communities. Likewise, by taking a "historically deep" approach, we can see how the disruptions to Indigenous cultural reproduction are a continuation of the settler colonial project – the same project which led to this tribe relocating from their ancestral land to the less desirable land along the Gulf Coast.

By attending to place in relation to cultural reproduction, we see the interface between the material, cultural, spatial, and temporal elements of the "slow violence" of climatic change and better understand the particular and complex "geography of violence" experienced by this tribe (Doel, 2017; Hyndman, 2019; Nixon, 2011; Springer and Le Billon 2016). The scholarship surrounding geographies of violence thus far has focused primarily on acutely experienced violent acts. However, this case study supports the growing calls for investigation of "geographies of slow violence" (O'Lear, 2021); which includes investigating the spatial patterning that emerges and provides supporting evidence of acts of violence that are otherwise difficult to see and measure.

Tribe Context

The tribe that was interviewed for this project resides in an expansive region along the Gulf Coast, with a dynamic amphibious landscape of bayous, wetlands, and river systems. Historically, tribal members relied upon the environment for various activities of economic, cultural, and subsistence importance, such as growing food/medicine, harvesting seafood, and fishing. Due to the Gulf Coast location, the area is especially susceptible to changes related to climate change, such as more frequent and more severe hurricanes, rising sea levels, land loss, and increased salt-water intrusion which drastically changes the ecological system of the land (Tully et al. 2019). The region also experiences high levels of exploitation from oil and gas companies which further changes the landscape, (e.g. through dredging of canals), exacerbating some of the issues caused by climate change, while increasing pollution in the region. Additionally, the region experienced the impacts of the devastating 2010 BP oil spill disaster when over 4.9 million barrels of oil poured in the Gulf of Mexico (Smith et al. 2011). Research has shown the negative mental and physical health impacts of this spill on residents of the region, due to reduced economic opportunities related

to contamination, as well as decreased availability of safe and healthy food (Fan et al., 2015).

The tribe has historically utilized traditional medicine and healers, a practice that relied upon a tight-knit community, the passing of generational healing knowledge, and reliance on the natural environment to practice the knowledge. The influx of Western medicine, as well as changes to the environment impacting both the availability of traditional plants and the dispersion of tribal members, may be changing this practice as evidenced by this study and other Indigenous accounts in the region (Alaska, 2020; Liddell & Kington, 2021; Liddell et al., 2021; Liddell et al., 2022a, 2022b; Liddell et al., 2024).

The tribe has gained state recognition but has failed to receive federal recognition – a process acknowledged as highly political and one that is granted inconsistently (Fletcher, 2006). While the process has been criticized for these reasons, without federal recognition, tribes are denied the same rights as federally recognized tribes, such as the ability to create and enforce environmental regulations. In the case of the BP oil spill, lacking federal recognition meant losing out on financial compensation from BP since they only recognize tribes that are also federally recognized (Billiot and Parfait 2019).

Because this tribe is not federally-recognized they do not have access to Indian Health Service (IHS), or other healthcare entities administered by the U.S. Department of Health and Human Affairs (Fonseca et al., 2019). The provision of healthcare for Indigenous peoples by the US is based on a trust agreement, which stipulates that the federal government is responsible for providing quality healthcare to federally recognized tribes. Currently, the provision of healthcare includes IHS health facilities, urban health centers, and tribal health centers (Fonseca et al., 2019). Though funding for these entities is provided by the federal government, management of these facilities is increasingly being held by federally recognized tribes or tribal nonprofits (Fonseca et al., 2019). There exist concerning financial gaps, staffing concerns, and other barriers limiting access to quality care. However, these entities are also often the only source of healthcare for Indigenous communities (Gurr, 2014; Jones, 2006; Theobald, 2019; Zuckerman et al., 2004). Moreover, the increase in tribal-managed healthcare facilities has led to a rise in the integration of traditional medicine into routine healthcare services and federally funded health entities may offer opportunities to access culturally congruent care (Warne & Frizzell, 2014). In being excluded from the trust agreement, state-recognized tribes do not have access to these services and must rely on public or private insurance for health coverage. Significant research has focused on federally recognized tribes and IHS. This research is unique for its focus on the provision of healthcare for a state recognized tribe.

Purpose

This research analyzes the cultural reproduction practices described by women members of a Gulf Coast state-recognized tribe using the environmental reproductive justice framework, emphasizing the material and cultural importance of place as an intermediary of environmental change and social reproduction. While the ERJ

framework has been increasingly used, little research has applied it specifically to the aspect of cultural reproduction. The reproduction of culture is especially important among Indigenous peoples in colonized nations such as the US, where the historical geographies of violence and cultural genocidal practices extend as far back as the onset of settler colonialism. The purpose of this study is to analyze the ways that Indigenous women describe cultural reproduction activities, barriers, and concerns. The guiding research questions are: "How do Indigenous women describe past, current, and future threats to cultural reproduction?" and "How is the concept of place described in connection to cultural reproduction?" In order to answer these questions, we hone in on the reproduction of traditional medicinal knowledge and practices.

Materials and methods

Research Design

The findings in this manuscript come from a larger study exploring the reproductive and sexual health experiences of Gulf Coast Indigenous women (Liddell et al., 2024; Liddell & McKinley, 2022). The research project was designed using a community-engaged approach and qualitative descriptive methodology appropriate for conducting research with Indigenous groups (McKinley, 2019; Burnette et al., 2014; Strega & Brown, 2015) and builds upon prior research with Indigenous tribes in the Gulf Coast (Burnette, 2015; McKinley et al., 2019; McKinley et al., 2023) and the framework of historical oppression, resilience, and transcendence (FHORT) (Burnette & Figley, 2017). Tribal members serving on a community advisory board assembled for the project acted as collaborators throughout the research process; from study design and recruitment to the dissemination of findings to the tribal community. In accordance with recommendations from tribal leaders and acknowledged best practices for conducting research with Indigenous populations, a semi-structured life-history interview methodology was used (Kovach, 2010).

