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# Toward a More Holistic Understanding of Uranium-Related Views and Experiences of Residents in the Four Corners Region of the United States

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# TOWARD A MORE HOLISTIC UNDERSTANDING OF URANIUM-RELATED VIEWS AND EXPERIENCES OF RESIDENTS IN THE FOUR CORNERS REGION OF THE UNITED STATES

by

Matthew J. Barnett

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# ABSTRACT

Toward a More Holistic Understanding of Uranium-Related Views and Experiences of Residents in the Four Corners Region of the United States

by

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Utah State University, 2022

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Research on rural Four Corners Region (FCR) residents' views about uranium production has focused mainly on predominately-White communities in the northern portion of the region. Meanwhile, residents in the southern part of the region, which includes the Navajo Nation and other tribal nations and communities, have dealt with the worst environmental and health effects of the uranium boom. Through a series of three studies in the southern part of the FCR, I explore the uranium-related views and experiences of racially diverse FCR residents.

In the first paper of this dissertation, I used 53 interviews to systematically investigate how sociodemographic factors were associated with attitudes about new uranium production among residents of the Grants Mining District, part of the FCR that was the epicenter of uranium activity during the uranium boom. I found that some sociodemographic groups (i.e., Native Americans, women, those with higher levels of formal education, and new residents) were more anti-uranium. In contrast, other groups

(Hispanics, those with less formal education, and those with uranium industry ties) were more pro-uranium. In the second paper, I applied a recently-developed framework that considers community responses to environmental injustice as a spectrum with at least four distinct pathways to a series of interviews with residents in Blanding ($n$ = 19)—a community located six miles away from the last operating uranium mill in the US, and 10 miles from the uranium-rich Bears Ears National Monument. I found that Blanding was situated near the middle of the spectrum and that many residents held ambivalent (complex and conflicted views) views about uranium production. In the third paper, I applied TribalCrit—a perspective focused on the positionality of Indigenous peoples in American society—to better understand the uranium-related views and experiences of Indigenous FCR residents ($n$ = 22). Participants frequently discussed distrust of the uranium industry and the US government regarding uranium issues. Some participants discussed their efforts to resist the siting of new uranium mines near their community. Taken together, the three papers in this dissertation contribute to a more holistic understanding of the uranium-related views and experiences of FCR residents.

(159 pages)

# PUBLIC ABSTRACT

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Research on rural Four Corners Region (FCR) residents' views about uranium production has focused mainly on predominately-White communities in the northern portion of the region. Meanwhile, residents in the southern part of the region, which includes the Navajo Nation and other tribal nations and communities, have dealt with the worst environmental and health effects of the uranium boom. Through a series of three studies in the southern part of the FCR, I explore the uranium-related views and experiences of racially diverse FCR residents.

In the first paper of this dissertation, I used 53 interviews to explore how sociodemographic factors (e.g., age, race, gender) were associated with attitudes about new uranium production among residents of the Grants Mining District, part of the FCR that was the epicenter of uranium activity during the uranium boom. I found that some sociodemographic groups (i.e., Native Americans, women, those with higher levels of formal education, and new residents) were more anti-uranium. In contrast, other groups (Hispanics, those with less formal education, and those with uranium industry ties) were more pro-uranium. In the second paper, I applied a recently-developed framework that considers community responses to environmental injustice as a spectrum with at least four distinct pathways to a series of interviews with residents in Blanding ($n$ = 19)—a community located six miles away from the last operating uranium mill in the US, and 10

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Matthew J. Barnett

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# CHAPTER 1

# INTRODUCTION

A transition from fossil fuels to carbon-neutral power sources is urgently needed to avert the most catastrophic impacts of climate change, which will disproportionately impact marginalized and vulnerable populations worldwide (Welsby et al. 2021). In the United States (US), one possible avenue for this transition is a revitalization of the nuclear energy program. Although the number of nuclear reactors in the US declined sharply in the early 1980s alongside rising public concerns about radioactive contamination, proponents of nuclear energy argue that it is a clean, reliable, and safe energy source that has unfairly garnered a poor perception among the public (Welsby et al. 2021; Rosner and Lordan-Perret, n.d.). Most nuclear reactors rely on uranium as their fuel source; thus, the nuclear energy sector is closely associated with a resurgence in the uranium industry, which boomed from the late 1940s to the early 1980s in the US (Sarkar 2019). With both the Trump and Biden administrations expressing an interest in developing a strategic uranium reserve, the demand for domestically produced uranium may soon be on the rise (Frazin 2021; Scheyder and Hunnicutt 2022).

Meanwhile, uranium industry activity has left a legacy of environmental injustice affecting poor and racially marginalized rural communities in the American West, particularly in the rural Four Corners Region (FCR), which was a major site of uranium activity during the uranium boom period (McLemore and Chenoweth 2017). Consequently, many communities in the FCR still deal with substantial environmental and health consequences associated with past uranium production (Malin and Petrzelka

2010; Credo et al. 2019; Redvers et al. 2021).[1] This is particularly true of communities in the Navajo Nation and other nearby tribal nations, where the density of abandoned uranium features (aka "zombie mines") and associated environmental contamination is most significant (Macmillan 2013; Voyles 2015:242). Despite the environmental and health legacy of the uranium boom and the implications of new uranium production for the health and well-being of FCR communities, there is a notable lack of EJ scholarship focused on FCR residents' views about uranium production. Much of the extant research on this topic has concentrated on majority-White communities in the northern portion of the FCR, where uranium industry boosterism is commonplace (Malin and Petrzelka 2010; Malin 2014, 2015).

Through a series of three papers, this dissertation aims to build upon the foundation established by the research mentioned above and contribute to a more holistic understanding of the uranium-related views and experiences of FCR residents. I do this by focusing on three communities in the southern portion of the FCR, which is more racially diverse. Additionally, it offers a more nuanced consideration of the complexity of views about uranium issues held by FCR residents than previous research on the topic. In the first paper, I focus on exploring the links between sociodemographic factors and attitudes about new uranium production among residents of two communities in the Grants Mining District (GMD) of Northwestern New Mexico, which was the epicenter of uranium activity in the FCR during the uranium boom. I also explore the underlying drivers of these attitudes. In the second paper, I focus on Blanding, Utah, a small community near the last operating uranium mill in the US and the uranium-rich Bears

[1] The FCR is located where the borders of Utah, Arizona, New Mexico, and Colorado meet. It contains southeastern Utah, northeastern Arizona, northwestern New Mexico, and southwestern Colorado.

Ears National Monument (BENM), to explore ambivalence (mixed or conflicting views) and quiescence (a lack of direct action or activism) regarding uranium production. In the third paper, I use three tenets from TribalCrit—an adaptation of Critical Race Theory (CRT) focused on the positionality of Indigenous peoples in American society—to highlight the political and racial dimensions of the uranium-related views and experiences of Indigenous FCR residents (Brayboy 2005). In this introductory chapter, I begin with an overview of the relevant literature and then provide a brief description of the three papers.

***Literature Review***

Sociodemographic factors such as race, socioeconomic status (SES), gender, and age are often associated with differential levels of exposure to environmental risks and differences in environmental concerns (Liu, Vedlitz, and Shi 2014; Ryder 2017). An extensive EJ literature has established that lower-SES and BIPOC (Black, Indigenous, and people of color) communities in the US bear a disproportionate burden of exposure to environmental harms (Bullard 2000; Taylor 2014; Ard 2015). Furthermore, BIPOC residents do not necessarily gain the same protective effects from increases in SES on exposure to environmental harms as White residents (Crowder and Downy 2010). In the FCR, Indigenous communities have borne a disproportionate brunt of the negative environmental and public health impacts of oil, gas, coal, and uranium production (Rosier 2008; Voyles 2015).

Meanwhile, studies have consistently found that women are somewhat more concerned about environmental issues than men (Xiao and McCright 2007, 2012), and working-class women and women of color constitute a majority of the membership of

grassroots EJ organizations (Krauss 1993; Kurtz 2007; Di Chiro 2008). Meanwhile, children and the elderly are more likely to experience exposure to environmental hazards, and more recent studies have noted a positive association between age and the magnitude of concern about environmental issues (Day 2010; Landrigan et al. 2010; Liu et al. 2014).

Although I have yet to locate a systematic exploration of the association between sociodemographic factors and attitudes about uranium production in the US, researchers have explored the links between these factors and other forms of natural resource extraction (e.g., hydraulic fracturing (fracking), coal, natural gas). These researchers have consistently found that women tend to be less supportive of extractive industries than men (Jacquet 2012; Boudet et al. 2014; Howell et al. 2017; Ulrich-Schad et al. 2020). Meanwhile, results for age and formal education have varied across regions and industries (Jacquet 2012; Boudet et al. 2014; Howell et al. 2017; Ulrich-Schad et al. 2020). Few of these studies have considered race/ethnicity, and when they have, they have typically explored it using a non-Hispanic White/other binary, with nonsignificant results (Boudet et al. 2014; Howell et al. 2017).

Internationally, results of studies focused on public attitudes about uranium production have varied from nation-to-nation. For example, public support for uranium mining in Australia has been noted to be relatively high, while in Finland, support has been noted to be relatively low, with residents tending to be more skeptical of uranium mining than other forms of natural resource extraction (McAllister 2008; Litmanen, Solomon, and Kari 2014; Litmanen, Jartti, and Rantala 2016). Meanwhile, academic research on attitudes about uranium production in the FCR (and the US, generally) is limited—though a small body of literature explores this topic. Malin (2015) has posited

that in some communities, particularly spatially isolated and economically depressed resource-dependent communities, residents have internalized free-market ideologies (favoring privatization and deregulation in environmental affairs). Rather than resisting the marketization of natural resources, these residents "mobilize 'sites of acceptance' for corporate self-regulation, marketization, and privatization of natural resources within potentially risky industrialized systems" (Malin et al. 2017:526). For example, while investigating FCR residents' attitudes about a proposed uranium mill in Southwestern Colorado, Malin (2015) found that residents in support of renewed uranium development in sites of acceptance, such as Naturita, Colorado, expressed faith in the ability of markets to solve social problems and safeguard the environment in and near their communities.

FCR residents who express concerns about the environmental and public health impacts of prior uranium development in the region are not necessarily precluded from supporting the uranium revitalization for economic reasons. Malin (2015) examined the uranium-related concerns of residents in Monticello, Utah, which hosted the US government-owned Monticello Mill, a uranium and vanadium processing facility that operated from 1942 to 1960. There was extensive contamination associated with the Monticello Mill's processing activities, leading to the creation of two Superfund National Priority List Sites—the Monticello Radioactively Contaminated Properties Site and the Monticello Mill Tailings Site—which were both remediated by the US Environmental Protection Agency (EPA) during the 1990s. Concerned residents have mobilized to seek redress from the federal government for health issues among residents, including high

rates of cancer, that they contend are directly related to occupational exposure and the mill's proximity to Monticello's residential areas (Malin and Petrzelka 2010).

Interestingly, Malin (2015) found that some residents of Monticello, Utah who have mobilized for compensation due to the health impacts of the Monticello Mill supported renewed uranium development to bolster their community's struggling economy. Much like the mill proponents in Naturita, these residents tended to view uranium development as central to their community's social and economic functioning. They also tended to express a severe distrust in the federal government and believed that nuclear energy is a cleaner and more sustainable alternative to fossil fuel production. Additionally, these residents were optimistic that, free of the federal government's shackles, the community would be able to work with uranium industry firms to ensure that their uranium production activities are safe for residents (Malin 2015).

Communities in rural regions like the FCR that have history of natural resource dependency (i.e., that have been economically dependent on hydraulic fracturing (fracking), coal, natural gas, etc.) are particularly prone to economic instability and high poverty rates (Krannich et al. 2014). In the words of Krannich et al. (2014:209), "[a]nalyses focusing on social and economic conditions in resource-dependent areas have repeatedly documented a variety of disruptions that result from sharp fluctuations and long-term declines in extraction-based employment, high rates of unemployment, and disproportionately high levels of poverty." In these economically depressed communities, residents and community leaders often view accepting locally unwanted land uses (LULUs) such as uranium mines and mills as the only avenue to spur economic growth

and provide much-needed employment opportunities to community members (Pellow 2004).

The uranium industry has provided an economic foundation and sense of identity for FCR communities, but as a "boom and bust" industry, this economic foundation is unstable and dependent on the tides of unpredictable global markets (Malin 2015; Voyles 2015). Furthermore, the employment opportunities that come with LULUs are not always what they seem—when jobs related to these industries are classified as "skilled," they often draw experienced workers from outside the community to fill them. When they are classified as "unskilled," they are often physically demanding and associated with long hours, low pay, poor benefits, and hazardous working conditions (Bullard 2000; Pellow 2004). Nevertheless, some residents in the FCR feel a strong pull towards revitalized uranium development, and many residents personally identify with the uranium industry and feel that they understand it better than community outsiders (Malin 2014).

Most EJ research has focused on "sites of resistance," where residents mobilize against environmental activities (like uranium production) that are associated with environmental injustices, and to a lesser extent, the sites of acceptance discussed above. EJ research has only recently begun to consider communities that do not fit within the resistance/acceptance dichotomy. For example, Greenberg (2023) used survey data to investigate attitudes about the coal industry in Southern West Virginia, an area with a history of economic dependence on coal. Interestingly, they found that many of the participants' written responses to the longform questions in the survey were characterized by ambivalence (mixed or conflicting views about the coal industry).

Subsequently, Greenberg (2023:1) postulated that southern West Virginia might be better described as a "site of ambivalence"—a place "where communities and individuals hold complex and conflicted attitudes toward polluting industries"—than a site of acceptance or resistance. To better understand communities that do not fit within the acceptance/resistance dichotomy, Malin, Ciplet, and Harrison (2023:3) have recently developed a framework that considers community responses to environmental injustice as a spectrum with at least four distinct pathways (i.e., "effectual resistance," "ineffectual resistance," "passive acceptance," and "active acceptance"). To my knowledge, this framework has not yet been used in empirical research, which I do in my second paper.

In the Eastern Agency of the Navajo Nation, grassroots anti-uranium activists and their allies have worked for decades to resist new uranium production (Voyles 2015). Navajo Nation residents who oppose new uranium development in the FCR point to an alarming set of public health statistics and resident statements to substantiate their concerns (Eichstaedt 1994; Voyles 2015; Redvers et al. 2021). By the end of the uranium boom in the 1980s, the more-than 3,000 Navajo men who had worked in the mines had lung cancer rates more than 56 times higher than the general population, prostate cancer rates more than 50 times higher, stomach cancer rates more than 200 times higher, and a life expectancy of 46 years. Yet, the impacts of the uranium boom on Indigenous communities in the FCR extend well beyond miners. Without working a single day in the uranium industry, children living in the Navajo Nation have been found to be more than 15 times more likely to be diagnosed with ovarian or testicular cancer than the same cohort in the general population (Shields et al. 1992; Rosen and Mushak 1999).

Meanwhile, there is widespread groundwater contamination in the Eastern Agency of the Navajo Nation and other tribal lands associated with erstwhile uranium activity (Tanana, Combs, and Hoss 2021). Droughts are common in the arid FCR and many communities heavily rely on groundwater to meet their needs (Chief, Meadow, and Whyte 2016). In addition, residents have reported that hundreds of abandoned mines have been used by animals as shelters, and several abandoned open-pit uranium mines in the region have become filled with water and have been used as a water source for animals (Eichstaedt 1994). Due in part to concerns about unsafe levels of uranium and other uranium industry byproducts in local water sources, around 40% of Navajo Nation residents haul potable water in buckets or bottles from outside sources to meet their basic water needs (McGraw 2018; Podmore 2020). These substantial environmental injustices in the Navajo Nation left behind by the uranium production era warrant increased attention from policymakers, the public, and EJ scholars.

Pellow (2017a, 2017b) proposed that incorporating insights from CRT may help to better understand the role that race plays in shaping environmental injustices, and how individuals and communities respond to them. CRT emerged from critical legal studies in the 1970s as a critique of the legal system's inability to address structural racism. CRT scholarship values the experiential knowledge of minority racial groups. Brayboy (2005) built upon CRT to develop tribal critical race theory (TribalCrit) as a framework for understanding the unique issues faced by Native Americans as they navigate society, both as a racial minority and a marginalized political group. Although TribalCrit emerged from educational studies, it provides a framework that focuses holistically on the Indigenous experience in modern American society. TribalCrit may also serve as a

valuable frame for research focused on Indigenous EJ issues, though I have not yet located EJ research that uses the framework, a gap I address in my third paper.

Given Indigenous FCR residents' status as unique marginalized racial and political groups, it cannot be assumed that the patterns from research in other contexts exploring attitudes and concerns related to uranium production will apply to them, whether they live within or outside of Navajo Nation borders. Due to their liminal position within American society, which is dominated by "European American thought, knowledge, and power structures," Indigenous FCR residents have a fundamentally unique relationship with America's social, political, and economic institutions as they seek to determine the path forward for themselves and their communities (Brayboy 2005:430).

In sum, the existing literature indicates that some FCR residents have significant environmental and health concerns related to the legacy of uranium development in the region (Eichstaedt 1994; Malin and Petrzelka 2010; Voyles 2015). While many of these concerns remain unassuaged, new uranium production has the support of some residents as an avenue for economic growth and community revitalization. It even has the support of some residents who have expressed concerns about the impacts of prior uranium development (Malin 2014; Malin 2015; Voyles 2015). Meanwhile, research on this topic has tended to focus on predominately-White communities in the northern part in the region. In this dissertation, I contribute to a more holistic understanding of the uranium-related views and experiences of FCR residents by focusing on three communities in the southern portion of the region, which tends to be more racially and culturally diverse.

Next, I provide a broad overview of the research design and briefly detail the three papers that comprise the body of the dissertation.

### *Research Overview*

This dissertation contains three papers that each make a unique contribution to the social science literature related to uranium production (and extractive industry activity more broadly). For these papers, I draw upon a set of in-depth semi-structured interviews with FCR residents across three communities: Grants and Crownpoint, both located in New Mexico, and Blanding, Utah. I focus on these communities specifically because, taken together, they are generally representative of the racial and ethnic diversity of the region (i.e., a mix of Native American, White, and Hispanic residents). Further, while each of these communities has a unique population size, sociodemographic composition, and historical legacy, all their histories are deeply intertwined with uranium production (Amundson 2004; Bunkall 2005; Voyles 2015).

***Paper 1:*** *"You've Already Made the Deal with the Devil": Evaluating Residents' Views about Uranium Revitalization in the Grants Mining District of Northwestern New Mexico*. The Grants Mining District (GMD), which includes the eastern portion of the Navajo Nation, was the epicenter of uranium production in the FCR during the uranium production era (McLemore and Chenoweth 2017). The uranium industry has remained interested in the area, and recent developments signal a potential increase in demand for domestically produced uranium (Frazin 2021; Scheyder and Hunnicutt 2022). Research investigating FCR residents' attitudes about uranium revitalization has focused on predominately-White communities in the northern portion of the region (Malin and Petrzelka 2010; Malin 2014, 2015).

In contrast, more culturally and racially diverse communities in the southern portion of the FCR have received less attention. Further, while several researchers have investigated these patterns for other types of natural resource extraction (e.g., hydraulic fracturing (fracking), coal, natural gas) in the US, I have not yet located research systematically looks at sociodemographic patterns in attitudes about new uranium production. The overall research objective for this paper was to conduct a systematic investigation of how these sociodemographic factors were associated with attitudes about new uranium production among GMD residents. This paper addresses the following research questions: (1) *How are sociodemographic factors associated with attitudes about uranium revitalization in the GMD?* (2) *What are the main drivers of attitudes about uranium revitalization in the GMD?*

In this paper, I relied on 53 in-depth semi-structured interviews with residents in two GMD communities: Grants ($n$ = 32), the namesake of the district, and Crownpoint ($n$ = 21), the political center of the Eastern Navajo Agency. My analysis focused on: (1) Identifying patterns related to sociodemographic factors and attitudes about new uranium development; and (2) Identifying the underlying drivers of participants' attitudes about new uranium development. In addition to a standard suite of sociodemographic factors (i.e., race/ethnicity, age, gender, and formal education), I also considered length of residence and uranium industry ties, as previous research indicates that these factors are associated with support for (or opposition to) a range of environmental activities, including natural resource extraction (Jacquet 2012; Qin 2016).

In my descriptive analysis, I found that participants fit within one of four categories regarding their attitudes about new uranium production: (1) those who clearly

supported new uranium production; (2) those who clearly opposed it; (3) those who were ambivalent (i.e., expressed mixed or conflicting views about new uranium production); and (4) those who were neutral on the topic. Some sociodemographic groups (i.e., Native Americans, women, those with higher levels of formal education, and new residents) tended to hold anti-uranium attitudes. In contrast, other groups (Hispanics, those with less formal education, and those with uranium industry ties) were pro-uranium. Pro-uranium attitudes were driven by potential economic benefits, concerns about energy security, and trust in contemporary technologies and regulatory structures, while environmental and health concerns primarily drove anti-uranium attitudes. The target journal for this paper is *Energy Research & Social Science*.[2]

***Paper 2:*** *Applying the Spectrum of Community Responses to Environmental Injustice: Ambivalence, Quiescence, and Uranium Production in Blanding, Utah.* EJ research has tended to focus on "sites of resistance," where residents mobilize against environmental activities (like uranium production) that are associated with environmental injustices, or "sites of acceptance," where residents mobilize to support them. Only recently have EJ researchers begun to consider places characterized by ambivalence (mixed or conflicting views) and quiescence ("the absence of collective activism in the face of deprivation or injustice, especially under conditions in which one might reasonably expect protest to occur") (Greenberg 2023; Malin et al. 2023:4).