The qualitative descriptive life-history approach was preferable for the study because it not only allowed participants to detail experience over the life course, but preserved participant voice by allowing for description of events according to the individual's experience and interpretation (Creswell & Poth, 2016; Milne and Oberele 2005; Sandelowski, 2000; Sullivan-Bolyai et al., 2005). Furthermore, prior research with the tribe employed this methodological approach and it was found to be culturally resonant (McKinley, 2019). Member checks took place, in which participants were asked if they would like to receive a summary of results and to provide feedback, prior to these results being shared with others. The second author sent a summary of results to those who opted into member checks and encouraged their input. Participants did not have suggestions for changing the analysis. The process of member checking was used as a means of giving individual participants as much control over their own stories as possible. Ultimately, the chosen approach centered around ensuring the well-being of the Indigenous women participating in this study and taking accountability for historical and ongoing harms research conduct

has enacted/enacts on Indigenous and other marginalized populations (Burnette and Sanders 2014; Denzin et al., 2008; Strega & Brown, 2015).

A high level of rigor was achieved by adhering to Milne and Oberele's (2005) qualitative description study protocol. The protocol emphasizes flexible but systematic sampling, open dialogue amongst participants, careful attention to accurate and verbatim transcription, codes directly derived from participant words and phrasing, and analysis that is data-driven and contextually embedded (Milne and Oberle 2005). Accordingly, study findings should be understood within the context of the tribe studied. Out of respect for tribal agreements, the tribe will remain unnamed.

Data Collection and Analysis

The research project was given IRB approval by both Tulane University and the tribal council. Between October 2018 and February 2019 a total of 31 interviews were conducted, which is typical for a study using the qualitative descriptive approach (Sullivan-Bolyai et al., 2005). Saturation was achieved after 27 interviews (Creswell and Poth 2016) but an additional 4 were conducted to affirm saturation and to follow through on all interviews scheduled prior to reaching saturation. Participants were recruited through snowball sampling extending from the community advisory board, word-of-mouth in the community, and fliers posted at community and tribal centers.

Those who self-identified as tribal members and as women and were at least 18 years old were eligible for inclusion. Women participating in the study ranged from 18 to 74 years old (mean: 52). Approximately half of the sample were more than 56 years old and offered unique insight into the perspectives of elder women in the focal tribe. This is notable given the cultural significance of elders within the tribe. These women were also able to speak to generational differences including not only their children but also grandchildren. 84% of the 31 participants had at least one child (mean number of children: 2.23). 73% of participants completed at least high school (see Table 1).

Interview locations were determined according to individual participant preferences. All interviews were conducted in locations comfortable for and physically proximal to participants. The majority of interviews were conducted in a private room at a local community center. The remaining interviews were conducted in individual's homes or in a coffee shop.

Interviews proceeded using a semi-structured interview guide. The life-course approach was infused into the guide through the strategic chronological progression of interview questions that would elicit stories from participants extending over the full life course; from childhood to the present moment (Sandelowski, 2000). All participants gave consent for the interviews to be recorded. The recordings were then professionally transcribed and quality checked to ensure verbatim accuracy. NVivo, a CAQDAS, was used to code the transcripts using a two-step conventional qualitative content analysis process (Milne and Oberele 2005; Hsieh & Shannon, 2005). First, open coding was used to ensure significant familiarity with the data and determine major themes. Direct coding was then used to add nuance to initial open codes (Sal-

Table 1 Demographic information for participants

Participant Demographics	
Number of Children (*M*)	2.23
Age at First Child (*M*)[1]	20.62
Education (*n*)[2]	
> High School	7
High School	3
Some College or Vocational	10
< Bachelors	6
Participant Age (*n*)	
Youth (Age: 18–23)	3
Adult (Age: 24–55)	13
Elder (Age: <56)	15
Insurance (*n*)[3]	
Private	21
Medicaid	5
Medicare	6
No Insurance	2

Note. This table displays the demographics of study participants. [1] Missing for 1 participant, N/A for 5 participants with no children. [2] Missing for 5 participants. [3]Missing for 1 participant. Four participants had multiple forms of insurance and stated that they had a combination of either Medicaid and Medicare or Medicaid and private insurance or Medicare and private insurance

dana 2015). The resultant coding scheme was hierarchically arranged and illuminated relations between sub-codes and larger thematic codes.

Results

In the following subsections we discuss key environmental reproductive justice themes identified by participants that connect worries and experiences surrounding the loss of place-based knowledges, specifically surrounding traditional tribal healing practices, to cultural reproduction over space and time. We report results through the discussion of the following themes: (1) Place-based concerns about environmental change and displacement; (2) Concerns about future generational changes in knowledge transmission; and (3) Loss of Indigenous health knowledge.

"Our Bayou Version of Gentrification": Place-Based Concerns about Environmental Change and Displacement

Indigenous women interviewed for this study often recounted the use of locally available plants for traditional healing practices. Participants described using such home remedies and visiting traditional healers for a variety of reasons, including efficacy, cost, proximity, and cultural familiarity and significance. Participant 15, a 52-year-old woman with two children, described using home remedies and being taken care of by family members because they couldn't afford to go to the doctor:

> In our household, we couldn't afford to go to the doctor, so we used home remedies. If it was a sore throat, my gram would pick certain leaves from the backyard and make a tea. If we had a cold, it was honey, her little concoction

> of leaves, or whatever else or bamboos. Earaches—it was smoke in the ear and different little remedies like that, all home-based.

Another participant recalls how traditional healers act as complementary healthcare practitioners to Western medical care and how, in instances where Western medical treatment fails, traditional healers and place-based remedies are viable, trustworthy, and important ways for tribal members to get high-quality care. Participant 4, a 68-year-old woman with 4 children, described taking her daughter to a woman healer to treat a migraine:

She said, 'Momma take me to the hospital. Take me to the hospital.' She came to church and she kept going, "Momma, let's leave. Let's leave.' Then after church I told my husband, 'We got to take her to the hospital. This is wrong.' So we took her, and [the doctor] said it was her migraine and blah, blah, blah. We were coming back home. She was still [in pain]. She said, 'Momma, it hurts. It hurts.' So we went to a [healer]. [The healer] said take the banana leaves. When [my daughter] got home I did it [sic] then she went to bed and that was it. It was good.

These two responses highlight how participants' cultural practices and knowledges, in this example accessing traditional healers and home remedies, are simultaneously predicated on intergenerational knowledge transmission and sustained relation to place through the home as well as the surrounding environment and available resources (e.g. plant matter such as banana leaves).

Participants often causally linked their concerns about loss of traditional and medicinal knowledge to environmental changes, forced displacement, and subsequent relocation away from traditional lands and ecologies. Participant 10, a 31-year-old woman with no children, described the loss of traditional and medicinal knowledge that occurs when tribal members are forced to relocate or have dramatic changes to their environment:

> I think that [loss of knowledge] is kind of what happens in colonization, when you remove people from their environments. My grandmother had to move away from where she was from and she moved into a community. She still had a yard, but not as much of a yard. She lost a significant amount of property. She didn't have plants anymore. That's where I grew up.

This participant goes on to express concerns about what large-scale land loss and relocation means for her whole community. She describes the strong sense of community that is based in place due to spatial proximity and shared cultural ecologies:

> I'm worried about coastal erosion for all the other reasons as well, like the trees and the animals […], but I'm also worried about what happens because we've already seen what happens when people lose those communities. […] When you can't just, like, go to your neighbor when you want to talk and you can't share Gumbo or when you can't pay the little old man that rides on the bike $6 for a Ziploc bag full of red fish. What are you going to eat? I worry about what's going to happen when we lose that. People know that they can go to their neighbors. There's always somebody around. We're forced to move from

> this community because eventually they are going under or you can't afford the insurance. Our bayou version of gentrification.

Participant 4 also expressed her worry that if rapid land loss continued for the tribe, there wouldn't be anywhere for them to live: "If [the tribe] had to leave they may have nothing to come back to. There won't be anything left for them to come [home] to. It's all going to go underwater." This participant describes the fear of impending climate-induced displacement and uncertain/unknown resettlement; the loss of place and the homeplace (hooks, 1999).

"Will my Kids Know About It? I Don't Know. I Really Don't": Concerns about Future Generational Changes in Knowledge Transmission

Despite the persistent cultural significance and respect for traditional medicinal practices and practitioners, participants repeatedly expressed concerns over the perceived decline in use of traditional medicine healers and home remedies. Participant 12, a 68-year-old woman with 2 children, went as far as to say, "[…] it is a dying art. And will my kids know about it? I don't know. I really don't." Many women were explicitly concerned about the intergenerational transmission of knowledge between tribal elders and the young tribal members today. Though participants spoke about learning about the use of plants and traditional medicine from their own mothers and grandmothers, many were worried that this knowledge was no longer being passed down.

Women expressed worries about the numerical decline in healers and worried that the tradition of utilizing healers at all was beginning to disappear. Participant 19, a 62-year-old woman with 3 children, described some of the healing practices she learned growing up from her mother who did not consider herself a formal traditional healer, but was well-known in the community for her healing practice and knowledge:

> There was one particular remedy that was [used] to cure asthma. It was a ritual, actually. It was with prayer and cutting somebody's hair in a cross over his head nine times. But it had to be a left-handed person. I was a young girl; I was the left-handed person. So knowing that I didn't know how to cut hair or what I was doing my mom said, 'Put your hands on the scissors and let me do the cutting.' She used my hands, but she did the cutting. Then once the hair was cut, she would take the person's hair, put it in a plastic bag, and go to the busiest entrance door, measure the person, and make a hole right where the person's height was, and then take the little plastic bag and stuff it in the hole. She would do prayers for nine days over that person and she would tell the patient. When he or she passes that height the asthma will be gone.

This participant describes her mother utilizing her to assist in her healing practices, in addition to describing the relationship between prayer and traditional healing. Through the actual intergenerational practice of healing rituals such as this, knowledge transmission occurred but to a limited degree. This participant went on to state that her mother had wanted her to document some of these healing practices:

> Before she passed away, she was trying to tell me a whole bunch of them. I said, 'Mom, I'll remember this.' She says, 'No, you need to write a book. You need to put all this in a book.' I never wrote the book she wanted me to write, but I still use a lot of remedies, especially for babies. […] There are a ton of them [remedies].

In addition to describing more of the home remedies her mother practiced, this participant states that her mother encouraged her to write down her healing practices, so that they could be preserved, although this participant did not do so.

Some participants stressed the importance of knowledge being passed down because of concerns about the future and the looming possibility of extreme hardship for tribal members. Faced with an unknown future, they viewed the preservation of place-based cultural knowledges as a potential tool for tribal survival. Participant 14, a 23-year-old woman with one child, stated that she hoped this knowledge would be passed on to her daughter: "[If] we can keep it going. I mean, I think it'd be good…. You just never know, how many years from now, a different time, completely different times." Tribal knowledge is not the sole mechanism by which survival is ensured or not, but it is recognized as an essential tool and asset among tribal members as they resist macro-scale environmental and political change that is intensively manifesting within their material and cultural environment. Through their expressed concerns participants demonstrated the significance of traditional knowledges and contemporary place-based tribal practices/lifeways as potentially vital resources in an unknown future for tribal members and the Indigenous community writ large.

"It Must've Died with Me": Loss of Indigenous Knowledge

Not only are participants expressing concerns about the intergenerational rift in cultural knowledge transmission but there is clear evidence that these concerns extend from personal histories and are being realized in real time. This was particularly apparent when asking women about their healthcare experiences over the life course. Elder women typically described first going to a family member or a traditional healer before seeking outside treatment or seeing a Western medical professional. Although use of traditional and familial connections for medical care was still common among younger generations, they less often mentioned going to traditional healers. Here we aim to articulate the manifestations of threats to cultural reproduction as well as some of the ways in which tribal members are resisting and, cumulatively, creating and enacting communal resilience and survivance. We refer to Indigenous resilience as creative and enduring adaptation in the face of adversity (Burnette & Figley, 2017), and Indigenous survivance as affirmation of identity and presence through narrative voice (Vizenor, 2009). Counter to victimhood, survivance draws on humor and reclamation of tropes to illuminate Indigenous cultural reality as living and breathing across time. Consistent with resilience, survivance is reflective of interactions and connections made between individuals, groups, policies, culture, and community (Burnette & Figley, 2017; Vizenor, 2009).

Women suggested that traditional healers were increasingly difficult to locate and/or were selective with those whom they chose to treat. Participant 22, a 67-year-old

woman with five children, reported that because the tradition of using traditional healers is no longer being passed down, she did not know who to send her daughter to when they wanted to find a traditional healer:

> The other day my daughter called me. She's 43. She said, 'Mom, you know somebody that [heals]?'…I said, 'I don't even have an idea. I don't know nobody [sic] that [heals] anymore.' The old [healers] they died. Nobody picked it up. They might have some that I don't know, but the ones we were used to [are gone].

Participant 12, a 68 year-old woman with two children, framed traditional medicinal knowledge as a 'gift' and that this gift was not being passed on and so it was dying. She went on to say:

> You see what it is, with a [healer], it's a gift. And the gift has got to be given to someone. So my grandmother was giving it to my mother. My grandmother fell sick, so my mother got some of it but not all of it. Then my mother never passed it on. It died right there. So whatever we learned was from different, other people, and from my grandmother, what she would do.