To better understand places that do not fit within the resistance/acceptance dichotomy, Malin et al. (2023) have recently developed a framework that considers community responses to environmental injustice as a spectrum with at least four distinct

[2] The author guidelines for *Energy Research & Social Science* state that original research articles in this journal are typically 6,000-10,000 words, including references.

pathways. Due to Blanding's proximity to the White Mesa Mill (WMM; the only operational uranium processing facility in the US) and the uranium-rich BENM, the community provides an excellent venue to begin exploring the utility of the framework developed by Malin et al. (2023). The overall research objective for this paper was to apply the spectrum mentioned above to a series of semi-structured interviews with Blanding residents ($n$ = 19) to begin to assess its usefulness as a tool for understanding community responses to environmental injustice. My analysis was guided by the following research question: *Where is Blanding located on the spectrum of community responses to environmental injustice?*

This paper explored three separate measures of perceptions of uranium production among Blanding residents ($n$ = 19): (1) views about new uranium production generally; (2) views about the WMM; and (3) views about new uranium mining near the BENM. Regarding quiescence and passivity, I looked for instances where participants stated that they had engaged in direct action or activism regarding issues related to uranium production. I also looked for instances where participants expressed a passive or indifferent view toward uranium production or downplayed the EJ concerns of other residents in the area.

Participants had mixed feelings about the more specific measures (i.e., the WMM and new uranium mining near the BENM) more often than new uranium mining in the area generally. Inconsistent views across the three measures were prevalent in a majority of the interviews ($n$ = 13), and there was a wide range of variation in how it emerged. Meanwhile, quiescence was prevalent throughout the interviews—none of the participants discussed having engaged in any direct action or activism related to uranium

production, and several participants expressed a passive view of the WMM or downplayed the EJ concerns of other residents in the area. My findings indicate that Blanding is most closely aligned with the "passive acceptance" pathway, at least regarding the WMM, but this characterization is less accurate regarding new uranium mining near the BENM. Ultimately, more work is needed to demarcate the four pathways described by Malin et al. (2023). The target journal for this paper is *Environmental Justice*.[3]

***Paper 3:*** *Applying TribalCrit to Highlight Indigenous Residents' Uranium-Related Views and Experiences in Diné Bikéyah*. The uranium boom in the US left behind more than 500 known abandoned uranium features, widespread radioactive groundwater and soil contamination, and remarkably high rates of cancer, kidney failure, and other diseases that have been linked to radioactive exposure in the Navajo Nation (Redvers et al. 2021). Meanwhile, grassroots anti-uranium activists in the Eastern Agency of the Navajo Nation have resisted a decades-long effort by the uranium industry and US government to site new uranium mines near the Eastern Agency communities of Church Rock and Crownpoint. Given the legacy of the uranium boom in the Navajo Nation and other nearby tribal nations, there is a need for significantly more EJ research that is "deeply grounded in these spaces" (Malin and Alexis-Martin 2020:4).

The overall objective of this exploratory study was to better understand the uranium-related views and experiences of Indigenous FCR residents ($n$ = 22). As mentioned previously, I relied on three tenets from Brayboy's (2005:429–430) TribalCrit framework, which "provides a way to address the complicated relationship between

[3] According to the author guidelines for *Environmental Justice*, a research article in this journal should be less than 4,000 words, not inclusive of tables, references, or figure captions.

American Indians and the United States federal government and begin to make sense of American Indians' liminality as both racial and legal/political groups and individuals" (Brayboy 2005:425). The three tenets of Brayboy's (2005) framework that I focused on were: (1) "Indigenous peoples occupy a liminal space that accounts for both the political and racialized natures of our identities." (2) "Indigenous peoples have a desire to obtain and forge tribal sovereignty, tribal autonomy, self-determination, and self-identification." (3) "Tribal philosophies, beliefs, customs, traditions, and visions for the future are central to understanding the lived realities of Indigenous peoples, but they also illustrate the differences and adaptability among individuals and groups."

Liminality most frequently emerged in relation to participants' discussion of the Church Rock spill of 1979 (the worst radioactive contamination event in US history) and other problematic events during the uranium boom, which contributed to a deep distrust of the uranium industry and the US government (particularly the Nuclear Regulatory Commission, or NRC). Discussion of the liminal geographic space surrounding Crownpoint (i.e., the "checkerboard area"), and its confusing mix of land statuses, was also common. Meanwhile, activists described their efforts to resist the licensure of new uranium mines in the Eastern Agency, which included community outreach, litigation with the US government, and lobbying the Navajo Nation tribal government (an example Indigenous peoples' desire to obtain and forge tribal sovereignty, tribal autonomy, self-determination, and self-identification). Their efforts directly contributed to the enactment of a permanent ban on all uranium mining and processing on Navajo lands in 2005, which has consistently been disregarded by the NRC and the US legal system (Navajo Nation Code, Title 18 §1301, 2005; Jantz 2018). Some participants discussed traditional

Indigenous knowledge that warns against uranium extraction or expressed concerns that new uranium mining could impede Indigenous residents' ability to engage in traditional practices on sacred lands, including gathering firewood and medicinal herbs, which they depend on for daily life. The target journal for this paper is *Environmental Sociology*.[4]

### *Conclusion*

In the three papers that make up the body of my dissertation, I provide a systematic exploration of resident views about new uranium production in the GMD, apply a recently developed framework focused on community action to environmental injustice in Blanding, and use TribalCrit to better understand the uranium-related views and experiences of Indigenous FCR residents. Taken together, these papers contribute to a more holistic understanding of the uranium-related views and experiences of FCR residents. The findings from these studies may be useful in informing policymakers and activists working to ensure a socially, environmentally, and economically sustainable future for their communities.

[4] The author guidelines for *Environmental Sociology* state that original research articles in this journal are typically under 8,000 words, inclusive of references.

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# CHAPTER 2

# "YOU'VE ALREADY MADE THE DEAL WITH THE DEVIL": EVALUATING ATTITUDES ABOUT NEW URANIUM PRODUCTION IN THE GRANTS MINING DISTRICT OF NORTHWESTERN NEW MEXICO

**Abstract**

The uranium booms and busts that occurred from the 1940s through the 1980s significantly shaped the social, environmental, and economic conditions of the uranium-rich Four Corners Region (FCR), particularly in the Grants Mineral District (GMD) of northwest New Mexico. Uranium prices have since fluctuated, and when they are higher, new uranium projects have been proposed in the GMD. While none of these projects have taken hold, the topic of uranium revitalization is controversial among GMD residents. Meanwhile, there is a growing sociopolitical interest in a transition toward nuclear energy, and recent developments suggest that demand for domestically produced uranium could soon be on the rise. Research investigating FCR residents' attitudes about uranium revitalization has focused on predominately-White communities in Utah in Colorado, while more culturally and racially diverse communities have received less attention. Further, there is a lack of research regarding sociodemographic patterns in attitudes about uranium revitalization in the FCR. I use 53 semi-structured interviews with residents of two racially and culturally diverse GMD communities to help fill these gaps. These interviews suggest that some sociodemographic groups (i.e., Native Americans, women, residents with higher levels of formal education, and new residents) tend to hold anti-uranium attitudes, while other groups (Hispanics, residents with less formal education, and residents with uranium industry ties) tend to be pro-uranium. Anti-

uranium attitudes were primarily driven by environmental and health concerns, while pro-uranium residents most frequently cited potential economic benefits, concerns about energy security, and trust in contemporary technologies and regulatory structures. Some residents were ambivalent about uranium revitalization, discussing pros and cons, and ultimately could not be categorized as pro- or anti-uranium. These findings have implications for public stakeholders in the region, and suggestions for policy and future research are discussed.

## Introduction

In 1948, the United States (US) Atomic Energy Commission announced that it would pay a guaranteed price for all domestically produced uranium to support its nuclear weapons program, prompting a uranium boom in the Western US that lasted through the mid-1960s. A second uranium boom, driven by the proliferation of commercial nuclear power plants, began in the early 1970s and busted in the late-1980s. This boom-bust cycle has had an enduring impact on the social, environmental, and economic conditions of the uranium-rich Four Corners Region (FCR), particularly in the Grants Mining District (GMD) of northwestern New Mexico, where an unprecedented amount of uranium was produced from the 1950s into the 1980s (McLemore and Chenoweth 2017; Thompson 2021).

The uranium sector has been volatile since the late-1980s, and soaring uranium prices have coincided with increased interest in new domestic uranium production in the FCR, particularly in the GMD (US EPA 2011; WNA 2022). Since the market is volatile, soaring uranium prices inevitably turn to falling uranium prices, thus, none of these projects have made it to the production stage. Nevertheless, they have been a major

source of community debate and conflict in the economically distressed area (AP 2020; Davis 2021). At the same time, there is a growing sociopolitical interest in a transition towards nuclear power for energy security and climate change mitigation (Omitaomu et al. 2022), and recent developments indicate that increased demand for domestically produced uranium may be on the horizon. In 2020, the Trump administration proposed investing $150 million to create a strategic uranium reserve, and Biden administration officials have expressed support for the idea (Frazin 2021; Scheyder and Hunnicutt 2022).

Research that focuses on residents' attitudes about uranium revitalization (i.e., new uranium production) in the FCR consists of class-based analyses among predominately-White communities in Utah and Colorado (Malin and Petrzelka 2010; Malin 2014, 2015). While this research reveals many important details about attitudes toward uranium revitalization, there remains a need for further research on this topic that incorporates the views among members of more racially diverse communities, particularly Indigenous communities, given the extensive environmental and health impacts of past uranium production on tribal lands throughout the American West (Malin and Alexis-Martin 2020a). Additionally, while many researchers have investigated the relationships between sociodemographic factors (e.g., race and ethnicity, gender, formal education, age) and attitudes about other kinds of natural resource extraction in the US (Boudet et al. 2014; Howell et al. 2017; Ulrich-Schad et al. 2020), I have not located a systematic investigation of how these factors are associated with attitudes about new uranium production. A better understanding of the sociodemographic variation in residents' attitudes about uranium revitalization in understudied areas with legacies of

uranium production—and where new uranium production is probably most likely to occur in the future—can help conscientious public officials make decisions about community development that more fully consider the concerns and preferences of their constituents.

In this study, I draw on 53 in-depth semi-structured interviews with residents of two GMD communities to investigate sociodemographic variation in attitudes about new uranium production. I focus on the two communities in the GMD that have received the most uranium industry attention since the late 1980s: Crownpoint (*T'iists'óóz Ńdeeshgizh*), the political center of the Eastern Agency of the Navajo Nation (*Dinétah*), and Grants, a racially and ethnically diverse and the namesake of the district. To address the research objective, I ask the following research questions: (1) *How are sociodemographic factors associated with attitudes about uranium revitalization in my study communities?* (2) *What are the main drivers of attitudes about uranium revitalization in my study communities?*

**Literature Review**

Numerous studies have found that some sociodemographic groups (e.g., people of color and women) have a heightened sense of awareness and concern about environmental issues. These differences are due to a myriad of factors which include unequal exposure to environmental risks and differences in socialization (Liu, Vedlitz, and Shi 2014). While I have not located a systematic investigation of how sociodemographic factors are associated with attitudes about uranium revitalization, there are several studies that have looked at how sociodemographic factors are (or are not) associated with attitudes about other types of extractive industry activity (e.g., hydraulic

fracturing (fracking), coal, natural gas). Many of these studies, however, have failed to include race and ethnicity. Exceptions include Boudet et al. (2014) and Howell et al. (2017), who included race/ethnicity (as non-Hispanic whites versus all other racial and ethnic identities) as covariates in their multivariate models predicting support for fracking using national survey data. In both cases, the race/ethnicity variable did not significantly predict support for fracking.

Regarding age and attitudes about extractive industry development, findings vary across different regions and industry types. For example, Jacquet (2012) found that younger residents tended to be more supportive of natural gas development than older residents. In contrast, Ulrich-Schad et al. (2020) found that age did not significantly predict support for the Dakota Access Pipeline (DAPL) in North Dakota and Montana. Boudet et al. (2014) and Howell et al. (2017) both included age in their models predicting support for fracking using national survey data, but had divergent results, with the former finding that older people tend to be more supportive of fracking and the latter finding age to be nonsignificant. The effect of gender on extractive industry support is more consistent—there is a robust pattern across studies indicating that women are less supportive of natural resource extraction than men (Jacquet 2012; Boudet et al. 2014; Howell et al. 2017; Ulrich-Schad et al. 2020).

Findings regarding formal education and attitudes about extractive industry development have varied between studies. In Northern Pennsylvania, Jacquet (2012) found that residents with higher levels of formal education were more likely to oppose natural gas development than those with less formal education. At the national level, Boudet et al. (2014) and Howell et al. (2017) once again had divergent findings, with the

former finding that more formal education was associated with an increased likelihood of support for fracking, and the latter finding it to be nonsignificant. Prior research also indicates that length of residence is an important consideration when assessing attitudes about natural resource issues, as significant sociodemographic and cultural differences can exist between new and established residents—though there is a lot of contextual variation (Qin 2016). For example, a recent study in the Intermountain West found that long-term residents tended to have stronger economic preferences, while newcomers tended to have stronger environmental preferences (Ulrich-Schad and Jakus et al. 2022).

Turning to attitudes about uranium production specifically, the economies of the uranium boomtowns in the American West have been unstable, characterized by booms and busts where periods of economic expansion are followed by decline as the resource base is depleted or loses commercial viability (Krannich et al. 2014). Nevertheless, previous research in places with a history of uranium production suggests that residents with pro-uranium attitudes see it as a pathway to economic revitalization (Malin and Petrzelka 2010; Malin 2014, 2015). Freudenburg (1992:306) offered an explanation for this phenomenon, arguing that community economic dependence on natural resource extraction is analogous to substance use disorders: “In many cases, individuals report that they find their early experiences with narcotic or other drugs to be pleasurable or even exhilarating, but the longer-term consequences are debilitating; efforts to discontinue use can be associated with negative reactions such as withdrawal symptoms.”

While extractive industry work offers comparatively high wages, the economic booms and busts associated with natural resource extraction can have negative community impacts such as social dislocation and strains on housing and community

infrastructure (Jacquet et al. 2018; Daum, Ryder, and Malin 2019; Ulrich-Schad et al. 2020). Additionally, while technological innovations and improvements open pathways for new forms of natural resource extraction, they are typically less labor-intensive than older methods, shrinking the number of jobs provided by these industries over time (Krannich et al. 2014). Nevertheless, previous research suggests that identification with occupations in natural resource extraction (through employment of self or a relative) is associated with greater levels of support for those industries (Jacquet 2012).

As with other extractive industries, the negative impacts of uranium production are felt at individual and community levels. As stated by Dr. Gabrielle Hecht, Frank Stanton Foundation Professor of Nuclear Security at Stanford University, there are "multiple registers in which the use of uranium has both created and destroyed communities" (Alexis-Martin 2020). Since the 1970s, researchers affiliated with the Southwest Research and Information Center have conducted extensive studies on the negative environmental and health impacts of uranium production in the southwestern US, including the health effects of uranium contamination on Navajo (*Diné*) lands, where the population has high rates of cancer, diabetes, autoimmune conditions, and other illnesses associated with exposure to uranium and other radioactive elements (Blake et al. 2015; Hunter, Peter, and Begay 2015; Erdei et al. 2019). Other researchers have pointed to uranium production on Indigenous lands in the FCR as a clear case of environmental racism and colonialism (Eichstaedt 1994; Voyles 2015; Lorenzo 2017). This body of research connects the processes of colonization to the diminishment, degradation, and destruction of Indigenous traditions and sacred spaces, and underscores the treatment of the lands of poor and racially marginalized rural communities as "national sacrifice

zones" or "wastelands" for the sake of militarization and nuclear energy generation (Rosier 2008; Voyles 2015).

While academic research that focuses specifically on residents' attitudes towards new uranium production in the FCR is limited, a small body of literature has shed light on this topic. In Malin's 2015 analysis, they focused on the communities near the proposed Piñon Ridge uranium mill in southwestern Colorado, which included places that fostered "sites of acceptance" (e.g., Naturita and Nucla, Colorado; Monticello, Utah) and "sites of resistance" (e.g., Telluride and Paradox, Colorado). Malin (2015:4) posited that sites of acceptance form a "triple movement" where "markets for commodities such as uranium become part of community social fabrics and are defended and supported by people as part of local culture and norms, despite the historical instability of these commodity markets."

In sites of acceptance, Malin (2015) found that residents often believed uranium revitalization would rejuvenate their communities and trusted modern regulatory structures to ensure the safety of people and the environment. They also held "alternative notions" of environmental justice (EJ) that highlighted the "positive environmental effects" of nuclear energy production, such as reduced carbon emissions (Malin 2014:277). In Monticello, some residents supported new uranium production while also lobbying to be compensated for high rates of cancer associated with a uranium mill that operated in the community during the nuclear era (Malin and Petrzelka 2010). In sites of resistance, Malin (2015:74) found that class-based tensions emerged between activists in Telluride, an affluent second homeowner and tourism-dependent community where residents sought to uphold "an image of pristine nature," and anti-uranium residents in

places closer to the Piñon Ridge site, like Paradox, who were concerned about the environmental and health implications of a uranium mill being sited in proximity to their communities.

As discussed above, previous research on residents' attitudes about uranium revitalization has primarily focused on comparing sites of acceptance, where residents mobilize in support of uranium revitalization, and sites of resistance, where residents organize against it (Malin and Alexis-Martin 2020b). Sociologically, ambivalence refers to "a pattern of a 'conflict of interests or of values' in which the interests and values incorporated in different statuses occupied by the same person result in mixed feelings and compromise behavior" (Merton 1976:9). Less attention has been paid to individuals with ambivalent views or places where residents have not reached a general consensus about uranium revitalization. However, many researchers have observed ambivalence about environmental issues among the people that they study (see Halkier 2001; Threadgold 2012; Mueller and Mullenbach 2018).

For example, Carolan (2010) found that some individuals expressed genuine concern about climate change while also believing that the seriousness of climate change is often overstated by the media. Similarly, attitudes about natural resource extraction in communities that have been shaped by the booms and busts of extractive industry development can be complex—residents may want oil and gas extraction in their community to continue but wish that the pace would slow (Ulrich-Schad et al. 2020). Greenberg (2023) investigated resident attitudes about acceptance or opposition to coal production in a region in Southern West Virginia that common wisdom suggests would be awash with sites of acceptance. Yet, they found that many individuals and

communities in the region were conflicted—or ambivalent—about coal production, and that this region could be described as a "site of ambivalence."

In summary, previous research suggests that sociodemographic factors are differentially associated with environmental concerns and attitudes about extractive industry development. Yet, I have not located research in the US that systematically investigates how sociodemographic factors relate to attitudes about uranium revitalization. Further, research has also explored residents' views about uranium revitalization in racially homogenous (i.e., predominately-White) sites of acceptance and resistance in the FCR, but the views of residents in more culturally and racially diverse communities in the southern part of the region have not yet been incorporated into this research. I hope to help fill these gaps by investigating attitudes about uranium revitalization in two GMD communities. In the following section, I provide detail about these communities and the methodological approach used for the study.

## Methods

### *Study Communities*

I selected the GMD as the focus of this study for three primary reasons: (1) The social and cultural landscape of the GMD is diverse, with several Indigenous territories—including the Navajo Nation—crisscrossing through it. (2) The quantity of uranium extracted and processed in the GMD during the uranium boom period is unprecedented. Between 1950 and 2002, over 340 million pounds of $U_3O_8$ (uranium concentrate, or "yellowcake") were produced from uranium ore deposits in the GMD (McLemore and Chenoweth 2017). Subsequently, hundreds of abandoned uranium mines are scattered throughout the area, and there are three Environmental Protection Agency Superfund

sites located there. (3) It is estimated that over 300 million pounds of mineable $U_3O_8$ remain in the area (McLemore and Chenoweth 2017). Thus, there is the potential for future uranium production if demand for domestically produced uranium increases. I focus on the communities of Grants and Crownpoint because, while both communities have strong historical links to uranium production, each has a distinct cultural heritage and sociopolitical background (Shaiman 1998; Amundson 2004), discussed more below. Additionally, most of the new uranium projects that have been proposed in the GMD since the late-1980s have been near one of these two places (Nasaw 2010; Davis 2021).