When asked why she felt her mother did not pass the gift on to her the participant said: "I don't know, because maybe it wasn't for me. Because it's a gift. So, if that gift is not for you, I can't give it to you." This participant added that she did not know of any current healers she could go to if she needed to: "Not that I know of. It's only word-of-mouth. Things that were passed on that you know." Although this participant stated that she was not taught healing from her grandmother and father, she also noted that her son had decided to pursue medical school and was supportive of traditional medicine in his own practice, indicating that perhaps the healing tradition was being passed on in their family in a different form. For this participant's son, values about the importance of traditional medicine were transmitted to him by his mother and community and were present in his own Western medical practice, albeit in a hybrid form. Here we see tribal community members demonstrating communal resilience by subverting threats to cultural reproduction through hybridizing knowledge and practices. In building and sharing the narrative that traditional medicine has continued to be passed on by her son, this participant also demonstrates survivance and takes ownership over how cultural reproduction is defined for her and her family.

Importantly, women recounted declines in both the presence of healers within the community and the use of remedies within the home among family. It is not only that fewer people know the remedies or have access to community members that know traditional remedies (e.g. elders and healers), but fewer people know these remedies themselves and don't feel that their knowledge is such that they can pass on this knowledge to younger generations. The following account illustrates an important causal link between knowledge transmission and spatial displacement and dispersion identified by Participant 11, a 36-year-old participant with three children. She starts by saying that all families have a particular set of healings that they practice and pass down generation to generation, "we all have our own family healings that are passed

down…that they just kind of know. If you give her a tea like this, that's got a little bit of this and that in there, she'll be fine. That kind of deal."

However, she then goes on to say that this community tradition of generational knowledge transmission within family units actually did not come to pass in her experience and, further, that she suspects a lack of spatial closeness is a major reason why: "I would hope it would be [passed down] but some of these families spread out so fast. I don't remember any of that. I know I'm one of those that it caught. It must've died with me. I don't remember anybody teaching me what it is or what it was that we did specifically. If it was certain remedies or certain elements. It wasn't taught to me." Participant 1, a 54-year-old woman with two adopted children and no biological children, similarly recounts that the information was passed down to her incompletely, but she suggests that this is a result of the influx of Western medicine into the community, "The older people didn't pass it down. I know some stuff from my nanny and I know some herbal stuff, but to do like a full-fledged [healing], like my momma's dad, my grandma and all them. No. I guess because people started going to the doctor, relying on that medicine versus your own people medicine." This participant went on to add that even though she had been told she had the gift, she had not taken it up, and that people no longer listen to the traditional knowledge: "I believe that wholeheartedly. People just don't listen to it. They said that I had the gift, but I never [practiced it]." These quotes indicate that although traditional Indigenous healers and traditional knowledge were held in high esteem at community, family, and individual levels, this knowledge was no longer frequently being passed down.

In addition to traditional healers and healing remedies/rituals, which was a key theme of the study, participants noted generational changes to other cultural traditions within families. Participant 14, a 23-year-old woman with one child, described speaking [language name omitted] as another important tradition that was no longer being passed down to younger generations: "[My grandmother] speaking [language name removed to protect identity], that's another thing that's getting lost. My dad, her son, he doesn't know anything. We don't know it." Participant 17, a 59-year-old woman with two children, similarly described a loss of the ability to speak this language among younger generations:

> That's our language; we talk English and [name omitted]. Now, my first three girls, when we meet, we talk [language name removed]. And then the last one, we talk English. She understands [the language]. But she doesn't talk it. My first three, when they entered school, they learn[ed] English in school. And then the last one, well, we spoke to her in English. So it's what you teach them, you know?

Though this mother taught her oldest children this language, she shifted to speaking English with their youngest child, perhaps in part because that is what all of the children were learning in school. Again, here we see threats to cultural reproduction being realized, but only partially. Cultural change occurs as a process and negotiation between actors, including the landscape and the tribal members themselves. Importantly, cultural reproduction is still happening as a result of communally-held

resilience and individual acts of resistance. Moreover, stories of continued cultural reproduction as authored by participants are poignant examples of survivance.

Discussion

Participants described clear disruptions to cultural reproduction, as well as concerns over continued and future cultural reproduction. We identified three primary themes, including material and place-based environmental changes, concerns over disruptions to intergenerational transmission of cultural knowledge, and the realization of these disruptions. Despite the concerns and participant accounts of environmental change and cultural disruption brought on by macro-scale sociopolitical forces (i.e. settler colonialism and neoliberal capitalism), the data also suggest ongoing reverence for traditional tribal knowledge and practices, including among younger tribal members. This ongoing affinity and enduring cultural reproduction, while demonstrably threatened, shows community strength and resilience despite mounting obstacles. Additionally, participants demonstrate survivance by claiming what is defined as traditional medicine and celebrating the longevity and ingenuity of young generations in integrating traditions into current systems.

Participants stressed the changes in cultural practices that resulted from environmental changes. They drew connections between the changing landscape, such as rising sea levels and saltwater intrusion, and the declining ability to rely on the land for traditional medicinal plants. Additionally, participants expressed concerns about the future of the tribe and cultural practices due to the continued effects of climate change on the land or what Bakker called the "erosion of the conditions of social reproduction" (2007, 547).

These findings support national findings that Indigenous groups experience high levels of environmental injustice (Maldonado, 2014; Vinyeta et al. 2016) and further contextualize this finding for an Indigenous tribe in the Gulf Coast Region of the United States. Concerns that loss of land and climate-induced displacement/relocation would undermine transmission of cultural knowledge and tribal identity were frequent worries of Indigenous women. Our results echo contemporary understandings of Indigenous cultural resilience as frequently tied to a sense of place and place-embeddedness and, furthermore, as affecting women and their labor in unique and gendered ways (Kirmayer et al., 2011). Place, amongst many Indigenous peoples, is connected to traditional lands and the materiality of those landscapes (i.e. plants, animals, waterways, etc.). Many participants linked loss of land to loss of culture via spatial-temporal disruption in environmental knowledge transmission processes. Environmental knowledge is itself a well-known facet of and vehicle for social reproduction (Katz, 1991, 2004). Further, the barriers to cultural reproduction, seen here to be largely resulting from local and global socio-environmental changes, have important ramifications for Indigenous identity insofar as tribal identity was so closely linked to threatened place-based cultural practices. The desire to preserve the land was strongly connected with a desire to preserve tradition and the ability to pass on tribal practices to one's children.

While many participants described Indigenous knowledge being passed down orally, one participant's mother encouraged the creation of a written record even though this is not the traditional mechanism for knowledge transmission within the culture. This reflects a clear awareness about the cultural ramifications of displacement from place. By stressing the creation of a cultural record, particularly through culturally dissonant means or what Katz (2004) calls "reworking," shows how participants recognize the difficulties in creating a sense of place elsewhere—where there are no guarantees of proximity to other tribal members or familiar ecological resources needed for various cultural practices. Accordingly, the cultural recordkeeping is a reworking in order to resist and is a clear example of survivance. For these participants, environmental changes that could cause participants to move away from their land were viewed as threats to the reproduction of important cultural practices and values, and a continuation of the historical land losses from forced relocation. This is consistent with the use of the settler colonial framework as an ongoing process rather than a discrete historical event. Further, through the integration of the geographies of slow violence concept (O'Lear, 2021), we can begin to understand how the violence of settler colonialism is not only temporal but spatial; it is geographically specific but also expansive and highly mobile through time. In parallel, survivance in the continuing folding in and reclamation of these events as defined by Indigenous people through narrative (Vizenor, 2009).

Participants expressed many concerns about the continued intergenerational transmission of knowledge. Many were concerned about the younger generation's knowledge about plants and remedies, as well as the sheer decline in accessibility of traditional healers, which are disproportionately women. Although participants described a tradition of both men and women healers, men were mentioned rarely in comparison to women. It is also notable that participants primarily referred to women relatives when discussing informally receiving healthcare (aunts, mothers, and grandmothers). This indicates that the tradition of women acting as healers is still an important value for many tribal members and provides important context for participant responses about perceived declines in traditional healers, healing practices, and traditional knowledge transmission. Here we see women's participation in traditional medicinal practices and knowledge as an extension of women's caretaking and reproductive labor responsibilities. Accordingly, threats to cultural reproduction as explored in this study are a necessary additional consideration of accounts of the intersectional gendered and Indigenous impacts of climatic and environmental changes. We must consider the impacts to Indigenous culture and Indigenous women when climatic and environmental changes create barriers to cultural reproduction, a labor disproportionately borne by women.

Participants noted with concern the transmission of cultural knowledge, and the declining quantity of traditional healers. One participant described receiving a call from her daughter looking for an Indigenous healer, and not being able to name anyone because she didn't know anyone who practices anymore. Here we see the real effects of diminishing cultural reproduction in the disappearance of traditional healers, which then has ripple effects within the community for those who are still interested in participating in these practices. This demonstrates the ways the changes that first appear to be within the family unit actually creates cultural rifts for the

larger community. Generational shifts in the use of traditional medicine and healers was caused in some cases by violent structural changes, such as increased access to and reliance upon Western medicine and healthcare, but also due to environmental transformations, such as land loss, saltwater intrusion, and climate change, which impacted the ability of traditional plants to grow. Although many participants still expressed a family and community valuation of traditional medicine and healers, they also acknowledged that it was no longer frequently transmitted to younger generations. Ultimately, the environmental and sociopolitical context is such that the knowledge is not necessarily disappearing but that it is increasingly inaccessible because of the dearth/absence of healers and an inability to practice the embodied knowledge within the environment itself as plants are overwhelmed by water and salt.

Drawing on Cindi Katz's work on social reproduction in the era of globalization, we see the materiality of the changing environment as a significant conditioning force in Indigenous women's work of social reproduction, work which we investigated here through the examination of traditional medicinal knowledge and practice (2004). We build upon Katz's work by suggesting that as some experience global expansion, others experience contraction, thus altering re/productive possibilities in shrinking geographies impacted by outmigration and land loss. Ultimately, we see the rearrangement of re/production in ways that: (1) exacerbate the precarity and burden of cultural work of Indigenous women, and (2) allow for new and ongoing extraction of wealth from the Indigenous body, inclusive of the land and human bodies, via environmental degradation and Western medical interventions (Meehan & Strauss, 2015). Importantly, bodily ailment in this context is itself significantly influenced by the hazards associated with living in an energy sacrifice zone and frontline community. In sum, extractive production has changed the place and, in turn, the arrangement of cultural reproduction within the tribe via shifting medicinal practices and knowledges. These shifting arrangements have important implications for Indigenous women, in particular, and how care is demonstrated and practiced through said reproduction. As a framework, ERJ must reckon with the ways in which geographies of violence influence care over the life course and not just in the reproduction of generations.

In the face of these challenges to cultural reproduction, participants also showed a strong sense of resilience, as demonstrated by one participant's instruction from her mother to record, in writing, traditional healing practices. Another participant described how her son who trained as a Western doctor integrates Indigenous medicine into his practices, finding new ways to continue the tradition of healing in their family. These are hybridized knowledges that Katz might call "reskilling" and "reworking" in light of the increasing pressures associated with the commodification of medicine within the tribe (Katz, 2004). These examples of survivance demonstrate that cultural reproduction is flexible, adaptive, and importantly, defined by the tribe themselves. Cultural knowledge, values, and practices remain important components of Indigenous community resilience (Kirmayer et al., 2009). Connection to land and the environment are fundamental dimensions of this cultural resilience, and loss of land does harm the intergenerational transmission of cultural knowledge and, therefore, cultural reproduction (McKinley, 2019; Billiot and Parfait, 2019; Kirmayer et al., 2009). It is therefore imperative to consider the relationship between changes to

place resulting from environmental changes and climate change, and the impact the changes have on cultural reproduction via knowledge systems and practices.

Limitations

While this study provides an important contribution in the often-overlooked area of cultural reproduction, this study was limited in that it was cross-sectional, and that it engaged with participants at one point in time only. We believe this contribution to be an excellent starting point in the exploration of this topic, and that future studies should incorporate different approaches which can demonstrate changes over time. Additionally, the original study focused on the sexual and reproductive health experiences of Indigenous women tribal members, and not specifically on cultural reproduction. Future studies dedicated primarily to this area will likely uncover additional concerns of cultural reproduction and further mechanisms by which threats to cultural reproduction are resisted or subverted. For example, research exploring cultural reproduction from the perspective of Indigenous tribal members of varying identities, including men, could demonstrate other ways in which cultural reproduction has been upheld through resilience and survivance not talked about in this paper.