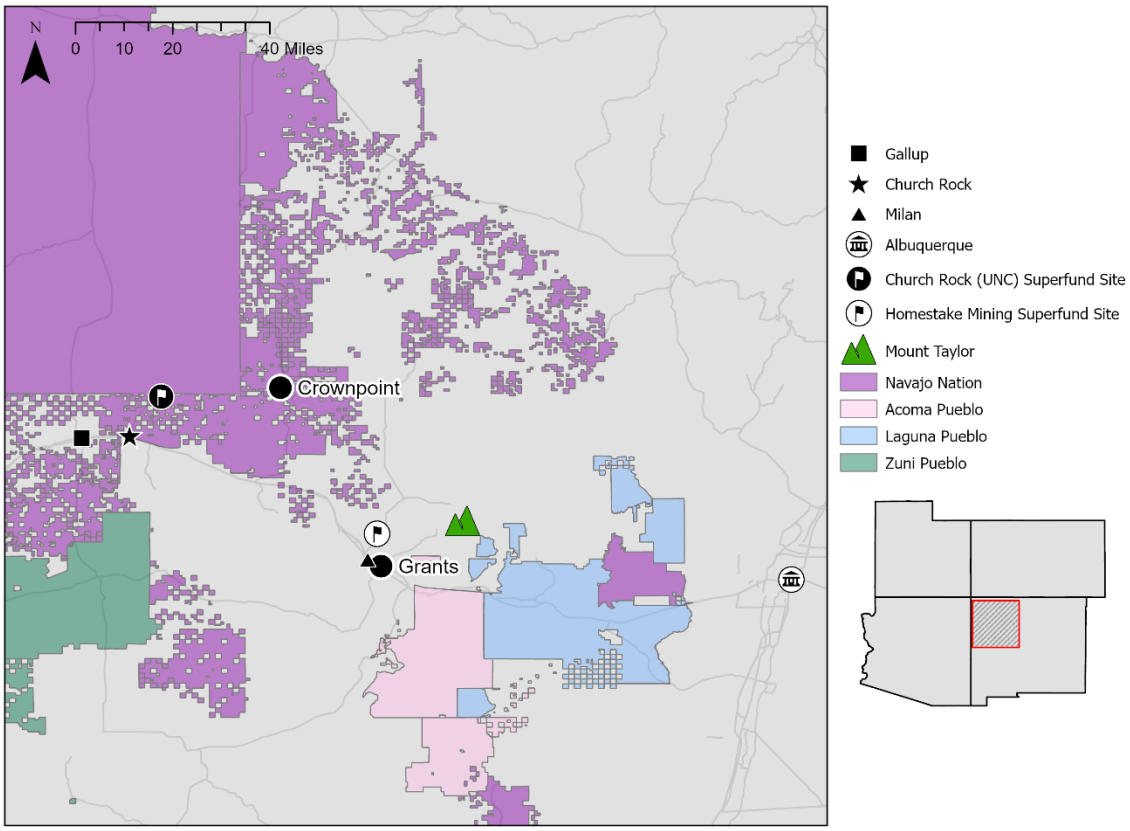


**Figure 2.1:** Map of Study Area

Grants, New Mexico, sits at the southwest base of Mount Taylor (*Tsoodził*), which is the tallest mountain in northwestern New Mexico and an important cultural site

for the Navajo people and many other Indigenous peoples in the Western US (Figure 2.1). Grants is bordered to the northwest by the less-populated Village of Milan (the two places are often referred to as "Grants-Milan" because of their social integration). Based on five-year estimates from the 2020 American Community Survey (ACS), Grants has a population of 8,987 (Table 2.1). Most (68%) of Grants residents identify as White, while 18% identify as Native American, and a majority of residents (of any race) have Hispanic or Latino Origin (54%). Grants has an average household size of 2.6, a per capita income of $21,866, and a 28% poverty rate (US Census Bureau 2020a). Similarly, the Village of Milan (population 3,665) has an average household size of 2.9, a per capita income of $19,833, and 26% poverty rate.

**Table 2.1: Census Data for Study Communities (2020 ACS 5-Year Estimates)**

| | Grants City | Village of Milan | Crownpoint CDP |
|---|---|---|---|
| Population | 8,987 | 3,665 | 3,018 |
| Households | 3,026 | 1,219 | 938 |
| Average Household Size | 2.6 | 2.9 | 3.1 |
| Race/Ethnicity | | | |
| White (%) | 64 | 58 | 5 |
| Black or African American (%) | 2 | < 1 | < 1 |
| American Indian or Alaska Native (%) | 18 | 20 | 89 |
| Asian (%) | < 1 | < 1 | 1 |
| Some Other Race (%) | 7 | 4 | < 1 |
| Two or More Races (%) | 9 | 18 | 4 |
| Hispanic or Latino Origin (Any Race) (%) | 54 | 66 | 1 |
| White Alone, Not Hispanic or Latino (%) | 25 | 13 | 4 |
| Median Age | 35 | 35 | 31 |
| Female (%) | 48 | 43 | 59 |
| Residence One Year Ago in the Same House (%) | 77 | 82 | 91 |
| Median Income ($) | 21,866 | 19,833 | 19,318 |
| Below 100% of Poverty Level (%) | 28 | 26 | 30 |
| Educational Attainment (25 and older) | | | |
| Less than High School or High School/GED (%) | 45 | 59 | 51 |
| Some College, Associate, or Vocational/Technical (%) | 33 | 26 | 33 |
| Bachelor's (%) | 13 | 11 | 9 |
| Graduate or Professional (%) | 8 | 5 | 7 |

(US Census Bureau 2020a, 2020b)

Prior to the uranium boom, agriculture had economic primacy in the Grants area, which was known as the "Carrot Capital of the World" (Jaramillo and Milan 2013). In the years following the uranium bust, three prisons have been established in Grants and Milan—which is commonplace in former energy boomtowns (Besser and Hanson 2016). The Homestake Mining Company Superfund Site is another notable legacy of the uranium boom. Located about five and a half miles north of Milan, the Homestake site consists of the defunct Homestake Mining Company uranium mill and two enormous tailings piles (waste impoundments). Around 200 residents live within a mile of the mill site, and runoff from the tailings piles has leeched into segments of nearby aquifers, impacting nearby agricultural lands and five residential subdivisions. Residents of these impacted neighborhoods have been advised not to use their well water, and in recent years, the Homestake Mining Company has purchased (or offered to purchase) many of the affected homes (US EPA, n.d.).

Crownpoint, New Mexico, is located within the Eastern Agency of the Navajo Nation, approximately 17 miles east of the United Nuclear Corporation Superfund site, where the Church Rock uranium mill spill of 1979—the worst radioactive accident in US history—occurred (Millard et al. 1983; Arnold 2014). Crownpoint has a population of 3,018, and most residents (89%) identify as Native American. The per capita income of $19,318 in Crownpoint is similar to Grants and Milan, but a slightly higher proportion of the population (30%) are persons in poverty (US Census Bureau 2020a).

Crownpoint is located within the "checkerboard" area of the Navajo Nation, where federal allotment policies have resulted in a jumble of tribal lands, trust lands (lands held by the federal government on behalf of the Navajo Nation), fee lands (lands

no longer held in trust by the federal government or the Navajo Nation that are owned by Navajo and non-Navajo people), allotment lands (lands held by individual members of the Navajo Nation, aka allottees), and other land designations (Fitzpatrick 2021). As the political center of the Eastern Agency, Crownpoint hosts several tribal offices, K-12 schools, and the flagship campus of Navajo Technical University. Residents in Crownpoint proper have access to running water provided by the Navajo Tribal Utility Authority, but many residents in surrounding areas struggle with access to clean and safe water due to a lack of infrastructure and contamination from past uranium production. These residents often rely on tainted water sources or travel to nearby places, like Crownpoint, to haul clean water for their homes (Tanana, Combs, and Hoss 2021).

The Crownpoint area has become a center of anti-uranium activism, and the grassroots Eastern Navajo Diné Against Uranium Mining (ENDAUM) organization has been instrumental in shaping the Navajo Nation's natural resource policies. Their most significant accomplishment in this regard was the ratification of the Diné Natural Resources Protection Act of 2005, which prohibits uranium mining and processing on Navajo lands (Segal 2012). In 2011, ENDAUM submitted a petition against the United States government to the Inter-American Commission on Human Rights (IACHR), contesting the Nuclear Regulatory Commission's decision to license *in-situ* leach (ISL) mining projects near Church Rock and Crownpoint.[5] A decade later, the IACHR decided

[5] ISL mining involves the injection of a leach solution into the ore zone below the groundwater table, dissolving the ore, and then pumping the loaded solution to the surface to recover the minerals (Taylor et al. 2004). Proponents of ISL mining tout its safety over underground and open-pit mining—citing minimal surface disturbance and reduced occupational hazards—while critics argue that it poses a significant threat of irreversible groundwater contamination (Ruiz et al. 2019).

that the petition filed by ENDAUM was admissible, marking only the second time in history they have agreed to hear an EJ case against the US government (IACHR 2021).

### *Data Collection and Analysis*

To investigate residents' attitudes about uranium attitudes in the GMD, I conducted 53 in-depth semi-structured interviews in Grants ($n$ = 32) and Crownpoint ($n$ = 21).[6] Additionally, I spent time in both study communities familiarizing myself with their social and built environments, surveying derelict (and proposed) uranium production sites, and having informal conversations with residents. I sought a participant pool with a diversity of sociodemographic backgrounds. I also sought a range of opinions about uranium revitalization, which I was able to achieve in Grants. In the Crownpoint area, there was a strong consensus in opposition to uranium revitalization, though a few participants there were ambivalent. The few solidly pro-uranium Crownpoint area residents that I was able to identify were unable or unwilling to participate in a research interview.

My goal for participant recruitment was to obtain a sample that reflected the sociodemographic diversity in the GMD and a diversity of viewpoints about new uranium production. I relied on multiple modes of recruitment. I searched local news sources (i.e., *Cibola Citizen*, *Albuquerque Journal*, *Navajo Times*, and *High Country News*) and city council and tribal meeting records to identify residents who had spoken publicly about

[6] Crownpoint and Grants are hub communities that residents in smaller outlying places rely on for employment, education, shopping, and other needs. Some interview participants lived in these outlying places, but in all cases, these interviewees had strong social ties in Crownpoint or Grants proper. Additionally, in most instances, they were also employed there. One Grants interviewee had recently retired and moved elsewhere in the state. I chose to include their interview in the present analysis because they were a lifelong resident who had moved only a few months before the interview and maintained strong ties to the community.

uranium issues. I also searched public directories for K-12 schools, colleges and universities, and government agencies to identify potential participants. I made initial contact with participants through email, phone, and face-to-face contact. Additionally, I relied on snowball sampling to help deepen and diversify the pool of participants.

Most interviews took 15–45 minutes, although some lasted longer, and a few took several hours. Due to the COVID-19 pandemic, most interviews were conducted remotely (by phone or video conference), but some were conducted in person. All interviews were recorded with the consent of the participants and then transcribed for analysis. To address my research questions, I asked participants whether they would support or oppose uranium revitalization in the area (and why). I also asked about their sociodemographic and background characteristics (i.e., their racial/ethnic identity, age, formal education, and current occupation).

I used an iterative coding process to identify the most frequently occurring themes in attitudes about new uranium production throughout the interviews (Galletta 2013).[7] Through the iterative process, I found that opinions about uranium revitalization did not fit within a rigid pro-uranium/anti-uranium dichotomy. Thus, I partitioned interviewees into three categories. I classified participants who clearly supported uranium revitalization as "pro-uranium," and those who clearly opposed uranium revitalization as "anti-uranium." Participants who expressed a conflicted view about uranium revitalization (i.e., they discussed both pros and cons of new uranium production and

[7] During the initial round of coding, I focused on identifying participants' attitudes about uranium revitalization as well as relevant sociodemographic factors. In subsequent rounds of coding, I focused on identifying the underlying drivers of participants' opposition to or support for uranium revitalization.

ultimately could not say if they would support or oppose it) were classified as "ambivalent."[8]

Following previous research (outlined in the preceding literature review), I focus on race/ethnicity, age, gender, formal education, length of residence, and uranium industry ties. Because I was conducting interviews in a relatively socially conservative area, I opted not to directly ask participants about their gender identity. Instead, I assumed their gender identity based on my interactions with them, which presents some limitations. I use formal education as an indicator of socioeconomic status (SES) because, as noted by Oakes and Andrade (2017:34) "educational attainment is an excellent proxy measure of SES," particularly for individuals aged 25 and older. For length of residence, I classified participants who said that they had lived in (or near) their respective community for less than five years and had never lived there previously as "new residents" and all others as "established residents."[9] Finally, I look at uranium industry ties (i.e., if a participant indicated that they or a family member has worked in the uranium industry). While I did not directly ask about ties to the uranium industry, a significant portion (44%) of participants indicated that they or a family member had worked in the uranium industry during their interviews, indicating that it was a factor worth exploring.

[8] One participant was neutral (i.e., they had only lived in Crownpoint for two years and felt that they needed more information on the topic before forming an opinion about it). I elected not to include their interview in the present analysis (which reduces the overall number of included participants from 53 to 52 and the number of Crownpoint participants from 21 to 20).

[9] Previous research suggests that various cutoff points for length of residence (i.e., 5, 10, and 20 years) can yield different results (Qin 2016). For the present study, the results were substantively similar across different cutoff points.

## Findings

### *Sociodemographic Factors and Attitudes about New Uranium Production*

The sociodemographic composition of each of the three groups (i.e., pro-uranium, anti-uranium, and ambivalent participants) is shown in Table 2.2. Overall, 29 (56%) of the 52 interviewees were anti-uranium, 17 (33%) were pro-uranium, and six (12%) were ambivalent. In Grants, residents expressed a diversity of attitudes about uranium revitalization. Of the 32 Grants interviewees, a majority (17, or 53%) were pro-uranium, while 11 (34%) were anti-uranium, and four (13%) were ambivalent. In contrast, the vast majority of Crownpoint residents (18 of 20, or 90%) were anti-uranium. The remaining two Crownpoint residents were ambivalent.

When asked about their racial/ethnic background, interviewees self-identified as one of four categories: white, Native American, Hispanic, or Black. Eleven (55%) of the 20 white interviewees were anti-uranium, seven (35%) were pro-uranium, and two (10%) were ambivalent. Fifteen (88%) of 17 Native American participants were anti-uranium, and the remaining two were ambivalent. There were no pro-uranium Native American participants. In contrast, most Hispanic respondents were pro-uranium (nine of 12, or 75%). Only two (17%) Hispanic participants were anti-uranium, and one was ambivalent. The one interviewee who identified as Black was anti-uranium. Two participants declined to provide information about their racial/ethnic identity—one was pro-uranium, and the other was ambivalent.

Age differences between anti-uranium, pro-uranium, and ambivalent participants were negligible (with median ages of 63, 59, and 59, respectively). Concerning gender, women were more frequently anti-uranium than men. Seventeen (68%) of 25 female

participants were anti-uranium, five (20%) were pro-uranium, and three (12%) were ambivalent. Men were more evenly split, with 12 (44%) of the 27 male participants being pro- and anti-uranium and the remaining three (11%) being ambivalent.

Anti-uranium participants tended to have higher levels of formal education than pro-uranium participants. Of the 22 participants with a high school diploma/GED, some college, or an associate or vocational/technical degree, nine (41%) were anti-uranium, 10 (45%) were pro-uranium, and three (14%) were ambivalent. In contrast, among the 30 participants with a bachelor's degree or graduate/professional degree, 20 (67%) were anti-uranium, seven (23%) were pro-uranium, and three (10%) were ambivalent.

A larger proportion of new residents held an anti-uranium stance than established residents. Specifically, six (86%) of seven new residents were anti-uranium, and the remaining new resident was ambivalent. In contrast, 23 (51%) of the 45 established residents were anti-uranium, 17 (38%) were pro-uranium, and five (11%) were ambivalent.

Participants with ties to the uranium industry more frequently supported uranium revitalization than those without uranium industry ties. Seven (30%) of the 23 participants with uranium industry ties were anti-uranium, 13 (57%) were pro-uranium, and three (13%) were ambivalent. Among the 29 participants that did not have uranium industry ties, 22 (76%) were anti-uranium, four (14%) were pro-uranium, and three (10%) were ambivalent.

**Table 2.2: Sociodemographic Factors by Attitude about Uranium Revitalization**

| | Anti-Uranium (*n* = 29) | Pro-Uranium (*n* = 17) | Ambivalent (*n* = 6) |
|---|---|---|---|
| | Percentage[a] (*n*) | | |
| Place | | | |
| Grants | 34(11) | 53(17) | 13(4) |
| Crownpoint | 90(18) | 0(0) | 10(2) |
| Race/Ethnicity (Self-Identified)[b] | | | |
| White | 55(11) | 35(7) | 10(2) |
| Native American | 88(15) | 0(0) | 12(2) |
| Hispanic | 17(2) | 75(9) | 8(1) |
| Black | 100(1) | 0(0) | 0(0) |
| Mean Age[c] | 58 | 57 | 56 |
| Median Age[c] | 63 | 59 | 59 |
| Gender | | | |
| Female | 68(17) | 20(5) | 12(3) |
| Male | 44(12) | 44(12) | 11(3) |
| Educational Attainment | | | |
| High School/GED | 67(2) | 33(1) | 0(0) |
| Some College, Associate, or Vocational/Technical | 37(7) | 47(9) | 16(3) |
| Bachelor's | 42(5) | 50(6) | 8(1) |
| Graduate or Professional | 83(15) | 6(1) | 11(2) |
| Length of Residence | | | |
| New Resident | 86(6) | 0(0) | 14(1) |
| Established Resident | 51(23) | 38(17) | 11(5) |
| Uranium Industry Ties | | | |
| Yes | 30(7) | 57(13) | 13(3) |
| No | 76(22) | 14(4) | 10(3) |

[a] Percentages are shown for rows.
[b] Two participants declined to provide information about their racial/ethnic background (thus, percentages and numbers for the race/ethnicity categories in the "Pro-Uranium," and "Ambivalent" columns do not add to the total).
[c] One participant declined to provide their age and was not included in the calculation of the mean and median age for the "Anti-Uranium" column.

### *Which Factors Drive Attitudes about New Uranium Production?*

Of the 29 anti-uranium interviewees in the overall sample, 24 (83%) expressed concerns about the potential impact of new uranium production on the environment. For example, a Crownpoint resident said, *"I'm less concerned with economic revitalization than I am with protecting our water table and our natural resources, like trees that help us breathe and that kind of thing."* This line of thinking was typical among anti-uranium participants. While most interviewees (pro- and anti-uranium alike) expressed concerns

about the state of the local economy or mentioned the local economy as a serious concern within the community, anti-uranium interviewees prioritized protecting the environment—or preventing any further environmental degradation from uranium activity—over short-term economic growth.

Twenty (83%) of the 24 anti-uranium interviewees who expressed environmental concerns specifically discussed concerns about water contamination. In many instances, these concerns were amplified by the megadrought the area has experienced over the past several decades. *"You can live a long time without food. You can eat bugs, but you can only live three days without water. Anybody, any living creature, plants, animals, human beings, have to have water,"* said a Grants resident, who lived in one of the affected neighborhoods near the Homestake Mining Company Superfund site. She went on, *"Why, why, why does the government and uranium industry think that they can keep contaminating water supplies? Oh, because it's not their water. That's why they think it's okay."* A Crownpoint resident who has been involved in anti-uranium activism for decades commented, *"I think we're saving most of the good water we have from the ground, and so that was the main reason why we really fought with the companies. Water is kind of scarce, so people are very careful about that."*

Twenty-one (72%) of the 29 anti-uranium interviewees mentioned concerns about human health when discussing their opposition to uranium revitalization, which included concerns about the health of uranium industry workers and community members generally. In most cases where participants cited concerns about the environment alongside health concerns, their environmental concerns were connected to concerns about human health. In other words, these GMD residents viewed the environmental

contamination left behind by prior uranium production in the area as an upstream factor contributing to health problems experienced by themselves, their family members, or others in their community, and did not trust that conditions would be safer under new uranium production. For example, a Crownpoint resident who expressed both environmental and health concerns said, *"I would oppose it, because … too many of my family members died from it."* A Grants resident who had worked in the uranium industry and subsequently had children who were born with birth defects said, *"I found something else to do [job wise] when I found out it was the radiation that was deforming my babies, not my bad pregnancies, you know?"*

In addition to drawing on their individual experiences and the experiences of their family members and friends when discussing health concerns, anti-uranium participants also often expressed uncertainty about how much uranium contamination community members have been exposed to, the pathways of exposure, and the extent to which exposure has contributed to adverse health outcomes. A Grants resident said, *"There's all these unknown health problems, and then there's the known ones, you know, the miners."* A Crownpoint resident said:

> *I think the biggest concern is the health of our community. I can't prove it, but my health was affected. I had the beginning stages of cancer in my stomach, and I had to have surgery, and they removed a third of my stomach, and then my little brother … had a tumor on his kidney, and it was beginning to get cancer, so they removed his kidney. … I can't prove that that's what caused our cancer, but, as a family, we didn't have a history of cancer. … [My] oldest child lives a distance from here, I would say 15 miles from here. She has no running water, so she comes into Crownpoint, and she has to bring her water tank and she has to fill it up and take it home. So, she's affected if she's going to be using the water.*

Overall, the most frequently cited reasons for opposing uranium revitalization were concerns about environmental degradation and human health. The primary

difference between anti-uranium interviewees in the two communities was the frequency they discussed water contamination when describing the reasons for their opposition to new uranium production. Of the 16 Crownpoint interviewees that cited environmental concerns, 15 (94%) specifically mentioned concerns about water contamination, compared to five (63%) of eight environmentally concerned Grants residents.

Turning to support for uranium revitalization, 14 (82%) of the 17 pro-uranium interviewees (all Grants residents) felt that new uranium production would provide significant economic benefits and, ultimately, rejuvenate the community, which has experienced economic stagnation and a declining population for decades. The following quote from a pro-uranium participant exemplifies the desperation that many Grants residents feel about the state of the local economy:

> *I would support just about anything that brings jobs to this town unless it's Al Qaeda or ISIS [Islamic State of Iraq] or something along those lines, you know what I mean, the drug cartels. I would support anything. … I have watched this town die. When I was a kid growing up, [there were] 23,000-24,000 people in the town, and now there's 8,000, maybe 8,500 if we're lucky.*

Similarly, a lifelong Grants resident stated, *"I support it [uranium revitalization] for … the growth of the economy, for the quick benefits."* Another pro-uranium interviewee (and lifelong Grants resident) felt that uranium revitalization would provide long-term economic growth, despite Grants' boom-bust economic history: *"I think it's a wonderful idea. I think that uranium is a future for us, especially, and I lived through the whole uranium crunch down here, and it devastated our community when all those mines shut down."*

While many pro-uranium residents were open to alternative modes of development, like tourism, they often felt that uranium production was at the core of the

community's identity and that it would be difficult or impossible for the community to escape the shackles of its uranium-producing past and pursue other forms of development. Thus, they advocated for doubling down on natural resource extraction to provide jobs and rebuild the community. *"Grants is never going be a Moab,"* a Grants participant said, *"It's never going to be any other destination if you will, but they're very rich in natural resources. [The GMD has the] largest uranium deposit in the United States. You've already made the deal with the devil."* Another Grants resident, who felt that the community did have the potential to grow its tourism, still felt that uranium production could play an important role in renewing the community: *"Mining, to me, is very important to our area because God gave us a bunch of minerals and we're not using them. In my mind, it [uranium] should still be mined in the same place through in-situ leaching and then put back in the same place for disposal because that aquifer's already all messed up anyway."*

Energy security was another major theme that emerged in interviews with pro-uranium participants. Of the 17 pro-uranium residents interviewed, 11 (65%) said that they felt that new uranium production in the area could play an important part in ensuring the energy security locally, regionally, and globally, as part of a broad sociopolitical shift towards nuclear power. For example, a Grants resident said: *Let's just use common sense, and let's create jobs and energy and make it work for all. Because … we could power the Four Corners… from right there in the San Mateo Basin for 100 to 500 years, would be my guess, and it wouldn't take much to do it, and you'd have good jobs, high paying jobs, too.* Another Grants resident, who worked in the uranium industry most of his life, referred to nuclear power as *"the true green energy."* He said, *"It would be great for the*

*economy, not just the economy, but we really need to move to a new energy source, and I think uranium could be a large part of that."*

Additionally, 41% (*n* = 7) of pro-uranium participants expressed trust in contemporary technologies and regulatory structures to ensure the safety of new uranium production. For example, a Grants resident said, *"I could understand back in the day when the government wanted it for their bombs and all this stuff to protect themselves during the arms races. Okay, I understand all that, why they did so fast and, and with no OSHA rules or anything like that."* He went on, *"But it's different now. We know, you know? It's different; we don't mine the way we used to. … We don't just dump it out on the ground no more."* Another Grants interviewee said, *"I personally would love to see it come back just because I know what it would do for our community, and I know that we're smarter now. We could regulate it better, and we would be able to protect our Earth better, and we're just so much more advanced."*

To summarize, pro-uranium residents most commonly cited economic concerns, energy security and trust in contemporary technologies and regulatory structures when elaborating on the reasons for their position.

Some interviewees were ambivalent and could not be classified as pro- or anti-uranium (or neutral). In total, I classified six (12%) participants as ambivalent, including four participants in the Grants and two in Crownpoint. The common theme among these respondents was that they all discussed the potential economic benefits of uranium revitalization. However, the potential negatives noted by these participants varied, and included: distrust in uranium companies' commitment to safe practices; strain on community infrastructure; concerns about water quality (and quantity, given that uranium

mining is a water-intensive practice); and concerns about the health and well-being of community members.

**Discussion and Conclusions**

In this study, I utilized a series of semi-structured interviews among residents of two GMD communities to examine residents' attitudes about uranium revitalization. There were several patterns worth noting regarding sociodemographic factors and attitudes about uranium revitalization. In contrast to Boudet et al. (2014) and Howell et al. (2017), who did not find a significant effect for race/ethnicity in their models predicting support for fracking, there were notable racial and ethnic differences in attitudes about uranium revitalization among the GMD residents that I interviewed. This may be because the samples that they used did not have enough racial/ethnic variation in them to capture differences, which I was able to do here at a more local level. In the present study, Native American participants were overwhelmingly anti-uranium. Only about a third of White participants were pro-uranium, but most were anti-uranium. Interestingly, a clear majority of Hispanic participants were in favor of revitalization. Further research is needed to determine the underlying social factors that contribute to these racial and ethnic patterns, which may include factors such as structural racism, economic factors, and cultural differences. Nevertheless, these differences highlight the importance of considering race and ethnicity beyond a non-Hispanic White/Other binary when studying public opinions about extractive industry activity.

Regarding gender, women more frequently held an anti-uranium stance than men, which is consistent with what has been found across studies on attitudes about natural resource extraction (Jacquet 2012; Boudet et al. 2014; Howell et al. 2017; Ulrich-Schad

et al. 2020). Age differences between pro- and anti-uranium participants were negligible, which is consistent with what Ulrich-Schad et al. (2020) found regarding support for the DAPL and Howell et al. (2017) found regarding support for fracking. Participants with higher levels of educational attainment more frequently opposed uranium revitalization than those with less formal education, which is similar to Jacquet's (2012) finding regarding attitudes about natural gas development in northern Pennsylvania. New residents more frequently expressed anti-uranium attitudes than established residents, indicating that length of residence is an important consideration (Qin 2016). Conversely, those with uranium-industry ties more frequently held pro-uranium attitudes than those without ties to the uranium industry, indicating that occupational identity is also an important consideration (Jacquet 2012). I did not note any systematic sociodemographic patterns related to ambivalence toward uranium revitalization.

Turning to the underlying drivers of attitudes about uranium revitalization, anti-uranium participants most frequently cited environmental concerns. However, their environmental concerns were usually driven by concerns about human health rather than the environment *per se*. The drivers of anti-uranium attitudes were similar between respondents in the two study communities in many respects, but Crownpoint residents more frequently discussed concerns about water contamination than Grants residents, which is unsurprising given the widespread groundwater contamination in the Eastern Agency (Tanana et al. 2021). Malin (2015) identified class-based conflicts between anti-uranium residents in the communities they studied near a proposed uranium mill site in southwestern Colorado. While I did note class differences between pro- and anti-uranium GMD residents (i.e., the anti-uranium residents that I interviewed tended to have higher

levels of educational attainment), I did not find any notable class conflicts between anti-uranium residents in my two study communities. Regardless of their level of formal education, anti-uranium interviewees' opposition to uranium revitalization was driven by concerns about environmental degradation (particularly water contamination) and human health, rather than upholding an image of the area to boost tourism and property values.

In contrast, pro-uranium interviewees typified the characteristics delineated in Malin's (2015) triple movement thesis—they identified with the uranium industry, felt that new uranium production would regenerate the community, and trusted technological advancements and current regulations to ensure their safety. They also expressed alternative notions of EJ—many pro-uranium residents viewed nuclear power as the most environmentally-friendly energy source, or as a Grants interviewee said, *"the true green energy"* (Malin 2014). Freudenburg's (1992) analogy of extractive industry dependence and drug addiction is salient for many pro-uranium Grants area residents, who often acquiesced to the designation of the area as a "national sacrifice zone" or "wasteland" and felt that it could be difficult for communities in the area to move past their history of uranium production and pursue other avenues of development (Rosier 2008; Voyles 2015). They also often felt that new uranium production in the area would offer a path for sustained economic growth, despite the transience of the first two uranium booms.

Overall, a small yet non-negligible proportion (12%) of interviewees were ambivalent about uranium revitalization and could not be classified as either pro- or anti-uranium (or neutral). These residents discussed economic growth as a potential benefit of new uranium production, while the possible disadvantages that they mentioned were diverse. At the community level, a majority of the Grants residents that I interviewed

were pro-uranium (53%). Yet, a significant number were anti-uranium (34%) or ambivalent (13%). Given the lack of a general consensus among the Grants interviewees and the wide range of views that they expressed (that were at times mixed or conflicting), Grants may be better classified as a site of ambivalence than a site of acceptance or resistance—but more research focused on community action in Grants is needed to determine if this is indeed the case (Greenberg 2023).

Meanwhile, Crownpoint is the Navajo Nation's primary site of resistance against uranium revitalization, which is reflected in my interviews: nearly all of the Crownpoint participants were against new uranium production, and the few that were not anti-uranium were ambivalent. As noted by Malin (2015:73), "Sites of resistance tend to mobilize in places where inequitable environmental and health outcomes have more salience than persistent poverty or spatial isolation do—for instance, where environmental degradation has damaged health and well-being of marginalized populations." The views and experiences of the Crownpoint residents that I interviewed typify this. These residents were galvanized by the health impacts of the widespread groundwater contamination left behind by erstwhile uranium production (Tanana et al. 2021). Though Crownpoint is characterized by persistent poverty and special isolation, residents prioritized the environment and health and wellbeing of community members over any potential economic benefits associated with new uranium production. Consequently, Crownpoint residents continue to fight to protect their remaining uncontaminated water sources from new uranium production, including ISL mining, which they feel poses a significant risk to their groundwater despite proponents' claims of safety (Ruiz et al. 2019; IACHR 2021).

This study has several limitations that must be acknowledged, primarily stemming from certain sociodemographic groups being overrepresented in the sample, which may skew the results. Specifically, the sample is significantly older, on average, than the population in the two study communities, and residents with higher educational attainment are overrepresented in the data, particularly in Crownpoint. Given these limitations, it would be worthwhile in the to conduct a broad survey about uranium issues in the GMD to see if the sociodemographic patterns and themes that emerged in my semi-structured interviews are prevalent in a larger, more representative sample of residents. A drop-off/pick-up survey design—which involves hand-delivering the survey to the households of sampled residents, and then returning later to retrieve them—could be useful for this data collection effort, since it has been associated with improved response rates in many rural settings (Jackson-Smith et al. 2016). Future research on this topic should also focus on incorporating the views and experiences of all the tribal communities in GMD, which include the Laguna (*Kawaika*), Acoma (*Haaku*), and Zuni (*Shiwinna*) Pueblos. Incorporating the views of pro-uranium Indigenous residents would also be of interest, though, based on my experience, it is not likely that many such residents can presently be located in the Crownpoint area. Despite the limitations of this research, it expands current knowledge about residents' attitudes about uranium revitalization in the GMD, which is useful for conscientious public officials and stakeholders in the area seeking environmentally, socially, and economically sustainable forms of development.

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# CHAPTER 3

# APPLYING THE SPECTRUM OF COMMUNITY RESPONSES TO ENVIRONMENTAL INJUSTICE: AMBIVALENCE, QUIESCENCE, AND URANIUM PRODUCTION IN BLANDING, UTAH

**Abstract**

Most environmental justice (EJ) research has focused on "sites of resistance," where residents mobilize against environmental injustices, and (to a lesser extent) "sites of acceptance," where residents mobilize in support of environmental activities associated with environmental injustices. EJ researchers have only begun to explore communities that do not fit within the acceptance/resistance dichotomy. Given its proximity to the White Mesa Mill (WMM), the last operating uranium mill in the United States (US), and the uranium-rich Bears Ears National Monument (BENM), the rural Southeastern Utah community of Blanding has a unique relationship to uranium production. Drawing on 19 interviews with Blanding residents, I apply a recently devised framework focused on the spectrum of community responses to environmental justice. The findings reveal a mix of opinions about uranium issues among Blanding residents that are often inconsistent and a lack of direct action and activism related to uranium production in the community. Based on these findings, I posit that Blanding is best described as a site of passive acceptance—at least regarding the WMM. This characterization is less accurate regarding new uranium mining near the BENM. Implications and suggestions for future research are discussed.

## Introduction

Environmental justice (EJ) scholars have tended to focus on "sites of resistance" where residents actively mobilize to stop activities associated with environmental injustices (such as natural resource extraction), and to a lesser extent, "sites of acceptance" where residents mobilize in support of them (Malin, Ciplet, and Harrison 2023:1). Yet, residents in many communities with a history of extractive industry dependence may hold "complex and conflicted" views about these industries (Greenberg 2023:1). Explorations of these "sites of ambivalence" are only beginning to emerge in the environmental justice (EJ) literature (Greenberg 2023:1; Malin et al. 2023). To better understand the "complex, plural, and varied" ways that communities respond (or do not respond) to environmental injustices, Malin et al. (2023:3) recently developed a framework that places community responses to environmental injustice on a spectrum. This spectrum considers the "rich middle zone" between acceptance and resistance to environmental injustices where ambivalence (complex and conflicted views) and quiescence (a lack of mobilization against environmental injustices) are of central importance (Malin et al. 2023:4).

Blanding—a city of 3,594 people in Southeastern Utah's sparsely populated San Juan County—has a unique connection to uranium production (Figure 3.1).[10] The community is located about six miles south of the White Mesa Mill (WMM), the only conventional uranium (and vanadium) mill still operating in the United States (US), and about 10 miles away from the eastern border of the uranium-rich Bears Ears National Monument (BENM). It would be easy to assume that most Blanding residents ardently

[10] In this paper, I use "uranium production" as a blanket term to refer to the extraction and processing of uranium ore and other radioactive materials.

support uranium industry activity. After all, the WMM has played an essential role in Blanding's economy for over four decades. Further, conservative public officials such as former San Juan County Commissioner and current State Representative Phil Lyman, who in 2017 said that "claiming to shut down the mill to protect the environment is akin to turning Bears Ears to an industrial tourism mecca in order to protect cultural resources," typically enjoy majority support among the Blanding electorate (Thompson 2021, par. 30).

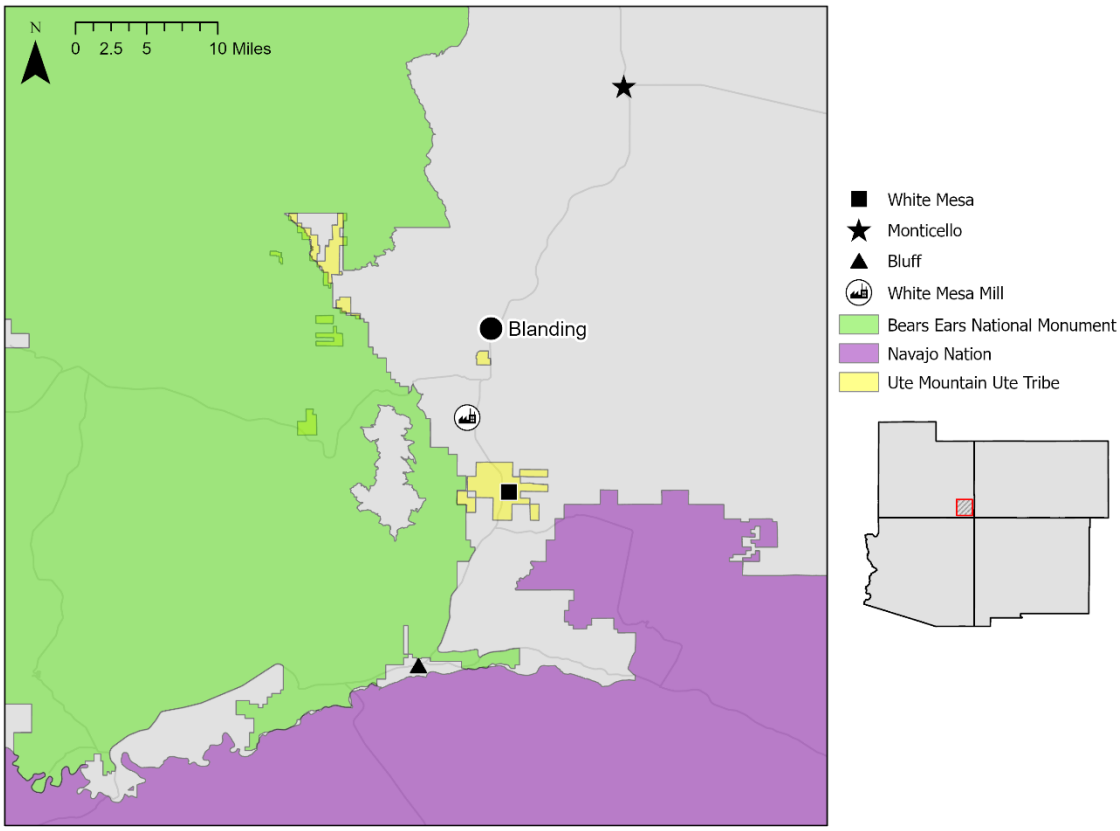


**Figure 3.1:** Map of Study Area

Given Blanding's unique connection to uranium production, the community provides a distinctive venue to begin exploring the utility of the spectrum of community responses to environmental injustice developed by Malin et al. (2023). Further, there is a

growing sociopolitical interest in nuclear energy as an alternative to fossil fuels (Podmore 2021; Omitaomu et al. 2022), and both the Trump and Biden administrations have expressed interest in developing a reserve of domestically produced uranium (Frazin 2021; Scheyder and Hunnicutt 2022). Since all uranium produced in the US is presently transported to the WMM for processing, it is important to gain a better understanding of how Blanding residents view and respond to issues related to uranium production. In this study, I apply the framework Malin et al. (2023) developed to a series of semi-structured interviews with Blanding residents ($n$ = 19) to begin to assess its usefulness as a tool for understanding community responses to environmental injustice.

**Background**

The WMM was constructed in 1980 during the peak of uranium production in the US. At the time, there were 26 licensed uranium mills (facilities that process uranium ore into uranium concentrate, or "yellowcake") in operation across the nation (UPA, n.d.). For decades, the WMM has been a significant employer of Blanding and other Four Corners Region (FCR) residents (employing about 65 people presently, and 150 people at full operation). Yet, it has also been a source of regional, national, and even international, controversy (Penrod 2018; Groetzinger 2020; Douglas 2021; Mimiaga 2022). Residents of some communities in proximity to the WMM, including the small village of White Mesa—located just a few miles south of the mill within a narrow section of the Ute Mountain Ute Reservation—claim that the mill has contributed to significant environmental contamination in the area, which has negatively impacted residents' health (Penrod 2018; Swanson 2022). Earlier this year, the Environmental Protection Agency awarded a $75,000 grant to the Ute Mountain Ute Tribe to conduct a study in partnership

with the Centers of Disease Control and Prevention (CDC) using tribal health data to investigate potential links between the WMM and remarkably high rates of cancer and other illnesses associated with radiation exposure (Woods 2022).[11]

Because uranium extraction in the US is, at present, marginal, most current activity at the WMM consists of processing "alternate feed materials" from sites around the US (EF, n.d.; Groetzinger 2020).[12] Consequently, the WMM has been accused of becoming a national dumping ground for radioactive waste (Groetzinger 2020). Additionally, a recent proposal to begin processing alternate feed materials exported from Estonia has spurred claims that the mill is becoming an *international* dumping ground for radioactive waste (Douglas 2021). All these controversies are disputed by Energy Fuels, Inc., the corporation that currently owns and operates the WMM, which maintains that the mill has rigorous safety protocols and provides a valuable and necessary service which reduces carbon emissions and provides good-paying jobs for Blanding residents (Mimiaga 2022; Sieg 2022).

As previously noted, Blanding is also located about 10 miles east of the 1.3-million-acre BENM, which experienced significant uranium activity during the uranium production era. The BENM is a culturally important and sacred space for Indigenous FCR residents, and a "special place" for Blanding residents from a wide range of backgrounds (Creadon and Bergren 2019; Eisenhauer, Krannich, and Blahna 2000:421). Originally designated by President Obama in 2016, the monument was downsized by roughly 85 percent by President Trump in 2017, and then restored by President Biden in

[11] The Ute Mountain Ute Tribe has around 2,000 registered members. The results for the CDC study are expected in 2025 (Woods 2022).

[12] About 21,000 pounds of uranium concentrate ($U_3O_8$) were produced in in the US in 2021, compared to the peak of 43.7 million pounds in 1980 (EIA 2022).

2021. At present, the BENM is protected from natural resource extraction due to its status as a national monument. Yet, the uranium industry has remained interested in the area (Groetzinger 2021).[13] Given the political back-and-forth with the BENM that has occurred during the three most recent presidential administrations, its protected status from natural resource extraction should not be taken for granted.

Despite being the center of uranium production in the US during the uranium production era (McLemore and Chenoweth 2017), research on attitudes about uranium production in the FCR is limited. It primarily consists of Malin's (2014, 2015) work which focused on the proposed Piñon Ridge uranium mill in Southwestern Colorado (which ultimately was never constructed because its license was revoked by the Colorado Department of Public Health and Environment in 2018) (Harmon 2018). Malin (2015:4) posited that, in sites of acceptance, which emerge in spatially isolated rural places that have historically been economically dependent on uranium production, "markets for commodities such as uranium become part of community social fabrics and are defended and supported by people as part of local culture and norms, despite the historical instability of these commodity markets." For example, in the small community of Monticello, Utah (approximately 21 miles north of Blanding), some residents supported new uranium production while also pursuing legal compensation for high rates of cancer in the community that they claimed were tied to a mill that operated there from 1942–1960 (Malin and Petrzelka 2010; Malin 2015). Meanwhile, Malin (2015:73) proposed that "[s]ites of resistance tend to mobilize in places where inequitable environmental and health outcomes have more salience than persistent poverty or spatial isolation do—for

[13] Several new uranium extraction projects were proposed in the BENM from 2017–2021, during the period that President Trump had reduced the size of the monument (Groetzinger 2021).

instance, where environmental degradation has damaged health and well-being of marginalized populations."