Conclusion

Cultural reproduction is a key facet of the ERJ framework and social reproduction that is understudied. Women are often not only responsible for caretaking and childrearing but also for the reproduction of the culture writ large. This is particularly salient within Indigenous groups wherein cultural reproduction is understood to be a meaningful source of communal resilience, resistance, and individually held Indigenous identity. Here we explore how cultural reproduction, through what Rochealeau and Roth (2007) call a "rootedness" within place and materiality, operates as an element of reproductive justice and specifically environmental reproductive justice amongst a tribe. We find that environmental injustices, particularly pertaining to already occurring saltwater intrusion and displacement resulting from climatic change and land loss, proceed over time in ways that are perceived to be inhibiting, and further inhibit in the future, the transmission of traditional Indigenous knowledges and ways of life. Ultimately, climatic changes are an environmental justice issue that disproportionately burdens Indigenous groups. In this study we go further to show that climatic changes are also inhibiting cultural knowledge transmission and therefore cultural reproduction, thus constituting a more acutely defined environmental reproductive justice issue that specifically speaks to the burdens of Indigenous groups and, especially, Indigenous women.

This study highlights the ways cultural reproduction is impeded by place-specific environmental changes, a key tenet of ERJ. The disruptions to cultural reproduction that resulted from environmental degradation, climate change, and a shift towards Western medicine demonstrate the ways that settler colonialism continues to violently promote cultural assimilation while impeding important cultural practices.

With the changing climate and increasingly expansive geographies of slow violence, this issue will likely grow in importance. It is important to note that impeding cultural reproduction is in line with the settler colonial project, and has at times been an explicit goal of the U.S. government. Given this history, it is especially important that targeted policies and resources be dedicated to facilitating the preservation of Indigenous culture and tribal identities.

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Declarations

Ethical Approval This study received ethical approval from Tulane University's Institutional Review Board (IRB) and the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki. Informed consent was obtained before conducting interviews.

Conflict of interest The authors have no conflicts of interest to disclose.

References

Alaska Institute for Justice (2020). Rights of Indigenous People in Addressing Climate-Forced Displacement. Submitted to the United Nations. Accessed August 8, 2021. https://assets.documentcloud.org/documents/6656724/Louisiana-Tribes-Complaint-to-UN.pdf.

Arquette, M., Cole, M., Cook, K., LaFrance, B., Peters, M., Ransom, J., … & Stairs, A. (2002). Holistic risk-based environmental decision making: A Native perspective. *Environmental health perspectives*, *110*(suppl 2), 259&264.

Bakker, I. (2007). Social reproduction and the constitution of a gendered political economy. *New Political Economy*, *12*(4), 541–556. https://doi.org/10.1080/13563460701661561.

Bell, S. E. (2013). *Our roots run Deep as Ironweed: Appalachian women and the fight for Environmental Justice*. University of Illinois Press.

Billiot, S., & Jessica Parfait (2019). Reclaiming land: adaptation activities and global environmental change challenges within indigenous communities. In *People and Climate Change*, edited by Lisa Reyes Mason and Jonathan Rigg, 108–121. Oxford, U.K.:Oxford University Press. https://doi.org/10.1093/oso/9780190886455.003.0006.

Burnette, C. E., & Figley, C. R. (2017). Historical oppression, resilience, and transcendence: Can a holistic Framework help explain violence experienced by Indigenous people? *Social Work*, *62*(1), 37–44. https://doi.org/10.1093/sw/sww065.

Burnette, C. E., & Sara Sanders (2014). Trust U the United States. *Qualitative Report*, *19*(22), 1–19. http://www.nova.edu/ssss/QR/QR19/burnette44.pdf.

Burnette, C. E., Sanders, S., Butcher, H. K., & Rand, J. T. (2014). A toolkit for ethical and culturally sensitive research: An application with indigenous communities. *Ethics and Social Welfare*, *8*(4), 364–382. https://doi.org/10.1080/17496535.2014.885987.

Burnette, C. (2015). Historical oppression and intimate partner violence experienced by indigenous women in the United States: Understanding connections. *Social Service Review*, *89*(3), 531–563.

Cidro, J. (2012). Nanabush storytelling as data analysis and knowledge transmissions. *The Canadian Journal of Native Studies*, *32*(2), 159–169. https://www.proquest.com/docview/1498365625/abstract/F716EFABD4114598PQ/1.

Collins, J. (1991). Women and the environment: social reproduction and sustainable development. In R. S. Gallin and A (Ed.), *The women and International Development Annual* (Vol. 2). Ferguson. Westview.

Cook, K. (1997). Women are the first environment. *Native Americas*, *XIV*(3), 58. https://www.proquest.com/docview/224760123/abstract/6074BC75343E403DPQ/1.

Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine. *In University of Chicago Legal Forum*, *1989*, 139–168.
Creswell, J. W., Cheryl, N., & Poth (2016). *Qualitative Inquiry and Research Design: Choosing among five approaches*. Sage.
Denzin, N. K., Yvonna, S., Lincoln, & Linda Tuhiwai Smith. (2008). *Handbook of critical and indigenous methodologies*. Sage.
Di Chiro, G. (2008). Living environmentalisms: coalition politics, social reproduction, and environmental justice. *Environmental Politics*, *17*(2), 276–298. https://doi.org/10.1080/09644010801936230.
Divarkarla, S. P., Aroni, R., & Sutherland, S. (2020). Transmission of traditional food knowledge. *Mahika Kai Journal*, 96–129. https://doi.org/10.34900/MK.V1I1.1155.
Doel, M. (2017). *Geographies of violence: Killing Space, Killing Time*. Sage.
U.S. Environmental Protection Agency (2020). Environmental Justice. Retrieved from.
Epstein, B. (1995). Grassroots environmentalism and strategies for social change. *In New Political Science*, *16*(1), 1–24. https://doi.org/10.1080/07393149508429735.
Fan, A. Z., Marta, R., Prescott, G., Zhao, C. A., Gotway, & Sandro Galea (2015). Individual and community-level determinants of mental and physical health after the deepwater horizon oil spill: findings from the gulf states population survey. *The Journal of Behavioral Health Services & Research*, *42*(1), 23–41. https://doi.org/10.1007/s11414-014-9418-7.
Farmer, P. (1996). On suffering and structural violence: A view from below. *Daedalus*, *125*(1), 261–283.
Farmer, P. (2004). An anthropology of structural violence. *Current Anthropology*, *45*(3), 305–325. https://doi.org/10.1086/382250.
Fletcher, M. L. M. (2006). Politics, history, and semantics: The federal recognition of Indian tribes. *In NDL Rev*, *82*, 487. https://law.und.edu/law-review.
Fonseca, S., Klemmer, A., van Blanken, R., Murphy, K., Palm, A., & Ortiz, E. (2019). Indian Health Service: Human Centered Design. US Department of Health and Human Services. https://www.hhs.gov/sites/default/files/hhs-ihs-hit-508-02-itu-ecosystem-facilities-and-archetypes.pdf.
Gurr, B. (2014). *Reproductive justice: The politics of health care for native American women*. Rutgers University Press.
Haraway, D. (1988). Situated knowledges: The Science question in Feminism and the privilege of partial perspective. *Feminist Studies*, *14*(3), 575–599. https://doi.org/10.2307/3178066.
Hausknecht, S., Freeman, S., Martin, J., Nash, C., & Skinner, K. (2021). Sharing indigenous knowledge through intergenerational digital storytelling: Design of a workshop engaging elders and youth. *Educational Gerontology*, *47*(7), 285–296. https://doi.org/10.1080/03601277.2021.1927484.
Hooks (1999). *Yearning: Race, gender and Cultural politics*. South End.
Hoover, E., Cook, K., Plain, R., Sanchez, K., Waghiyi, V., Miller, P., Dufault, R., Sislin, C., & Carpenter, D. O. (2012). Indigenous peoples of North America: environmental exposures and reproductive justice. *Environmental Health Perspectives*, *120*(12), 1645–1649. https://doi.org/10.1289/ehp.1205422. https://ehp.niehs.nih.gov/doi/pdf/.
Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687.
https://www.epa.gov/environmentaljustice.
Hyndman, J. (2019). Unsettling feminist geopolitics: forging feminist political geographies of violence and displacement. *Gender Place & Culture*, *26*(1), 3–29.
IPCC (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. edited by H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, and B. Rama. Cambridge University Press.
Jones, D. S. (2006). The persistence of American Indian health disparities. *American Journal of Public Health*, *96*(12), 2122–2134. https://doi.org/10.2105/AJPH.2004.054262.
Katz, C. (1991). Sow what you know: The struggle for social reproduction in Rural Sudan. *Annals of the Association of American Geographers*, *81*(3), 488–514. https://doi.org/10.1111/j.1467-8306.1991.tb01706.x.
Katz, C. (2001). Vagabond capitalism and the necessity of Social Reproduction. *Antipode*, *33*(4), 709–728. https://doi.org/10.1111/1467-8330.00207.
Katz, C. (2004). *Growing up Global: Economic Restructuring and Children's everyday lives*. U of Minnesota.
Kermoal, N., & Isabel Altamirano-Jiménez (2016). *Living on the land: Indigenous women's understanding of place*. Athabasca University.

Kirmayer, L. J., Sehdev, M., Whitley, R., & Dandeneau, S. F., and Colette Isaac (2009). Community resilience: Models, metaphors and measures. *International Journal of Indigenous Health*, *5*(1), 62–117.

Kirmayer, L. J., Dandeneau, S., Marshall, E., Phillips, M. K., & Karla Jessen Williamson (2011). Rethinking resilience from indigenous perspectives. *The Canadian Journal of Psychiatry*, *56*(2), 84–91. https://journals.sagepub.com/doi/pdf/10.1177/070674371105600203.

Kovach, M. (2010). *Indigenous methodologies: Characteristics, conversations, and contexts*. University of Toronto.

Krauss, C. (1993). Women and toxic Waste protests: Race, class and gender as resources of Resistance. *Qualitative Sociology*, *16*(3), 247–262.

Liddell, J. L., & Kington, S. G. (2021). "Something was attacking them and their reproductive organs": Environmental reproductive justice in an Indigenous tribe in the United States Gulf Coast. *International Journal of Environmental Research and Public Health*, *18*(2),1–17. https://doi.org/10.3390/ijerph18020666

Liddell, J. L., McKinley, C. E., & Lilly, J. M. (2021). Historic and contemporary environmental justice issues among native Americans in the gulf coast region of the United States. *Studies in Social Justice*, *15*(1), 1–24. https://doi.org/10.26522/ssj.v15i1.2297

Liddell, J. L., & McKinley, C. E. (2022). The Development of the Framework of Integrated Reproductive and Sexual Health Theories (FIRSHT) to Contextualize Indigenous Women's Health Experiences. *Sexuality Research and Social Policy*, *19*(1),1–14. https://doi.org/10.1007/s13178-022-00693-z

Liddell, J. L., Kington, S. G., & McKinley, C. E. (2022a). "We Live in a Very Toxic World": Changing environmental landscapes and indigenous food sovereignty. *Studies in Social Justice*, *16*(3), 571–590. https://doi.org/10.26522/ssj.v16i3.2746.

Liddell, J. L., Kington, S. G., & McKinley, C. E. (2022b). "You Got to Drive 30 Miles to Get an Apple": Indigenous food sovereignty, food deserts, and changing subsistence practices in the gulf coast. *SN Social Science*, *2*(10), 1–22. https://doi.org/10.1007/s43545-022-00530-5

Liddell J. L., McKinley, C. E., & *Stiffarm, A. (2024). 'Keep the Fire Burning': Applications andculturally congruent research strategies for research on sexual and reproductive health with Indigenous women. *Journal of Participatory Research Methods*, *5*(1), https://doi.org/10.35844/001c.94023

Little, J., Peake, L., & Richardson, P. (1998). *Women in cities: Gender and the Urban Environment*. University.

Loewen, S., Pinchoff, J., Ngo, T. D., & Hindin, M. J. (2022). The impact of natural disasters and epidemics on sexual and reproductive health in low- and middle-income countries: A narrative synthesis. *International Journal of Gynecology & Obstetrics*, *157*(1), 11–18. https://doi.org/10.1002/ijgo.13768.

Maldonado, J. K. (2014). Facing the Rising Tide: Co-occurring Disasters, Displacement, and Adaptation in Coastal Louisiana's Tribal Communities. PhD diss., American University. https://dra.american.edu/.

McKinley, C. E., Figley, C. R., Woodward, S., Liddell, J., Billiot, S., Comby, N., & Sanders, S. (2019). Community-engaged and culturally relevant research to develop mental and behavioral health interventions with American Indian and Alaska Natives. *American Indian and Alaska Native Mental Health Research*, *26*(3), 79–103. https://doi.org/10.5820/aian.2603.2019.79.