Yet, many communities with a history of extractive industry dependence do not fit neatly within an acceptance/resistance dichotomy (Greenberg 2023; Malin et al. 2023). In their exploration of views about the coal industry in southern West Virginia, which relied on survey data, Greenberg (2023) focused on trust in coal companies, perceived harmfulness of the coal industry, and the future outlook on coal jobs. Yet, interestingly, they found that "conflicting and competing" views emerged frequently in participants' written comments in the survey. Ultimately, Greenberg (2023:1) posited that southern West Virginia itself is a site of ambivalence where "communities and individuals hold complex and conflicted attitudes toward polluting industries."

With the goal of better understanding the "complex, plural, and varied" ways that communities respond (or do not respond) to environmental injustices, Malin et al. (2023:3) have recently developed a framework which considers community responses to environmental injustice as a spectrum with "at least three overlapping but distinct pathways through which exploitative or extractive projects move forward, despite potential environmental injustices" (Figure 3.2). Starting at the "environmental justice" side of the spectrum, processes associated with "effectual resistance" include "[c]ommunity organizing, demands for procedural equity, and (often) sustained coalition building." According to Malin et al. (2023:3), these communities "often reject neoliberal approaches to policymaking, with their goals and solutions deviating from market-based, private, or deregulated ones." In contrast, communities on the "ineffectual resistance" pathway of the spectrum are places where residents mobilize to stop environmental

injustices but are ultimately unable to stop them (Malin et al. 2023:3). Processes associated with this pathway include “spatial isolation, persistent poverty, faith in corporate self-regulation, or long-term entanglements between industry and community economies” (Malin et al. 2023:3).

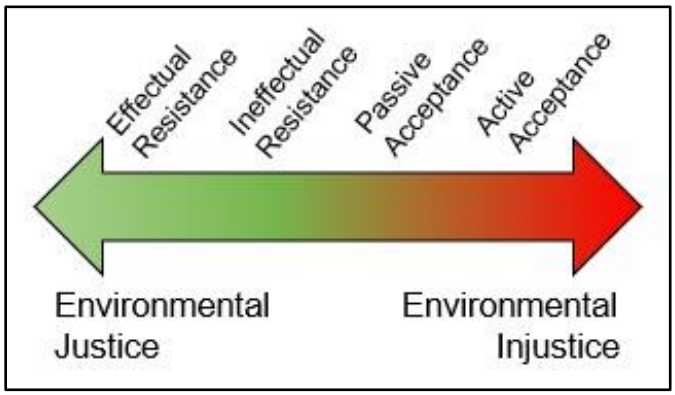


**Figure 3.2:** Spectrum of Community Responses to Environmental Injustice (Malin et al. 2023)

Moving toward the “environmental injustice” side of the spectrum, “passive acceptance” emerges when residents are unengaged with EJ issues, which allow environmental injustices to move forward (Malin et al. 2023:4). Ambivalence and quiescence (“the absence of collective activism in the face of deprivation or injustice, especially under conditions in which one might reasonably expect protest to occur”) play central roles in the pathway of passive acceptance (Malin et al. 2023:4). Finally, the pathway on the rightmost side of the spectrum (“active acceptance”) involves communities that “actively support environmental activities that create or exacerbate environmental injustice” (Malin et al. 2023:5). This pathway is associated with the sites of acceptance discussed previously, where commodity markets for polluting industries become part of the “social fabric” and identity of the community (Malin et al. 2023:5).

In summary, most EJ research has focused on sites of resistance or, to a lesser extent, sites of acceptance. Yet, some recent research has indicated that there are also places with complex and conflicted views about environmental activities associated with environmental injustices—even in communities that one may reasonably expect to actively accept them. EJ scholars have only recently begun to explore these communities in their research (Greenberg 2023; Malin et al. 2023). The primary goal of this study is to apply the spectrum developed by Malin et al. (2023) to Blanding and begin to assess its usefulness as a tool to better understand community responses to environmental injustice. My analysis assesses the ways Blanding residents view and respond (or do not respond) to uranium production. Ultimately, I seek to address the following research question: (1) *Where is Blanding located on the spectrum of community responses to environmental injustice?*

**Methods**

I conducted 19 in-depth semi-structured interviews with Blanding residents between July and August 2022 as part of a larger project focused on FCR residents' views about new uranium production in the region. This study focuses on Blanding, Utah, due to its unique relationship to uranium production. Key indicators from the US Census 2020 American Community Survey (ACS) estimates for Blanding are provided in Table 3.1.

**Table 3.1: Census Data for Blanding City (2020 ACS 5-Year Estimates)**

| | |
|---|---|
| Population | 3,594 |
| Households | 1,089 |
| Average Household Size | 3.2 |
| Race/Ethnicity | |
| White Alone, Not Hispanic or Latino (%) | 68 |
| American Indian or Alaska Native (%) | 24 |
| Black or African American (%) | < 1 |
| Asian (%) | 2 |
| Some Other Race (%) | < 1 |
| Two or More Races (%) | 5 |
| Hispanic or Latino Origin (Any Race) (%) | 9 |
| Median Age | 27 |
| Female (%) | 52 |
| Residence One Year Ago in the Same House (%) | 86 |
| Median Income ($) | 25,304 |
| Below 100% of Poverty Level (%) | 18 |
| Less than High School Graduate (%) | 9 |
| High School Graduate/GED (%) | 22 |
| Some College or Associate/Voc/Tech (%) | 39 |
| Bachelor's (%) | 21 |
| Grad/Prof (%) | 9 |

(US Census Bureau 2020a, 2020b)

All Blanding residents over the age of 18 were eligible to participate in an interview. My goal was to recruit a respondent pool that reflected the community's diversity (both in terms of demographics and views about uranium production). Thus, I used multiple modes of recruitment. Recruitment was made easier because I am a decades-long Blanding resident. I searched local and regional news sources such as the *San Juan Record*, *High Country News*, and public meeting notes from city and council meetings to identify residents that had spoken publicly about issues related to uranium production. Potential participants were contacted face-to-face, as well as by phone and email. I also did some public intercept recruiting at stores and the local college campus. Additionally, I relied on snowball sampling. Most interviews were conducted in

person, though some ($n$ = 6) were conducted by phone. In my discussion of the results, I use pseudonyms to help maintain participant confidentiality.

I include three separate measures of perceptions of uranium production, which allows for a deeper exploration of the contextual complexity of the topic of my analysis. The first measure (views about new uranium production in the area generally) was captured by asking, "Would you support or oppose new uranium production in the area?" The second measure (views about the WMM) was captured by asking "How do you feel about the White Mesa Mill?". The third measure was captured by asking, "How do you feel about new uranium mining near Bears Ears?" While the question regarding the WMM is rooted in the present, the questions about new uranium production generally and the BENM are speculative.

The coding process for the interviews was iterative and began with the conclusion of the first interview, which helped promote reflexivity throughout the research process (Galletta 2013). First, I focused on identifying participants' views regarding each of the three measures of perceptions of uranium production. For each of the measures, I found that participants' views fit within four categories: (1) "support" indicates clear support; (2) "oppose" specifies clear opposition; (3) "ambivalent" indicates an unclear opinion, with the participant expressing mixed feelings; and (4) "passive" signifies passivity or indifference.

I also consider inconsistences across measures (cases where participants' views were not consistent across the three measures of perceptions of uranium production) in my analysis as a general indicator of ambivalence toward uranium production in the community. Regarding quiescence, I noted in my coding whether participants stated that

they had engaged in any sort of direct action or activism (i.e., community organizing, demands for procedural equity, or coalition building) regarding issues related to uranium production (Malin et al. 2023). I also identified instances where participants expressed a passive or indifferent view toward uranium production or downplayed the uranium-related EJ concerns of other residents in the area.

## Results

Participant characteristics (i.e., age range, gender, race/ethnicity, and formal education), views about uranium production, and participation in activism related to uranium production are shown in Table 3.2. Most of the interviews ($n$ = 13) were characterized by inconsistent views across the three measures—a general indicator that ambivalence about uranium production is common in Blanding. Regarding activism (and quiescence), the community organizing, demands for procedural equity, and coalition building that characterize the pathway of active resistance was absent as participants discussed their uranium-related views and experiences across the interviews (Malin et al. 2023).

Regarding participants' views about new uranium production generally, 10 participants expressed opposition, seven voiced support, and two were ambivalent. However, because this measure is the least specific of the three measures of perceptions of uranium production, views about the WMM and new uranium mining near the BENM are the foci of the present analysis.

**Table 3.2: Participant Characteristics, Views about Uranium Production, and Participation in Activism Related to Uranium Production**

| Name | Age Range | Gender | Race/Ethnicity | Formal Education[a] | New Uranium Production Generally | The WMM | New Uranium Mining Near BENM | Inconsistent[b] | Activism |
|---|---|---|---|---|---|---|---|---|---|
| Dori | 70–79 | Female | White | Associate | A | A | A | No | No |
| Tamra | 30–39 | Female | Native American | Associate | O | P | O | Yes | No |
| Chloe | 20–29 | Female | White | Associate | O | P | O | Yes | No |
| Rodney | 30–39 | Female | White | Associate | S | S | S | No | No |
| Freya | 30–39 | Female | White | Bachelor's | O | O | O | No | No |
| Eloise | 20–29 | Female | White | Associate | S | P | A | Yes | No |
| Jack | 60–69 | Male | White | Associate | S | S | O | Yes | No |
| Carmen | 50–59 | Female | White | Graduate | O | A | O | Yes | No |
| Abe | 30–39 | Male | White | Associate | O | O | O | No | No |
| Milo | 40–49 | Male | White | Associate | O | P | O | Yes | No |
| Leah | 50–59 | Female | Native American | Associate | S | S | A | Yes | No |
| Aimee | 30–39 | Female | Native American | Associate | O | A | O | Yes | No |
| Fiona | 30–39 | Female | White | Associate | A | P | A | Yes | No |
| Earl | 60–69 | Male | Native American | Bachelor's | O | O | O | No | No |
| Albert | 80–89 | Male | White | Associate | S | S | S | No | No |
| Jason | 30–39 | Male | White | Associate | S | S | S | No | No |
| Ella | 60–69 | Female | Native American | Associate | O | S | S | Yes | No |
| Mabel | 30–39 | Female | White | Associate | O | A | A | Yes | No |
| Trevor | 40–49 | Male | White | High School | S | P | S | Yes | No |

*Note:* S = Support; O = Oppose; A = Ambivalent; P = Passive.
[a] = "High school" refers to a high school diploma or GED; "associate" refers to an associate degree or vocational/technical certification; "graduate" refers to a graduate or professional degree.
[b] = The "inconsistent" column identifies cases where the participant did not have consistent views across the three measures of perceptions of uranium production.

### *Views about the White Mesa Mill*

Outright opposition to the WMM was uncommon ($n$ = 3) and stemmed from concerns that the mill has (or may have) harmed the health of Blanding residents. Conversely, six participants expressed strong support for the WMM. These participants felt that, by and large, the WMM has been a positive force in the community over the years—and a much-needed source of employment for Blanding residents. For example, Rodney was in his 30s. He had lived in Blanding for much of his life and worked at the WMM for a few years in his 20s. Regarding the WMM, he said:

> *I think it's fine. I think it's an important place for people to have a job around here as an option, you know? … It definitely employs a lot of people, helps the community. They donate to local sports teams and stuff. So, I think it's a good thing.*

Four participants were ambivalent about the WMM. These participants were typically torn between a desire for Blanding residents to have good-paying jobs available and concerns about the health of community members. For example, Mabel, who was in her 30s and had lived in Blanding for most of her life, said, *"I always felt uneasy about it, but it's jobs, and I'm grateful people have jobs."* Similarly, Carmen, a longtime Blanding resident in her 50s, said:

> *It provided a lot of jobs for people in need, and it was great for the economy. I don't necessarily like the fact that we've had this radiation, and we've had such a high rate of cancer, and I can't help but think it came from that mill, you know?*

Interestingly, passivity only emerged in relation to the mill ($n$ = 5). For these participants, the WMM—which has been in operation for over four decades—was just another feature of the area and something that they rarely, if ever, thought about. For example, Chloe was in her 20s and had lived in Blanding for most of her life. She opposed new uranium production in the area generally and new uranium mining near the BENM. However, regarding the mill, she said:

> *I don't really feel any way about it. It's just always been there, you know? … I don't know really what they do. … I don't know anything about it. I know sometimes people work there. … It's always been, like, you drive by and go, "That's kind of weird."… It's just part of life. … It's like asking me how I feel about that apartment that's kitty corner.*

Fiona was a longtime Blanding resident in her 30s who was ambivalent about new uranium production in the area generally and uranium production near the BENM (i.e., she wanted the economic stimulus that new uranium production in the area could provide and felt that it could contribute to national energy security but was concerned about the

*"safety and wellbeing of the community"*). Like Chloe, she had a passive view of the WMM:

> *There are some Indian ruins that I remember going to as a kid, and we would drive past those fences that have the radioactive signs all along them, and we'd just drive along those fences and then hike out to the ruins. That's the extent of my experience with any of it, is passing by it and being like, "Oh, that's kind of freaky that that's right here and we're going for a hike right alongside it," you know, kind of thing, but I just kind of took it in stride. I never questioned it or anything, just assumed it was part of the deal, I guess.*

Additionally, two participants actively discounted or minimized EJ concerns associated with the WMM. Jason was a lifelong Blanding resident in his 30s who expressed support for all three measures of perceptions of uranium production. Like Rodney, he had previously worked at the mill. While discussing the WMM, he said:

> *I did know that there was a concern down there at the White Mesa Mill that the water, that all those tailing ponds were contaminating the drinking water and stuff, which, in my opinion is totally bogus. … Especially since the ponds are lined with rubber mats and clay to keep it from seeping in too far.*

Albert, 80s, also expressed support for all three measures of perceptions of uranium production. Like Jason, he felt that the environmental concerns of residents in communities south of the mill (including White Mesa) were overstated:

> *I think one of the biggest problems I hear about is the water supply. … People many miles away [in White Mesa] seem to worry about it, and I don't know why they would worry. … Even as far as Bluff [about 26 miles south of Blanding], they worry about it, and I think, "Well, that's a lot of miles away, why would it affect the water supply?" I guess I don't understand.*

### *Views about New Uranium Mining Near the Bears Ears National Monument*

Participants' views about new uranium mining near the BENM had a markedly different pattern than their views about the WMM. Five participants supported new

uranium mining near the BENM. All these participants felt that new uranium mining near Bears Ears would be an economic boon for Blanding. For example, Jason said: *"I would be all for it, honestly. I have heard about it, and I do think that it would be smart for us to give some mining permits and actually start some mining production."* Rodney also supported new uranium mining near the BENM. In addition to feeling that new uranium mining near the BENM would be an economic boon for Blanding, he felt that it could contribute to national energy security (*"If you look at the country as a community, it's what the country needs"*). Yet, he also expressed some trepidation about ruining the natural beauty of the area:

> *It'd be nice if they could do it as low-key as possible. Like, try not to wreck everything and just ruin the forest, because there's some awesome forest up there. I'd like to see it, but that's the problem, right, is sometimes it's a double-edged sword. You got to go get the uranium, but you got to also shift the whole landscape to do so.*

Conversely, nearly half of participants ($n$ = 9) clearly opposed new uranium mining near the BENM. The BENM's status as a special place for Blanding residents was at the forefront of these responses. For example, Freya, a longtime Blanding resident in her 30s who expressed opposition to all three measures of perceptions of uranium production, said: *"I think it is one thing to mine in a big open ugly area like White Mesa, but definitely shouldn't be tearing up any more land, especially near where a lot of people go for recreational activities."* Jack, a lifelong Blanding resident in his 50s who supported the WMM and new uranium mining generally for economic reasons, also said that he would not support new uranium mining near the BENM:

> *My feelings on the monument aside, I don't want to see any big, large-scale mining going on out there, because I've seen a lot of the sites where they did mine, and some are unobtrusive and kind of grown over and reclaimed, but I've seen where they went in and just kind of made a mess*

> *too, and those scars last a long time, but yeah, I wouldn't want to see any large-scale mining going on up there. I mean, I think there's enough … other reserves in the Four Corners Area.*

Carmen also opposed new uranium mining near the BENM, even though (like Jack) she opposed the Bears Ears area's designation as a national monument:

> *I just don't, I mean, as soon as they announced that that was a national monument, it turned into trash. I mean, there's trash all over that mountain we've never seen before, and they're protecting who exactly? Because the reason that's still pristine is because the ranchers, and the farmers, and the Native Americans, all of us have worked together to keep that pristine. I mean, we respect our Earth, right? I mean, we take care of it, so they're really not protecting us from ourselves. As soon as they announce that as a national monument, everybody moved in and started throwing their shit all around. So, there's trash up there we've never seen before, and I just don't feel like we need [new uranium mining near the BENM] on top of that.*

Finally, five participants were ambivalent about new uranium mining near the BENM. A range of factors, including a desire for economic growth, implications for national energy security, a desire to protect the natural beauty of the area, and concerns about human health contributed to these participants' ambivalence regarding this issue. For example, Dori was in her 70s and was originally from Blanding. She expressed concerns about the health of Blanding residents and outsiders visiting the BENM: *"There's people that live and tour the area and they would be at risk, as well as drifting of the carcinogens."* Meanwhile, Eloise was in her 20s and had lived in Blanding for less than five years. Interestingly, while she noted that she is not particularly concerned about environmental issues, she also discussed some of the socio-environmental justice implications of new uranium production near Blanding:

> *I guess I'm torn. … I see the value of jobs and I don't particularly take care of nature, but even if the uranium mine in Bears Ears does supply jobs to the people here, the jobs wouldn't ever be done correctly. I've seen it time and again, the work ethic in this town is no good. Everything is*

> *done half-assed. Destroying the monument would be done in vain in this case. Also, to have a population like Blanding's, people that lack skills and opportunities, be put in this position is definitely taking advantage of a lot of people.*

**Discussion and Conclusion**

The primary goal of the present study was to apply the framework developed by Malin et al. (2023) to Blanding and begin to assess its usefulness as a tool to better understand community responses to environmental injustice. Inconsistent views across the three measures characterized a majority of the interviews ($n$ = 13). Given the complex (and often conflicting) pattern of views about uranium production that emerged across my interviews with Blanding residents, I argue that the community is better categorized overall as a site of ambivalence than a site of acceptance or resistance on this topic (Greenberg 2023).

There are many factors to consider regarding the spectrum of community responses to environmental injustice. Ultimately, the pathway of passive acceptance is most closely aligned with what I found in Blanding—at least regarding the WMM. While participants were not necessarily comfortable with the mill's proximity to Blanding, outright opposition to the WMM was relatively uncommon. Meanwhile, a larger share of the sample (twice the number as those opposed) clearly expressed strong support for the WMM. Ambivalence toward the mill (which Malin et al. (2023) associated with passive acceptance) was also relatively common. Further, the participants' lack of direct action or activism regarding WMM, and the prevalence of passivity toward the mill are strong indicators that Blanding is currently in a quiescent state regarding this issue—which Malin et al. (2023) also associated with passive acceptance. Yet, Malin et al. (2023) noted

that the "long-term entanglements between industry and community economies"—a factor that frequently emerged in participants' discussion of the WMM—are associated with a different pathway (i.e., ineffectual resistance). This indicates that continued work is needed to clarify the pathways in the middle of the spectrum (i.e., which mechanisms are shared by different pathways, and which are unique among them).

Regarding new uranium mining near the BENM, a different pattern emerged, and the characterization of Blanding as a site of passive acceptance becomes less accurate. Support for new uranium mining near the BENM was relatively low. Meanwhile, a diverse coalition comprising nearly half of the participants clearly opposed new uranium mining near the BENM, and a notable proportion of participants were ambivalent toward it. Further, it should not be assumed that Blanding residents would be quiescent in the face of a serious threat of new uranium mining near the BENM, since none of the participants voiced a passive view about the issue. Whether direct action or activism aimed at stopping new uranium mining near the BENM would ultimately be successful, of course, is another matter of discussion entirely.

Overall, my research suggests that viewing community responses to environmental injustice as a spectrum rather than an acceptance/resistance dichotomy is a valuable step forward for EJ research (Malin et al. 2023). For example, regarding how Blanding residents view and (do not) respond to the WMM, classifying the community as a site of *passive* acceptance offers a more nuanced and accurate description than simply classifying it as a site of acceptance. However, researchers need to be careful when characterizing community responses to environmental injustice in this way because, as the present analysis illustrates, communities are dynamic, and context matters. I suggest

that this framework should be used to characterize how communities view and respond to more narrowly defined EJ issues rather than broad topics (like uranium production) or environmental injustice generally. With proper consideration of context, researchers can avoid creating muddled or inaccurate characterizations of the communities they are studying, which could cause more harm than good for these places.

The present study has various limitations. Any patterns that I have noted among specific categories in the respondent pool are interesting and warrant further investigation but should also be considered cautiously, as the sample size is relatively small, and I have not reached "saturation" in many of these categories (Glaser and Strauss 1967:61). Additionally, I relied on the assumption that participants would discuss their involvement in anti-uranium activism during the interview rather than directly asking participants if they had done so, which presents some limitations (i.e., some participants may have engaged in anti-uranium activism, but did not volunteer information about it during the interview). Nevertheless, as this study is (to my knowledge) the first practical application of the spectrum of community responses to environmental justice, it helps provide a groundwork for researchers conducting similar studies in the future to reference and build upon (Malin et al. 2023).