McKinley, C. E., Miller Scarnato, J., Liddell, J. L., *Knipp, H., Solomon, T. A., Comby, N., Comby, H., Haynes, P., Ferris, K., & Dynan, M. (2023). Developing the weaving healthy families program to promote wellness and prevent substance abuse and violence: Approach, adaptation, and implementation. *Families in Society*, *104*(3), 245–261. https://doi.org/10.1177/10443894221146

Meehan, K., & Strauss, K. (2015). *Precarious worlds: Contested geographies of Social Reproduction*. University of Georgia.

Milne, J. and Kathleen Oberle (2005). Enhancing rigor in qualitative description. *Journal of Wound Ostomy & Continence Nursing* 32 (6): 413–420. https://journals.lww.com/jwocnonline/Fulltext/2005/11000/Enhancing_Rigor_in_Qualitative_Description.14.aspx?casa_token=U0H_eHNoN2QAAAAA:Kx3V5tqcoRcFqxbvqO2BC0fGEeUuNxDjwNCpXGonZaqe9MYY8CKyjgzS_ipn0o6VqkKzrwn7zfdayD6o6fSSwjo.

Nixon, R. (2011). *Slow violence and the Environmentalism of the poor*. Harvard University Press.

O'Lear, S. (2021). *A research agenda for geographies of slow violence*. Edward Elgar Publishing.

O'Sullivan, M. D. (2016). More Destruction to these family ties: Native American women, child welfare, and the solution of sovereignty. *Journal of Family History*, *41*(1), 19–38.

Rocheleau, D., and Robin Roth (2007). Rooted networks, relational webs and powers of connection: rethinking human and political ecologies. *Geoforum*, *38*(3), 433–437.

Rose, G. (1993). *Feminism & geography: The limits of geographical knowledge*. U of Minnesota.

Ross, L., Gutiérrez, E., & Gerber, M., and Jael Silliman (2016). *Women of Color Organizing for Reproductive Justice*. Chicago, IL: Haymarket Books.

Saldaña, J. (2015). *The Coding Manual for qualitative researchers*. Sage.

Sandelowski, M. (2000). Whatever Happened to Qualitative Description? *Research in Nursing & Health*, 23 (4): 334–340. https://onlinelibrary.wiley.com/doi/pdf/10.1002/1098-240X%28200008%2923%3A4%3C334%3A%3AAID-NUR9%3E3.0.CO%3B2-G.

Smith, L. C., & Smith, M., and Paul Ashcroft (2011). Analysis of Environmental and economic damages from British petroleum's deepwater horizon oil spill. *Albany Law Review*, *74*(1), 563–585. https://doi.org/10.2139/ssrn.1653078.

Spiegel, S. J., Thomas, S., O'Neill, K., Brondgeest, C., Thomas, J., Beltran, J., Hunt, T., & Yassi, A. (2020). Visual storytelling, Intergenerational environmental justice and indigenous sovereignty: exploring images and stories amid a contested oil pipeline project. *International Journal of Environmental Research and Public Health*, *17*(7), 2362. https://doi.org/10.3390/ijerph17072362.

Springer, S., and Philippe Le Billon (2016). Violence and space: An introduction to the geographies of Violence. *Political Geography*, *52*, 1–3.

Strega, S., & Brown, L. (2015). *Research as Resistance: Revisiting critical, indigenous and anti oppressive approaches*. Canadian Scholar's Press and Women's.

Strid, P., Snead, M. C., Galang, R. R., Bish, C. L., & Ellington, S. R. (2022). Fertility and contraception among women of reproductive age following a disaster: A scoping review. *Reproductive Health*, *19*, 147. https://doi.org/10.1186/s12978-022-01436-4.

Sullivan-Bolyai, S., Bova, C., & Doreen Harper (2005). Developing and refining interventions in persons with health disparities: the use of qualitative description. *Nursing Outlook*, *53*(3), 127–133. https://doi.org/10.1016/j.outlook.2005.03.005.

Taylor, D. E. (1997). Women of Color, Environmental Justice, and Ecofeminism. Ecofeminism: Women, Culture, Nature: 38–81.

Theobald, B. (2019). *Reproduction on the reservation: Pregnancy, childbirth, and colonialism in the long twentieth century*. UNC Press Books.

Tully, K., Gedan, K., Epanchin-Niell, R., Strong, A., Bernhardt, E. S., Todd BenDor, M., Mitchell, J., Kominoski, T. E., & Jordan, Scott, C. Neubauer, and Nathaniel B. Weston. 2019. The invisible flood: The chemistry, ecology, and social implications of coastal saltwater intrusion *BioScience* 69 (5): 368–378. https://doi.org/10.1093/biosci/biz027.

Vinyeta, K., & Whyte, K. (2016). and Kathy Lynn. Climate change through an intersectional lens: Gendered vulnerability and resilience in Indigenous communities in the United States. Accessed 25 July 2021. U.S. Department of Agriculture. https://www.fs.fed.us/pnw/pubs/pnw_gtr923.pdf.

Vizenor, G. (2009). Native Liberty: Natural reason and Cultural Survivance. *UNP - Nebraska Paperback*. https://doi.org/10.2307/j.ctt1dgn41k.

Warne, D., & Frizzell, L. B. (2014). American Indian health policy: Historical trends and contemporary issues. *American journal of public health*, *104*(S3), S263–S267.

Wolfe, P. (1999). *Settler Colonialism*. A&C Black.

Zuckerman, S., Haley, J., Roubideaux, Y., & Lillie-Blanton, M. (2004). Health service access, use, and insurance coverage among American Indians/Alaska natives and whites: what role does the Indian health service play? *American Journal of Public Health*, *94*(1), 53–59. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1449826/.

Authors and Affiliations

Jessica L. Liddell[1] · **Sarah G. Kington**[2] · **Devin C. Wright**[2]

✉ Jessica L. Liddell
Jessica.liddell@umt.edu; Jessica.liddell@mso.umt.edu

Sarah G. Kington
skington@tulane.edu

Devin C. Wright
Dwright10@tulane.edu

[1] School of Social Work, University of Montana, Jeannette Rankin Hall 004, 32 Campus Dr, Missoula, MT 59812, USA

[2] City, Culture and Community Program, Tulane University School of Liberal Arts, 6823 St. Charles Avenue, New Orleans, LA 70118, USA

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