Future research should prioritize a deeper look into the factors that shape quiescence and passivity in Blanding and similar communities—which may include gender norms, distrust of government due to regulatory failure in the past, or fear of retaliation from industry, government, or local actors (Gaventa 1982; Malin et al. 2023). Similar studies in the future focusing on other communities near the WMM would be also useful. This is particularly true of White Mesa, given the ongoing concerns about resident

health associated with its proximity to the mill. Further, a larger, more representative sample of Blanding residents would help to further elucidate the contextual variation in views about uranium production discussed in this paper. Thus, a mail or drop-off/pick-up survey effort regarding these issues in Blanding is an important future research objective.

This research highlights the complexity in the range of viewpoints that can be found in sites of ambivalence, which have only recently begun to be explored by EJ researchers (Greenberg 2023; Malin et al. 2023). Further, the results suggest that Blanding is a community for EJ researchers to watch. This is particularly true under increased demand for domestically produced uranium, which could have significant implications for the community that may include ramped up activity at the WMM or new uranium mining near the BENM (or other nearby places with large deposits of uranium remaining). Because of Blanding's status as a site of ambivalence, the community has the potential to shift in either direction in the future. Further, the results suggest that future community responses to uranium production around Blanding are likely to be context-specific. For example, participants often discussed Bears Ears' status as a special place. Subsequently, concerns about the potential environmental impact of new uranium mining near Bears Ears was a theme that frequently emerged in interviews with pro- and anti-uranium residents alike. Therefore, new uranium mining near Bears Ears (or other nearby special places) could shift the community towards the "environmental justice" side of the spectrum (Eisenhauer et al. 2000). Meanwhile, the results also indicate that the general level of opposition to the mill is relatively low among Blanding residents at present. Additionally, several of the interviewees who were opposed to new uranium mining in

the area generally expressed positive, mixed, or indifferent views about the mill. Taken together, these factors suggest that Blanding may tend to move more toward the "environmental injustice" side of the spectrum regarding issues related to the WMM.

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# CHAPTER 4

# APPLYING TRIBALCRIT TO HIGHLIGHT INDIGENOUS RESIDENTS' URANIUM-RELATED VIEWS AND EXPERIENCES IN DINÉ BIKÉYAH

**Abstract**

Critical Race Theory (CRT) can elucidate the racialized meanings underlying environmental injustices and how individuals and communities respond to them. The TribalCrit framework builds on CRT to provide a framework that specifically applies to the Indigenous experience in United States (US) society. Although TribalCrit emerged from education studies, its tenets apply to a wide range of contexts, though it is not commonly utilized in environmental justice research. In this exploratory study, I used three tenets from TribalCrit to understand better the uranium-related views and experiences of Indigenous FCR residents. Participants discussed how the Church Rock spill of 1979 (the worst uranium contamination event in US history) and other events during the uranium boom contributed to a deep distrust of the uranium industry and the US government. Several participants described their efforts to fight against the federal government's licensure of new uranium mines, including community outreach, litigation with the US government, and outreach to the Navajo Nation tribal government. Some participants referenced or expressed concerns that new uranium mining could impede Indigenous residents' ability to gather firewood and medicinal herbs, which they depend on for daily life. Others shared their visions for the future, which typically involved keeping unmined uranium in the ground. Theoretical and practical implications and suggestions for future research are discussed.

## Introduction

In 1948, the US Atomic Energy Commission announced that it would pay a guaranteed price for all domestically mined uranium, spurring a uranium boom across the Western United States (US). The most intensive activity during the boom took place in and around the Navajo Nation, located at the heart of the region where the states of Utah, Arizona, Colorado, and New Mexico meet (i.e., the Four Corners Region, or FCR). Without their consent, many tribal communities in the FCR were rapidly transformed into uranium boomtowns (Brugge and Goble 2002). The uranium industry's interest in the Indigenous lands of the American West during the uranium boom was twofold. First, the resources they desired were abundant—the Navajo Nation and surrounding lands hold the largest deposit of mineable uranium in the US (McLemore and Chenoweth 2017). Second, the large number of Navajo men returning from World War II provided a low-cost labor pool for the uranium industry to exploit—most Navajo uranium industry workers were paid minimum wage or less and tended to work positions with higher occupational risk than the large number of non-Navajo uranium workers that migrated into the Navajo Nation during the boom (Brugge and Goble 2002).

The uranium boom came to a halt in 1980, and in 1990, after years of activism on was passed. RECA acknowledged the mistreatment of uranium workers (i.e., those working prior to 1971) and provided financial compensation for medical conditions that could be tied to uranium work (Brugge and Goble 2002). While this is a beginning, the impacts of prior uranium production in the Navajo Nation extend well beyond uranium workers and their families. The uranium boom left behind more than 500 known abandoned uranium mines and mills (most of which have not been remediated) and has

contributed to remarkably high rates of cancer and other serious illnesses linked to uranium contamination throughout many areas of the Navajo Nation (Redvers et al. 2021).

Meanwhile, in the Navajo Nation's Eastern Agency, grassroots anti-uranium activists have (at present) successfully resisted efforts on behalf of the uranium industry and the US government to develop new uranium mines in and near their communities (Jantz 2018). Nevertheless, there is a growing public interest in nuclear power as an alternative to fossil fuels (Omitaomu et al. 2022). Further, the Trump and Biden administrations have both expressed interest in the development of a strategic domestic uranium reserve. Communities with histories of uranium production, and where uranium remains to be extracted, may soon face renewed pressure from the uranium industry and the US government to accept new uranium production (Scheyder and Hunnicutt 2022).

Researchers have observed a paucity of research on environmental justice (EJ) issues affecting Indigenous communities given "the 'startling' level of environmental risk borne by these groups" (Hooks and Smith 2004:588; Vickery and Hunter 2016:46). A need to prioritize scholarship on Indigenous EJ issues related to uranium production, specifically, has been discussed by researchers. In their assessment of the state of uranium social science research, Malin and Alexis-Martin (2020:4) argued that "research done by [Indigenous] communities, or deeply grounded in these spaces, should be given special priority to enhance our collective understanding of the relationships between uranium production and socio-environmental justice."

There have been several insightful studies on Indigenous EJ issues in the American West in recent years (see Voyles 2015; Bray 2021; Vinyeta 2022). However,

these studies tend to rely on historical accounts. Historical research is, of course, hugely important—but given the prevalence of the "myth of the vanishing Indian" (the tendency to focus on Native Americans as historical peoples, rather than contemporary political and racial groups), it is also important to have research which highlights the views and experiences of contemporary Indigenous people regarding these crucially important issues (Kauanui 2018). Critical Race Theory (CRT) can offer insights into the racialized meanings that often underlie environmental injustices and the ways individuals and communities respond to them (Pellow 2017a, 2017b).

The objective of the present study is to use TribalCrit—a perspective rooted in the CRT tradition which interrogates the positionality of Indigenous peoples in American society—to better understand the uranium-related views and experiences of the Indigenous FCR residents (Brayboy 2005). Doing so will help contribute to a fuller understanding of the political and racial meanings behind the profound environmental injustices that Native American individuals and communities have endured and continue to deal with.

I begin by discussing the theoretical background for the study, as well as scholarship relevant to the research objective.

## Theoretical Background and Relevant Scholarship

Much early EJ research focused on establishing the pattern of environmental racism and teasing out the roles that race and class play in shaping environmental injustices. In recent years, researchers have turned towards more critical perspectives, which interrogate structures such as racism, sexism, and capitalism, to explore the deeper social meanings attached to environmental injustices (Pellow 2017b). To this end, Pellow

(2017a, 2017b) proposed that the incorporation of Critical Race Theory (CRT) in EJ research may offer insight into the racialized meanings that drive environmental injustices and the ways that individuals and communities respond to them. CRT is an expansive intellectual and social movement that emerged from critical legal studies during the political turbulence of the late 1970s and early 80s which interrogates race, racism, and power in society (Delgado and Stefancic 2012). Driven by frustration with the restricted success of the Civil Rights Movement and the legal system's propagation of White supremacy, the early architects of CRT have offered poignant critical analyses on a range of topics (Bell 1980; Delgado 1984; Matsuda 1988; Crenshaw 1991).[14]

Because CRT is expansive and has grown through the work of several scholars across decades, there is no definitive list of tenets for the theory. However, Delgado and Stefancic (2012:7) outlined three tenets that they suggested "many would agree on." The first was that "racism is ordinary, not aberrational— 'normal science,' the usual way society does business, the common, everyday experience of most people of color in this country." In other words, racism is endemic to society. The second proposition, often referred to as "interest convergence" or "material determinism," posits that since "racism advances the interests of both white elites (materially) and working-class people (psychically), large segments of society have little incentive to eradicate it." The third proposition, referred to as "the social construction thesis," focuses on race as a phenomenon that it is "[n]ot objective, inherent, or fixed" and does not relate to "biological or genetic reality."

[14] Derrick Bell, Richard Delgado, Mari Matusda, Kimberlé Crenshaw, and numerous other scholars have been credited as founders of CRT.

Some scholars have built on CRT to develop theoretical frameworks that apply to the unique contexts of these other groups. One such scholar in the field of Education, Brayboy (2005:425), adapted the core concepts of CRT to develop Tribal Critical Race Theory (TribalCrit), a theoretical framework that "provides a way to address the complicated relationship between American Indians and the United States federal government and begin to make sense of American Indians' liminality as both racial and political groups and individuals." The nine tenets of TribalCrit, as outlined by Brayboy (2005:429–430), are:

1. Colonization is endemic to society.
2. U.S. policies towards Indigenous peoples are rooted in imperialism, White supremacy, and a desire for material gain.
3. Indigenous peoples occupy a liminal space that accounts for both the political and racialized natures of our identities.
4. Indigenous peoples have a desire to obtain and forge tribal sovereignty, tribal autonomy, self-determination, and self-identification.
5. The concepts of culture, knowledge, and power take on new meaning when examined through an Indigenous lens.
6. Governmental policies and educational policies toward Indigenous peoples are intimately linked around the problematic goal of assimilation.
7. Tribal philosophies, beliefs, customs, traditions, and visions for the future are central to understanding the lived realities of Indigenous peoples, but they also illustrate the differences and adaptability among individuals and groups.
8. Stories are not separate from theory; they make up theory and are, therefore, real and legitimate sources of data and ways of being.
9. Theory and practice are connected in deep and explicit ways such that scholars must work towards social change.

According to Brayboy (2005), the first tenet in the above list is "the basic tenet of TribalCrit," and is analogous to the basic premise, or "tenet" of CRT (i.e., that racism is endemic to society). It is also similar to the central focus of settler colonialism theory (i.e., the persistence of settler colonialism as a structural force in society), which has underpinned much of the recent research that focuses on Indigenous EJ issues in the American West (see Voyles 2015; Bray 2021; Vinyeta 2022). While the aim of classical

colonialism is the subjugation of another society or territory, settler colonialists pursue the destruction or displacement of Indigenous cultures and peoples to establish themselves as the rightful inhabitants of the land and the proprietors of the resources contained within it (Bacon 2018; McKay, Vinyeta, and Norgaard 2020). As explained by Veracini (2016:3), settler colonialism can be distinguished from other forms of colonialism in that it "supersedes rather than reproduces the colonial rule of difference." Thus, "settlers win by discontinuing unequal relationships rather than maintaining them" (Veracini 2016:3). McKay et al. (2020) posited that the structures of racism and colonialism work in tandem. While racism marginalizes Indigenous peoples (and other nonwhite racial groups) and justifies social inequality, settler colonialism dispossesses racially marginalized peoples of their resources and land and institutionalizes laws and systems of governance in colonized areas that privilege Whiteness.

A number of Indigenous EJ studies in the American Southwest have utilized settler colonial theory in recent years, and several of these have focused specifically on Indigenous EJ issues in the FCR. For example, Bray (2021) applied settler colonial theory to environmental injustice on Navajo lands, focusing on irrigation projects, including the Navajo Indian Irrigation Project (NIIP) passed by congress in 1962. Despite the stated goal of fostering "self-sufficiency" and improving material conditions for the Navajo people through the irrigation of farmland and the development of family farms, Bray (2021) found that the NIIP was a "settler colonialist racial project" and a paternalistic act of environmental racism which ultimately undermined tribal water rights and furthered the settler colonialist goals of tribal termination and assimilation. Voyles (2015) drew upon settler colonial theory and other critical perspectives (including

Indigenous feminist theory) in their historical investigation of the social construction of *Diné Bikéyah* as a "wasteland" during the uranium boom. According to Voyles (2015:8), "wastelanding" takes two primary forms: "The assumption that nonwhite lands are valueless, or valuable only for what can be mined from beneath them, and the subsequent devastation of those very environs by polluting industries." Voyles (2015:22) also posited that settler colonialism is so profoundly linked to natural resources that environmental injustices on the lands of racially marginalized communities "must always be understood through the lens of settler colonialism."

In this paper, I begin to explore the utility of TribalCrit as a frame for EJ research, focusing specifically on three tenets that are particularly salient to the topic of uranium production on Indigenous lands. I use the third tenet (liminality) because it considers the byzantine relationship that Native Americans have with the US government, and wider society, given that Indigeneity is both a racial and political identity. This may help elucidate the underlying political and racial meanings associated with uranium issues in the interviews. I use the fourth tenet because it focuses on Indigenous peoples' desire to chart their own course (which includes "control over existing land bases, natural resources, and tribal national boundaries") without interference from government (or private sector) actors—which, as the following analysis demonstrates, is a major factor in Indigenous EJ issues involving uranium. Finally, I use the seventh tenet because prior research indicates that tribal philosophies, beliefs, customs, and traditions are a crucial factor when considering how Indigenous people experience and respond to environmental injustices (Lorenzo 2017). I now turn to the methods used in the study.

## Methods

### *Study Area*

In broad terms, the study area for the present research is *Diné Bikéyah*: the traditional homeland of the Navajo people, which extends well beyond the contemporary political borders of the Navajo Nation. Before the original borders of the Navajo reservation were established by the 1868 Treaty of Bosque Redondo, the Navajo People lived throughout (and beyond) the desert region where the contemporary borders of the states of Utah, Nevada, Colorado, and New Mexico meet (Linford 2000). Data were collected as part of a larger project focused on views about new uranium development in the FCR. I conducted interviews in three communities: Crownpoint and Grants, New Mexico, and Blanding, Utah (Figure 4.1). These three communities were selected for the project because they all have unique sociohistorical contexts (that are deeply tied to uranium), and because they are, taken together, broadly representative of the racial and ethnic composition of the population in the rural FCR (i.e., they include a mixture of Native American, White, and Hispanic residents). Key indicators from the US Census 2020 American Community Survey (ACS) estimates for the three study communities are provided in Table 4.1.

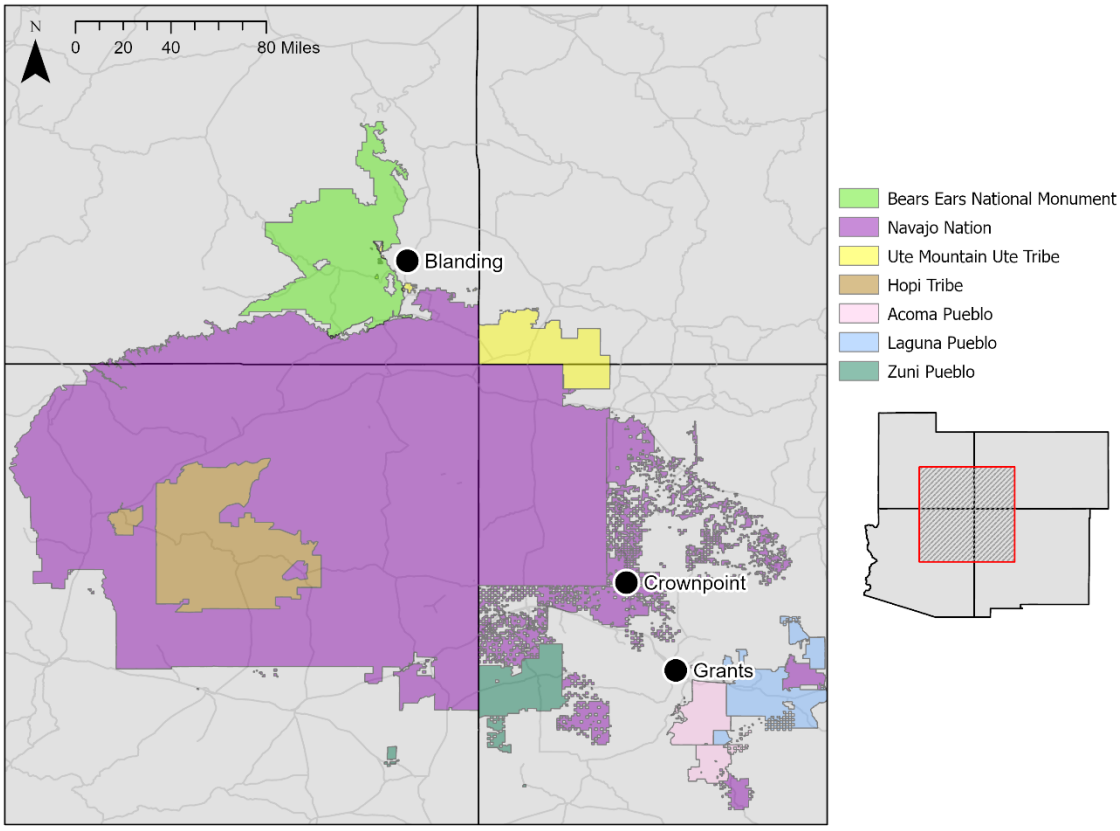


**Figure 4.1:** Map of Study Area

**Table 4.1: Census Data for Study Communities (2020 ACS 5-Year Estimates)**

| | Grants City | Crownpoint CDP | Blanding City |
|---|---|---|---|
| Population | 8,987 | 3,018 | 3,594 |
| Households | 3,026 | 938 | 1,089 |
| Average Household Size | 2.6 | 3.1 | 3.2 |
| Race/Ethnicity | | | |
| White Alone, Not Hispanic or Latino (%) | 25 | 4 | 60 |
| Black or African American (%) | 2 | < 1 | < 1 |
| American Indian or Alaska Native (%) | 18 | 89 | 24 |
| Asian (%) | < 1 | 1 | 2 |
| Some Other Race (%) | 7 | < 1 | < 1 |
| Two or More Races (%) | 9 | 4 | 5 |
| Hispanic or Latino Origin (Any Race) (%) | 54 | 1 | 9 |
| Median Age | 35 | 31 | 27 |
| Female (%) | 48 | 59 | 52 |
| Residence One Year Ago in the Same House (%) | 77 | 91 | 86 |
| Median Income ($) | 21,866 | 19,318 | 25,304 |
| Below 100% of Poverty Level (%) | 28 | 30 | 18 |
| Educational Attainment (25 and older) | | | |
| Less than High School Graduate (%) | 19 | 17 | 9 |
| High School Graduate/GED (%) | 26 | 34 | 22 |
| Some College or Associate/Voc/Tech (%) | 33 | 33 | 39 |
| Bachelor's (%) | 13 | 9 | 21 |
| Grad/Prof (%) | 8 | 7 | 9 |

(US Census Bureau 2020a, 2020b)

*Grants*

Grants is a former uranium boomtown located about 15 miles southwest of *Tsoodził* (Mount Taylor), the southern Sacred Mountain. The population of Grants (8,987) is racially and ethnically diverse—25% of Grants residents are White, 18% are Native American, and 54% have Hispanic or Latino origin (of any race). Grants has a per capita median income of $21,866 and a poverty rate of 28%, significantly higher than the US poverty rate of 13% (US Census Bureau 2020a). Before the uranium boom, Grants' economy relied on vegetable farming. However, Grants was swept up in the boom, and by the early 50s Grants' moniker shifted from "The Carrot Capital of the World" to "The

Uranium Capital of the World." Since Grants was, in many ways, shaped by the uranium boom, it was devastated when the uranium industry busted in the 80s. In the years following the uranium bust, three correctional facilities have been sited around Grants in an attempt to bring economic activity to the area (Jaramillo and Milan 2013).

*Crownpoint*

Crownpoint is a small village located approximately 56 miles northwest of Grants with a population of 3,018, where most residents (89.2%) identify as Native American. It has a per capita income of $19,318 and a poverty rate of 30%, even higher than Grants (US Census Bureau 2020a). Crownpoint is the center of the Eastern Agency of the Navajo Nation, a major hotspot of uranium activity during the uranium boom and where the largest uranium production projects in the Navajo Nation were located (US EPA, n.d.). Drinking water in Crownpoint proper is safe, but many residents of nearby areas lack access to safe water due to uranium contamination and lack of infrastructure. Subsequently, these residents often travel to Crownpoint to draw water and haul it back to their homes (Tanana, Combs, and Hoss 2021).

The Eastern Agency is the primary site of contention between the Navajo Nation's grassroots anti-uranium activists and the uranium industry (Voyles 2015). Over the past several decades, the uranium industry, with the support of the Nuclear Regulatory Commission (NRC) and other government entities, has engaged in a sustained effort to site new *in-situ* leach (ISL, aka *in-situ* recovery or solution) uranium mines in the legally murky lands surrounding Crownpoint and the neighboring community of

Church Rock.[15] These efforts have been met with fierce opposition from concerned Eastern Agency residents, spearheaded by the Eastern Navajo Diné Against Uranium Mining (ENDAUM), a grassroots anti-uranium campaign founded in Crownpoint in 1994 (Paskus 2006).

The legally murky lands surrounding Crownpoint mentioned above are known as the "checkerboard" area of the Navajo Nation. The checkerboard area contains tribal trust lands, allotted trust lands, fee lands, and a variety of federal and state land jurisdictions. Tribal Trust lands, which are held by the federal government for the benefit of the tribe and governed by the tribal leadership, make up most of the Navajo Nation. Meanwhile, allotted trust lands are held by the federal government for the benefit of individual Navajos or their heirs, which has led to fractionation (i.e., an increasing number of heirs (interests) as the land is passed down to successive generations). Consequently, allotted lands often have hundreds of fractional interests, significantly complicating land use and management decisions (including decisions about leasing land for extractive industry development). Meanwhile, fee lands are generally private properties held by Navajo and non-Navajo people that can be freely encumbered or alienated by their owners without federal government approval (Fitzpatrick 2021). The jumble of land designations in the checkerboard area is the result of processes associated with federal policies, including the

[15] ISL mining involves drilling holes into an ore deposit, pumping a leaching solution into the deposit to dissolve the ore, and then pumping the pregnant solution to the surface to collect for processing (Taylor et al. 2004). In 1988, Hydro Resources, Inc. (HRI) applied to develop an ISL project near Church Rock, later amended to include two additional ISL project sites near Crownpoint. HRI planned to process the slurry from the three sites at a facility that they owned in Crownpoint (US NRC 1997). In 1997, a Final Environmental Impact Statement (FEIS) for the projects issued by NRC concluded that while "the entire area of impact constitutes an 'environmental justice population,'" any significant impacts associated with the proposed mineral extraction could be mitigated (US NRC 1997:3-79). Despite intense legal opposition from grassroots anti-uranium activists and their allies, the NRC followed the advice of the FEIS in 1998, issuing a source and biproduct minerals license to HRI (Jantz 2018).

implementation of the General Allotment Act of 1887 (aka the Dawes Act), an act derived from settler colonial logic which sought to abolish reservations, dissolve tribal governments, and assimilate Native Americans into mainstream American society as farmers (Otis 2014).

The environmental legacy of the uranium boom looms large in Crownpoint. In mid-July of 1979, the worst radioactive accident in US history occurred less than 20 miles west of Crownpoint. A dam burst at the United Nuclear Corporation (UNC) mill near Church Rock, discharging 1,100 tons of tailings and 94 million gallons of mill process effluent into the Rio Puerco, permanently polluting its bed and banks, and contaminating the crops and livestock that line the river. The incident released three times the radiation as the infamous Three Mile Island event near Middletown, Pennsylvania (which had occurred just four months prior), but the implications for residents were largely downplayed by politicians and ignored by the broader American public (Millard et al. 1983; Arnold 2014). Requests to declare the site a federal disaster area from the Navajo Services Coordinating Committee were denied by Democratic New Mexico Governor Bruce King. The NRC authorized the resumption of operations at the mill site less than five months later. Operations ceased at the mill site in 1982, not because of concerns about radioactive contamination, but because the hand of the UNC was forced by rapidly declining uranium market conditions. The human health effects of the Church Rock uranium mill spill have not been fully quantified (Brugge, Delemos, and Bui 2007).

*Blanding*

With a population of 3,594, Blanding, Utah is the largest city in Utah's sparsely populated San Juan County. Blanding has a higher per capita median income than the

other two study communities ($25,304) and a much lower poverty rate (18%). Like Grants and Crownpoint, Blanding's sociohistorical context is deeply linked with uranium production. However, Blanding is one of the few communities in the US where uranium production is occurring nearby. Blanding is located six miles north of the White Mesa Mill—the country's only currently operating uranium mill.

Additionally, Blanding is located about 10 miles east of the uranium-rich 1.36-million-acre Bears Ears National Monument (BENM), an important cultural site for Native American tribes in the region. Initially designated by the Obama administration in 2016, then cut by roughly 85% by the Trump administration in 2017, then restored by the Biden administration in 2021, the BENM has become a national political battleground over the management of public lands. The BENM was a major site of uranium activity during the nuclear era, and the uranium industry and other energy developers have remained interested in the area—as evidenced by the proposed development of several new uranium mines there between 2017–2021 (Groetzinger 2021).

### *Data Collection and Analysis*

Data were drawn from a series of in-depth semi-structured interviews with residents living in (or near) Grants, Crownpoint, or Blanding ($n$ = 72). For the reasons outlined above, this study focuses solely on the participants who identified as Native American ($n$ = 22).[16] Any resident over the age of 18 who lived in (or near) one of the study communities was eligible to participate in an interview. The interviews were

[16] Of the 22 participants, 18 identified solely as Navajo. One participant declined to provide any information about their tribal identity. Of the remaining three participants, one identified as a non-Navajo tribal member, and two identified as Navajo in conjunction with another tribal identity. I do not discuss the tribal identity of these participants to maintain their confidentiality.

conducted in two waves. The first wave, which occurred between August 2021 and April 2022, focused on Grants and Crownpoint. Because of the COVID-19 pandemic, most of these interviews were conducted remotely (i.e., via telephone or video conference), though five of the later interviews were conducted in person. In the second wave of interviews, which took place between July–August 2022, I focused on Blanding. In contrast to the Grants and Crownpoint interviews, most of the Blanding interviews were conducted face-to-face, though six took place remotely. Most interviews took 15–45 minutes, but a few lasted longer (up to several hours).

With the goal of reaching a diverse array of residents in the study communities (in terms of demographics like race/ethnicity and gender and views about uranium production), I used multiple strategies for participant recruitment. I searched local and regional news sources such as *Cibola Citizen*, *Albuquerque Journal*, *Navajo Times*, *San Juan Record*, and *High Country News* to identify individuals that had spoken publicly about issues related to uranium production. I also searched public meeting notes from municipal, county, and tribal council meetings. Additionally, I used public directories for K-12 schools, colleges and universities, and government agencies in the study communities to identify potential participants. Participants were recruited via phone, email, and face-to-face contact. With prior permission, I approached residents at public spaces in the study communities (i.e., college and university campuses and grocery stores) to if they would be willing to participate in an interview. I also used snowball sampling for participant recruitment (i.e., I included a question in the research protocol asking participants if they knew of someone in the community that they would recommend for an interview).

All the interviews were recorded with the consent of the participants and then transcribed for analysis. The protocol for the semi-structured interviews contained three blocks of questions (participants' relationship with their community, topics related to uranium, and sociodemographic characteristics (i.e., age, gender, length of residence, formal education). I did not ask questions specifically focused on the three TribalCrit tenets outlined previously. Instead, these topics emerged organically as participants discussed their views and experiences related to uranium throughout the interviews.

The interviews were coded iteratively (Galletta 2013). I began by identifying all instances where the interviewee discussed anything related to Indigenous people. I then focused on identifying instances where the participant discussed Indigenous issues related to uranium, specifically. In my discussion of the results, I focus on the dominant subthemes relevant to the three tenets of TribalCrit discussed above. Because the number of participants is small when broken down by community, drawing comparisons between the three study communities is not the focus of the present research. Nevertheless, I do note differences in how the research themes discussed emerge (or do not emerge) in interviews across the three places when necessary. Pseudonyms are used to help maintain participant confidentiality.

### *Operationalization of Key Concepts*

I used the three tenets from TribalCrit outlined above to help operationalize the primary concepts I focus on in my discussion—liminality (tenet three); a desire for tribal sovereignty, tribal autonomy, self-determination, and self-identification (tenet four); and tribal philosophies, beliefs, customs, traditions, and visions for the future (tenet seven).

Each of these tenets has several related subthemes—I focus my discussion on the most prominent subthemes across the interviews.

The consideration of liminality is a central pillar of the TribalCrit. Indeed, Brayboy (2005:425) cited their desire to "begin to make sense of American Indians' liminality as both racial and legal/political groups and individuals" as the impetus for the development of the framework. Per Brayboy (2005:427), the liminal space occupied by Native Americans complicates their efforts to obtain political/legal and social recognition: "It is this liminal space that accounts for both the political/legal nature of our relationship with the U.S. government as Americans and with our embodiment as racialized beings." Brayboy (2005:427) also stated that they "wish[ed] to emphasize the liminality of our position (legally/politically and socially)." Thus, I operationalized liminality as any instance the discussion of Native Americans' liminal legal/political or social position in relation to uranium issues emerged in the interview. Further, since Lorenzo (2017:14) argued the importance of considering geographic space in Indigenous peoples' struggle for EJ, as Indigenous peoples "have been a 'spatial' people for millennia," I include instances where participants discussed geographic liminality (i.e., spaces with unclear social and political boundaries) in relation to uranium.[17]

The operational definitions for the interrelated concepts of tribal sovereignty, tribal autonomy, self-determination, and self-identification are more straightforward (tenet three). According to Brayboy (2005), tribal sovereignty is the ultimate goal of

[17] Crownpoint is located within the checkerboard area of the Navajo Nation, which has a complicated mixture of land statues that creates significant jurisdictional challenges for communities (Otis 2014). The checkerboard of land statuses around Crownpoint was directly shaped by settler colonialism, which operates in tandem with racism on a structural level to marginalize Indigenous peoples and dispossess them of their land and resources (McKay et al. 2020).

TribalCrit. Brayboy (2005:435) defined it as "self-determination, self-government, self-identification, and self-education." Tribal autonomy refers to "the ability of communities and tribal nations to have control over existing land bases, natural resources, and tribal national boundaries. Autonomy is also linked to the ability to interact with the U.S. and other nations on a nation-to-nation basis" (Brayboy 2005:433-434). Self-determination "rejects the guardian/ward relationship currently in place between the U.S. government and tribal nations," while self-identification refers to "the ability and legitimacy for groups to define themselves and to create what it means to be Indian" (Brayboy 2005:434). Since my analysis focuses on uranium issues, my discussion about these concepts focuses primarily on tribal autonomy and self-determination via participants' descriptions of their efforts to resist uranium industry incursions into fee and allotment lands in the checkerboard area, and to contest the authority of the NRC to license uranium production projects on tribal lands.

Finally, my operational definitions for the (also) interrelated concepts of tribal philosophies, beliefs, customs, traditions, and visions for the future (tenet four) are also fairly straightforward. Brayboy (2005:437) described how the seventh tenet of TribalCrit "honors the adaptability of groups and recognizes the differences within individuals and between people and groups" and recognizes that "Indigenous ways of knowing" are "viable and important for the lives of the individuals and the members of the group" (Brayboy 2005:438). Since Brayboy (2005) did not specifically define these concepts, I rely on their standard definitions, with tribal philosophies referring to the systemized study of general and fundamental questions (including traditional ecological knowledge), beliefs the things that individuals within a group generally accept to be true (including

religious convictions), customs being a common way of behaving within a social group, and traditions being beliefs or behaviors with special significance or symbolic meanings that originated in the past and are passed down within a social group (Rock and Ingram 2020). Regarding visions for the future, I focused on instances where participants shared their predictions or hopes for the future rather than every instance that a participant simply mentioned uranium in the future tense.

## Findings

### *Description of Participants*

For reference, descriptive characteristics for the 22 study participants are provided in Table 4.2. Most participants ($n$ = 16) lived in Crownpoint, five lived in Blanding, and one in Grants. Participants tended to be older. On average, participants were 55 years old, ranging from 30 to 68. Fourteen interviewees were women. All but one of the interviewees had lived in their community for more than five years. One participant had a high school diploma or GED; nine had attended some college or held an associate, vocational, or technical degree or certificate; six held a bachelor's degree; six held a graduate or professional degree.

**Table 4.2: Participant Characteristics (*n* = 22)**

| | **Percentage (*n*)** |
|---|---|
| Place | |
| Grants | 5(1) |
| Crownpoint | 73(16) |
| Blanding | 23(5) |
| Mean Age[a] | 55 |
| Median Age[a] | 57 |
| Gender | |
| Female | 64(14) |
| Male | 36(8) |
| Length of Residence | |
| New Resident | 5(1) |
| Established Resident | 95(21) |
| Educational Attainment | |
| High School/GED | 5(1) |
| Some College, Associate, or Vocational/Technical | 41(9) |
| Bachelor's | 27(6) |
| Graduate or Professional | 27(6) |

[a] Two participants (one each in Grants and Blanding) declined to provide their exact age and are excluded from the calculation of the mean/median ages.

### *Liminality*

The third tenet of TribalCrit, which focuses on the "liminal space" (i.e., transitional space between two locations or states of being) occupied by Native Americans as both a political and racial group, which complicates their position in society and their relationship with the US government (Brayboy 2005:427). In total, 14 of the 22 interviewees' discussion of uranium issues referenced this liminal space (Table 4.3).[18] Liminality most frequently emerged in relation to participants' discussion of Church Rock uranium mill spill of 1979. While a few participants described the Church Rock spill simply in matter-of-fact terms (usually in response to the interview question,

[18] The numbers related to the subthemes discussed below do not necessarily add up to 14 because the subthemes are not mutually exclusive. This also applies to the discussion of the results for the other two tenets.

"What have you heard about uranium activity in the area?"), most participants who discussed the incident referred to it, and the response to it (or lack thereof) from government and the wider society, as contributing to their mistrust of the uranium industry and the government agencies responsible for regulating it.

**Table 4.3: Number of Times Discussion Related to the Three TribalCrit Tenets (and Related Subthemes) Emerged in the Interviews**

| | Percentage (*n*) | | |
|---|---|---|---|
| | **Overall (*n* = 22)** | **Within Navajo Nation (*n* = 16)** | **Outside of Navajo Nation (*n* = 6)** |
| **Tenet Three**[a] | 64(14) | 81(13) | 17(1) |
| Church Rock uranium spill of 1979 (and lack of response) | 55(12) | 69(11) | 17(1) |
| Uranium industry and US government exploiting checkerboard | 27(6) | 38(6) | 0(0) |
| Community impacts of influx of settlers during uranium boom | 18(4) | 25(4) | 0(0) |
| **Tenet Four** | 45(10) | 63(10) | 0(0) |
| Participation in anti-uranium activism | 23(5) | 31(5) | 0(0) |
| Support for anti-uranium activism | 23(5) | 31(5) | 0(0) |
| **Tenet Seven** | 50(11) | 44(7) | 67(4) |
| Tribal philosophies, beliefs, customs, and traditions | 23(5) | 13(2) | 50(3) |
| Visions for the future | 27(6) | 31(5) | 17(1) |

[a] The counts of the subthemes do not add up to the total number for the tenet because they are not mutually exclusive.

For example, Carl, a lifelong Crownpoint resident in his 40s who was against new uranium production in the area said, *"To know that the levy breach there in Church Rock was declared one of the worst mining accidents in US history is kind of concerning. … I'm just wondering why it wasn't treated that way."* He went on, *"So, I'm kind of skeptical of these government agencies that are supposedly protecting us. Why didn't they treat it as a big deal like that?"* Similarly, Marie, who was in her 50s, and had lived in Crownpoint for over 10 years, said,

> *They said there was nobody here, yet there was like 500 families that lived in the area, and it was highly populated, but they said that, "No, there was no one living there," but that was a lie. And yet there was something*

> *similar that happened somewhere on the East Coast and yet those people got paid out. They were compensated.*

Six of the 14 who discussed liminality described how HRI and the NRC have exploited the bizarre mix of land jurisdictions in the checkerboard area in their attempts to site new uranium mines in the Eastern Agency, despite opposition from residents and even the Navajo Nation tribal government. For example, Macy was a non-Navajo woman in her 60s who has lived in Crownpoint for over 15 years. She expressed frustration with the uranium industry's attempts to circumvent the ban on uranium mining on Navajo lands. When discussing HRI's attempts to bring ISL mines in allotment and fee lands in and near Crownpoint, she said, "*they [HRI] end up coming right to the edge of the reservation and mining."* Marie was a lifelong Crownpoint resident in her 50s. Like Macy, she was concerned about the uranium industry making incursions into fee and allotment lands in the checkerboard area against the wishes of residents:

> *Their actions will linger long after they leave, and our children and grandchildren will live in those conditions. We cannot have that happening in our front yards. Regardless of whether or not it is on private land, approximately 500 Navajos live near Church Rock, and more live in Crownpoint. These companies do not care about the people; they just want the resource because they will not be living in these parts after they are done with it.*

Genevieve, a lifelong Crownpoint resident in her 60s, discussed HRI's efforts to persuade allottees to lease their lands for the ISL projects:

> *The area where they wanted to go and extract the water were on lands that Navajos leased. They are called allottees, and so, they went to them, and they wanted them to sign a paper saying, "If you let us drill on this land, we will give you this amount of money," and so that's what they were telling them, that it's safe. "All we're going to do is take out the water and then we're going to take it off, and we're going to take it into Crownpoint to the processing plant and process it there." So, it was actually on some tribal land, but it was leased to Navajos, and they were signing an agreement to let them do that.*

Devin, a lifelong Crownpoint resident in his 30s, felt that HRI did not provide adequate (or accurate) information to elder allottees, who tended to speak Navajo in their homes and had limited experience with English:

> *Another concern was these older folks that had been getting invitations to participate with the allotment discussion, a lot of them didn't speak English. I mean, for an example, my grandparents did not speak a word of English—my mother's side—and they were getting cards, saying, you know, "Come participate in this meeting and learn about the benefits of uranium." Luckily, despite the fact that they didn't speak English, or they didn't attend school, they knew what uranium was and did not want to participate, but there was [sic] others where they were not fully informed, translation of all these technical terms were not being provided, or even legal terms were not being properly provided to a lot of the older generation.*

Four of the 14 participants who discussed liminality touched on the community impacts of the influx of settlers to the Eastern Agency during the uranium boom. Specifically, these participants felt that the liminal space within the checkerboard allowed settlers to live above the law and escape penalties for criminal activity. For example, when I asked Bret, 50s, what he disliked about Crownpoint (if anything), he said, *"The checkerboard land status."* After being asked to elaborate, he replied, *"When the uranium was here, there was a lot of miners that were here also, and they had free rein of doing any criminal activity without being penalized on the Navajo reservation. Because they were non-Natives, it was easier for them to get away with a lot of things."* Audrey, a lifelong Crownpoint resident in her 60s, said,

> *When I was in high school, we had mining activity here. At that time, I really didn't pay attention to the dangers of uranium, and nobody was telling us what was going on, but I saw that there were a lot of miners that were coming from the city of Grants into Crownpoint, and they were driving up and down the road to the point where they almost ran you off the road, and there would be three miners in a vehicle just speeding up the road and doing whatever they could, and so that was going on, and they seemed to take over our town.*

In summary, the liminal political and social (racial) space occupied by participants was reflected in their discussion of the Church Rock spill of 1979, which they felt was not given the public and political attention appropriate for such a massive event. It was also reflected in their discussion of the checkerboard of land jurisdictions surrounding Crownpoint, which has given the uranium industry and US government leverage in their efforts to bring new uranium mines to the area. Participants also discussed the checkerboard as a sort of "no man's land," which allowed outsiders who migrated to the area during the boom to commit illegal activity without recourse. These events have fomented distrust, not only of the uranium industry, but also the government agencies tasked with regulating it.

### *Tribal Sovereignty, Tribal Autonomy, Self-Determination, and Self-Identification*

The fourth tenet of TribalCrit focuses on Native Americans' "desire to obtain and forge tribal sovereignty, tribal autonomy, self-determination, and self-identification" (Brayboy 2005:429). In total, participants discussed topics related to this tenet in 10 of the interviews. These desires are reflected in participants' discussion of direct action and activism aimed towards stopping uranium production on Indigenous lands. Five of the 10 interviewees, all from Crownpoint, discussed having engaged in anti-uranium activism, an indicator of participants' desire "to have control over existing land bases, natural resources, and tribal national boundaries" (Brayboy 2005:433). All these participants viewed protecting Crownpoint's groundwater from uranium contamination as the top priority. For example, Wendy, a lifelong resident of the Crownpoint area in her 40s who participated in anti-uranium activism in college, said, *"That's water that we need for life.*

*We're in a freaking desert for crying out loud, we don't have the water to expend on those kind of activities."*

The interviewees' discussion of anti-uranium activism primarily centered on disputing the US government's decision to license HRI's ISL mines and, ultimately, preventing uranium industry incursions into the checkerboard area surrounding Crownpoint. Devin, who has participated in anti-uranium activism for several years, described the history of activism against HRI's ISL mines near Crownpoint:

> *I guess you could look at [it] in phases, because you had the first phase where it was mostly community outreach and educating the local community on the situation, and the second phase was looking into the regulations and the laws that currently exist, and then you have the later phase, where the co-petition [to the Inter-American Commission on Human Rights] was originally filed in 2011.*

Five Crownpoint residents who mentioned this tenet stated that, while they had not participated in activism themselves, their views had been influenced by the educational efforts of anti-uranium activists in the community and they supported the goal of keeping uranium production away from Navajo lands. For example, Eugine, a retiree in his 60s who was originally from the Crownpoint area, and returned after retirement, was staunchly against HRI's efforts to bring new uranium mines into the area. He said:

> *I know they were really looking at restarting the mines, but there's some community meetings that came together, and they were very much against it, because by the Eastern Navajo Agency, it's a particular group of them that are against uranium, spearheading that in the community. Getting the communities informed of the potential harm that it would provide, and the previous ones that have done that. So, it was really impressive to hear them participate in that.*

As discussed by the participants, anti-uranium activism in Crownpoint has focused on litigation in addition to the community outreach discussed above. In these

efforts, anti-uranium activists in the Crownpoint area have petitioned the US government (at many levels) in opposition to the NRC licensing of HRI's ISL projects. They have also appealed to the Navajo Nation Council (the legislative branch of the Tribal government). This avenue has been significantly more fruitful than appealing to the US government. Audrey described this process:

> *At the Crownpoint chapter, we were told off several times, but we stepped to it, and we had a lot of backing. We had a lot of supporters behind us that said, "Yes, we don't want our water contaminated. You guys keep fighting. You guys keep fighting." So, we did. For years. We kept fighting, and we went round and round with the council delegates. And finally, here in 2005, we were able to come up with that law to no more uranium on Indian land.*[19]

However, despite the Diné Natural Resources Protection Act (DNRPA), the US government courts repeatedly upheld the 1998 decision by the NRC to grant a source and byproduct minerals license to HRI for the Crownpoint and Church Rock ISL projects. In 2010, after winding its way up the federal court system, the Tenth Circuit Court of Appeals upheld the NRC decision. In 2011, after the United States Supreme Court denied a petition to hear the review the NRC decision, anti-uranium activists in the Crownpoint area and their allies took their grievances against the United States government to the international stage, filing a petition with the Inter-American Commission on Human Rights (IACHR). After a decade, the IACHR has declared the petition as admissible, marking the second time the commission has agreed to hear an EJ case from the US, and the first time it has agreed to hear a Native American EJ case (IACHR 2021).

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[19] The law that Audrey referred to is known as the Diné Natural Resources Protection Act (DNRPA). Signed by Navajo Nation president Joe Shirley, Jr. on April 29, 2005, the DNRPA bans all uranium mining and processing within the Navajo Nation (Navajo Nation Code, Title 18 §1301, 2005). The DNRPA was one of the first laws enacted by the Navajo Nation government to cite Navajo philosophy and beliefs. Specifically, the act references *dóó nal yea dah,* which (loosely translated) means *"things from within the Earth that are known to be harmful to the people should not be disturbed"* (Curley 2008:3).

In summary, five Crownpoint participants discussed engaging in direct action and activism regarding uranium issues, most often in relation to efforts to block new uranium mines in the Eastern Agency. These activities included community outreach, litigation with the US government, and lobbying the Navajo Nation tribal government. An additional five Crownpoint participants expressed support for these activism efforts. These efforts directly contributed to the enactment of a permanent ban on all uranium mining and processing on Navajo lands in 2005, which has consistently been disregarded by the NRC and the US legal system (Navajo Nation Code, Title 18 §1301, 2005; Jantz 2018). These actions illustrate participants' desire for tribal autonomy (i.e., the "ability of communities and tribal nations to have control over existing land bases, natural resources, and tribal national boundaries") (Brayboy 2005:433).

### *Tribal Philosophies, Beliefs, Customs, Traditions, and Visions for the Future*

Discussion related to this tenet emerged in 11 of the interviews. Five of the 11 participants mentioned tribal philosophies, beliefs, customs, and traditions in relation to uranium issues. For example, Morris, 60s, said he learned about uranium issues from seminars and conferences at tribal schools in the area, which incorporated tribal philosophies and beliefs:

> *They would present a lot of information about uranium, the history of the mining and the negative impact about it, and they even had medicine men talk about, how it really, in fact, violated a lot of the traditional values because they were taking this substance, or this stuff out of the earth, and it violated a lot of the traditional beliefs, and it really should have just been left alone, and by bringing it out of the Earth like that, they introduced our people into a lot of the consequences of it, and some of the major ones, of course, is around health.*

Carl said that he reconnected with traditional Indigenous ecological knowledge while researching uranium issues during his activism, *"One of the things that came up on all this was the scientific knowledge on uranium and all this stuff, but, as time went on, I kind of forgot about that stuff, and then doing a little bit more research, or actually just asking questions on my side, on my Navajo culture side, the Navajos seem to have that knowledge way back about things that were underground."* He went on, *"It's interesting to know that our people had this knowledge hundreds of years ago, maybe even thousands of years ago, before any science research could be done on it, scientifically. This knowledge is already there."*

Other participants who discussed tribal philosophies, beliefs, customs, and traditions did so when discussing their concerns about new uranium mining near the BENM. Curtis (who declined to provide his age) was an anti-uranium participant originally from the Blanding area. When asked how he felt about new uranium mining near the BENM, he cited his traditional Native American beliefs: *"As a Native American, our thought is, with Mother Earth, we'll keep it as is and not exploit it."* Courtney, who was in her 30s, and had lived in various places near Blanding (in San Juan County) throughout her life, cited Native American customs and traditions while discussing her opposition to new uranium mining near the BENM: *"It's just going to make that place look ugly if [they're] going to do that … and as Native Americans, we collect our medicine, herbs, and firewood from that area."*

Similarly, Joanne, a longtime Blanding resident in her 50s, expressed some trepidation when asked about new uranium mining near the BENM. Like Courtney, Joanne cited Native American customs and traditions: *"Is it going to ruin the forest and*

*stuff like that? Because Native Americans really need the wood. They use that place to get wood, their herbs, and stuff like that."*

Six of the 11 that mentioned the third tenet shared their vision for the future of uranium in *Diné Bikéyah*. In most cases, these participants envisioned a future where the remaining uranium in *Diné Bikéyah* (and beyond) stayed in the ground. For example, Marie said:

> *The water tables need to be protected for future generations. There are several communities on the Navajo reservation where water needs to be delivered because the water is contaminated beyond repair. People talk about Flint, Michigan forced to drink and use contaminated water; it's worse on the Navajo Nation and the Navajo Nation is not being heard.*

Similarly, Genevieve said, *"I worry about my children, I worry about my grandchildren, because I'm worried about their health, and I want them to have a healthy life rather than being faced with uranium mining."* Meanwhile, in her discussion of the future, Macy connected the Navajo experience with uranium to the wider struggle for EJ in the US:

> *They need to put a thousand-year moratorium on mining, not in just in this area, but all places. Stop the extraction near reservations where Native people live, and also, all the chemicals, too, that they use to refine it. It's poisoning people down in Louisiana, down along the Mississippi River, and we, I don't want to go all "Iron Eyes Cody" on you, but people start pollution, and people can stop it.*[20]

In summary, participants' discussion of tribal philosophies, beliefs, customs, and traditions focused on Indigenous traditional ecological knowledge which warns against

[20] "Iron Eyes Cody" refers to the (in)famous "crying Indian" (who was actually played by a white man) in the "Keep America Beautiful" public service announcements (PSAs) that ran continuously on public TV in the 1970s. Iron Eyes Cody is a quintessential example of the "ecological Indian" racial trope, which perpetuates "the idea that authentic Indians live in harmony with nature and have an environmentally neutral impact on local ecologies" (Smithers 2015:92). Consequently, "Native American people and communities that do not behave according to prescribed racial stereotypes are too easily dismissed as inauthentic and environmentally destructive" (Smithers 2015:92).

the dangers of uranium extraction, as well as concerns that new uranium mining near the BENM could impact Indigenous residents' ability to collect firewood and medicinal herbs. In most cases, when participants discussed their views of the future of uranium in *Diné Bikéyah*, they described their hope for a future free of the risks of uranium production.

**Discussion and Conclusions**

In this study, I used three tenets from TribalCrit to better understand the uranium-related views and experiences of Indigenous FCR residents. While this study only begins to explore the potential connections between TribalCrit and environmental injustices affecting Indigenous peoples, it does contribute to our collective understanding of the political and racial dimensions of the uranium-related experiences of Indigenous FCR residents. This research also highlights the significance of the environmental injustices that have impacted—and continue to impact—the health and well-being of Indigenous FCR residents (Eichstaedt 1994; Voyles 2015; Redvers et al. 2021).

Discussion regarding the third tenet of TribalCrit, which focuses on the liminal position held by Native Americans in American society (Brayboy 2005), primarily emerged in the Crownpoint interviews. These residents discussed the Church Rock uranium spill of 1979, and the lack of public attention or efforts to ameliorate the impacts of the spill (Brugge et al. 2007), as factors that contributed to their wariness towards uranium companies and the US government. The checkerboard of land statuses surrounding Crownpoint also emerged as an important subtheme, with residents discussing the bizarre mixture of land jurisdictions in the checkerboard area as a major complicating factor in their efforts to keep new uranium mining away from Navajo lands.

Some Crownpoint residents also referred to the murky legal status of the checkerboard area, which they said allowed the outsiders who migrated to the area during the boom to escape punishment for illegal activities.

Participants tended to focus on their legal/political identity when discussing uranium issues, rather than their racial identity. The following explanation from Brayboy (2005:432-433) helps to elucidate why:

> My intent here is to argue that American Indians are both legal/political and racialized beings; however, we are rarely treated as such, leaving Indigenous peoples in a state of inbetweeness wherein we define ourselves as both, with an emphasis on the legal/political, but we are framed as racialized groups by many members of society. The racialized status of American Indians appears to be the main emphasis of most members of U.S. society; this status ignores the legal/political one, and is directly tied to notions of colonialism, because larger society is unaware of the multiple statuses of Indigenous peoples.

The second tenet of TribalCrit that I used focused on participants' "desire to obtain and forge tribal autonomy, self-determination, self-identification, and ultimately tribal sovereignty" (Brayboy 2005:433). Again, discussion related to this tenet emerged primarily in Crownpoint, where grassroots anti-uranium groups have mobilized and engaged in a protracted battle, lasting several decades, with uranium companies and government to thwart new ISL uranium mining projects in the Eastern Agency. The activists and those that support the activist activity that I interviewed discussed their extended, and ongoing, campaign to educate Crownpoint residents on the risks associated with the proposed ISL mines, and to petition both the US government and the Navajo Nation tribal government.

Finally, the third TribalCrit tenet that I used focused on "tribal philosophies, beliefs, customs, traditions, and visions for the future" (Brayboy 2005:429). In all cases,

discussion focused on opposition to, or trepidation about, uranium production (Lorenzo 2017). In Crownpoint and Grants, some participants referenced the same tribal philosophies and beliefs that were used to justify the ratification of the DNRPA in their discussion of uranium issues. In Blanding, participants expressed concerns that new uranium mining near the BENM would degrade the natural beauty of the area and interfere with Indigenous residents' ability to collect firewood and medicinal herbs from the area, which they many on for daily life (Lorenzo 2017). Participants also discussed their views of the future of uranium in *Diné Bikéyah*, which usually involved keeping it (and other substances that are harmful to people) in the ground (Curley 2008).

In addition to the legal/political and social space outlined by Brayboy (2005), the present study emphasizes Native American lands, particularly the checkerboard area of the Eastern Agency, as a liminal geographic space (Lorenzo 2017). It is worth noting that liminality emerged less frequently in the interviews with Blanding residents, at least in ways that I was able to ascertain in my coding. This is interesting, given that the status of these participants as Navajo people residing in a "bordertown" a short distance outside the boundaries of the Navajo Nation is highly liminal. However, this is likely because Blanding, as a majority-White community, is not in proximity to the worst environmental contamination associated with the uranium boom (and is also far away from the puzzling political boundaries of the checkerboard area). Perhaps the finding is due to the relatively small number of Blanding interviewees included in the present study ($n = 5$). Future research on this topic should play close attention to differences in uranium-related views and experiences between Indigenous peoples living within and outside tribal boundaries.

Regarding the persistent structures of settler colonialism and racism (i.e., the primary tenet of TribalCrit, and the central focus of settler colonialism theory), several studies in recent years have highlighted how various US government agencies, such as the Bureau of Reclamation and the US Forest Service, have historically made ecological management decisions that ignore Indigenous knowledge and the wants and needs of Indigenous communities (Bray 2021; Vinyeta 2022). Regarding uranium issues, these structures continue to shape the experiences of Indigenous people living in the FCR, particularly residents in the community of Crownpoint, where anti-uranium activists have battled with the uranium industry and government for decades to prevent new uranium mining in their community. Despite the passage of the uranium mining ban on Navajo Lands in 2005, which can be attributed to grassroots anti-uranium activism originating in Eastern Agency communities like Crownpoint, the NRC has disregarded tribal energy sovereignty and maintained that it holds the authority to license uranium production projects on tribal lands. As noted by Jantz (2018:247), "most Federal agencies responsible for environmental regulation have taken meaningful steps to address the disparate impacts of pollution on low-income communities and communities of color, the United States Nuclear Regulatory Commission has lagged behind."

Like all studies, this current one has limitations. While I made efforts to ensure that the respondent pool was diverse, the sample is biased toward older residents and women, which could potentially influence the results of the study (i.e., different patterns may be found in a respondent pool with more younger residents and men). As previously discussed, except for one participant, all the Native American interviewees identified as Navajo. It is important to mention that all the Native American tribes in the American

Southwest, which include the Laguna (*Kawaika*), Acoma (*Haaku*), and Zuni (*Shiwinna*) Pueblos, the Hopi Tribe (*Hopituh Shi-nu-mu*), and the Ute Mountain Ute Tribe (*Wʉgama Núuchi*), have been adversely affected by uranium industry activity. Research highlighting the uranium-related views and experiences of members of these tribal communities and nations is also needed. Additionally, while I focused on three tenets of TribalCrit, most (if not all) of the other tenets of TribalCrit may also have relevance for research focused on Indigenous EJ issues. The other tenets of TribalCrit should be considered in future research on this topic (and similar topics) and may enhance our collective knowledge about how the lived experiences and views of Indigenous peoples connect to environmental injustices.

The experiences of Crownpoint residents also provide a striking example that politically and racially marginalized peoples *can* effectively mobilize and resist the incursion of extractive activities near their communities. Had Eastern Agency residents not mobilized against uranium mining, it is likely that the Church Rock and Crownpoint mining projects would have come to fruition. Given the history of the devastation of tribal lands associated with the longstanding structures of settler colonialism and racism (Bacon 2018; McKay et al. 2020), private industry and government cannot be trusted to make land use decisions that are in the best interest of Indigenous people. If demand for domestically produced uranium increases in the future, and new uranium production projects are proposed on or near tribal lands, it is crucial that the original inhabitants of these lands—not the uranium industry or the NRC—make the final decision.

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# CHAPTER 5

# CONCLUSION

## Discussion

The three papers in this dissertation each provide a unique vantage point that contributes to a more holistic understanding of the uranium-related views and experiences of Four Corners Region (FCR) residents. The first paper explored sociodemographic variation in attitudes about uranium revitalization in two communities (Crownpoint, within the Navajo Nation, and Grants, outside of it) of the Grants Mining District (GMD) of Northwest New Mexico—the epicenter of uranium production in the FCR during the uranium boom (McLemore and Chenoweth 2017). Women more frequently opposed new uranium production than men, which is consistent with the pattern noted across previous studies focusing on sociodemographic factors and attitudes about other types of natural resource extraction (e.g., hydraulic fracturing (fracking), coal, natural gas) (Jacquet 2012; Boudet et al. 2014; Howell et al. 2017; Ulrich-Schad et al. 2020). Similarly, I found that new residents and those with higher levels of formal education more frequently opposed new uranium production, which is consistent with some previous work regarding public attitudes about natural resource extraction (Jacquet 2012). Established residents (i.e., residents living within their community for five years or more) and residents with uranium industry ties tended to support new uranium production, which is also consistent with findings from some previous research (Jacquet 2012; Qin 2016).

Research regarding public attitudes about natural resource extraction has tended to overlook race/ethnicity. When these studies have considered race/ethnicity, it has

typically been operationalized as a non-Hispanic White/Other binary. These studies have not found race/ethnicity to be associated with attitudes about resource extraction (Boudet et al. 2014; Howell et al. 2017). Meanwhile, I found notable patterns regarding race/ethnicity and attitudes about new uranium production. Native American participants were overwhelmingly anti-uranium. A majority of White participants were also anti-uranium, though approximately one-third of Whites (35%) supported new uranium activity. Interestingly, participants who identified as Hispanic tended to be pro-uranium. More scholarship is needed to (1) determine if this racial and ethnic differences noted above are prevalent in a more representative (probability) sample of GMD residents; and (2) identify the underlying factors that contribute to these racial and ethnic differences (which may include factors such as structural racism, economic factors, and cultural differences). Nevertheless, this research highlights the value of case studies (like the present research) where diverse voices in rural places can be seen more clearly.

The first paper also examined the primary drivers of GMD residents' attitudes about new uranium production. Pro-uranium participants discussed economic concerns, energy security and trust in contemporary technologies and regulatory structures, which is consistent with the characteristics of sites of acceptance that were illuminated in Malin's (2014, 2015, 2017) research. Meanwhile, anti-uranium participants' discussions were typically focused on environmental and health concerns. Participants in Crownpoint more frequently discussed concerns about groundwater contamination than Grants participants—which is not surprising given the extensive radioactive groundwater contamination throughout the Eastern Agency of the Navajo Nation (where Crownpoint is located) (Tanana, Combs, and Hoss 2021).

Most EJ research has focused on "sites of resistance" where residents mobilize against environmental injustices, and (to a lesser extent) "sites of acceptance" where residents mobilize in support of polluting industries (Malin, Ciplet, and Harrison 2023:1). EJ researchers have only recently begun to explore communities with mixed or conflicting views about these industries (Greenberg 2023; Malin et al. 2023). In the second paper, I focused on Blanding, Utah—which has a unique connection to uranium production due to its proximity to the last operating uranium mill in the nation (i.e., the White Mesa Mill, or WMM) as well as the uranium-rich Bears Ears National Monument (BENM). I applied a framework that was recently developed by Malin et al. (2023) that considers community responses to environmental injustice as a spectrum, rather than a resistance/acceptance dichotomy. This framework posits that there are at least four distinct pathways of community responses to environmental injustice, ranging from "effectual resistance" to "active acceptance." According to Malin et al. (2023:4), the middle zone of the spectrum is characterized by ambivalence (mixed or conflicting views) and quiescence ("the absence of collective activism in the face of deprivation or injustice, especially under conditions in which one might reasonably expect protest to occur").

I considered three measures of perceptions of uranium production in my analysis: views about new uranium mining generally, views about the WMM, and views about new uranium mining near the BENM. Ambivalence was more common for the two more specific measures (i.e., views about the WMM and new uranium mining near the BENM) than the more general measure (i.e., views about new uranium mining in the area generally). Meanwhile, inconsistencies across measures were prevalent in a majority of

the interviews (i.e., 13 of 19). Further, none of the participants discussed having participated in any direct action or activism regarding issues related to uranium production, and several participants expressed a passive view of the WMM or discounted the EJ concerns of other residents (Malin et al. 2023).

Because of the prevalence of ambivalence across the interviews noted above, I posit that Blanding is better characterized as a "site of ambivalence," or place where "individuals hold complex and conflicted attitudes toward polluting industries" (Greenberg 2023:1), than a site of acceptance or resistance. Regarding the WMM, Blanding most closely aligns with the "passive acceptance" pathway on the spectrum of community responses to environmental injustice. Yet, this characterization is less accurate regarding new uranium mining near the BENM, which received notably less support from participants. Overall, considering community responses to environmental injustice as a spectrum is a major improvement over the resistance/acceptance dichotomy that has dominated EJ research, but researchers utilizing the framework need to carefully consider contextual factors. Further, more work is needed to delineate the four pathways outlined by Malin et al. (2023) and identify potential additional pathways.

In the third paper, I applied three tenets from the TribalCrit framework—which builds upon Critical Race Theory to interrogate on the positionality of Native Americans in society—to better understand the uranium-related views and experiences of Indigenous FCR residents (Brayboy 2005). The three tenets that I applied were: (1) "Indigenous peoples occupy a liminal space that accounts for both the political and racialized natures of our identities." (2) "Indigenous peoples have a desire to obtain and forge tribal sovereignty, tribal autonomy, self-determination, and self-identification." (3) "Tribal

philosophies, beliefs, customs, traditions, and visions for the future are central to understanding the lived realities of Indigenous peoples, but they also illustrate the differences and adaptability among individuals and groups" (Brayboy 2005:429).

Participants' discussion of liminality primarily emerged in relation to the Church Rock uranium spill of 1979 (the worst radioactive contamination event in American history), and the lack of response from society (Brayboy 2005; Brugge, Delemos, and Bui 2007). This, and other radioactive contamination events in the Navajo Nation, have contributed to participants' distrust of the uranium industry and US government. The checkerboard of land statuses surrounding Crownpoint also emerged as an important subtheme, with residents discussing the confusing mixture of land jurisdictions in the checkerboard area as a major hurdle in their efforts to stop the uranium industry and US government from developing new uranium production projects in and near tribal lands. Some Crownpoint said that the murky legal status of the checkerboard area, which they said allowed non-Navajo uranium workers who migrated to the area during the boom to commit crimes without legal recourse.

Regarding "Indigenous peoples' "desire to obtain and forge tribal sovereignty, tribal autonomy, self-determination, and self-identification," participants' discussion of their desire for tribal autonomy ("the ability of communities and tribal nations to have control over existing land bases, natural resources, and tribal national boundaries") was related to anti-uranium activism (Brayboy 2005:429, 433). Participants described their efforts to keep new uranium mines out of the Eastern Agency, which included community outreach and education, litigation against the uranium industry and US government, and lobbying the Navajo Nation tribal government.

Finally, "tribal philosophies, beliefs, customs, traditions, and visions for the future" also emerged frequently in the interviews (Brayboy 2005:429). Some participants in Crownpoint referenced *dóó nal yea dah*, which (loosely translated) means "things from within the Earth that are known to be harmful to the people should not be disturbed" (Curley 2008:3), while others in Blanding discussed concerns that new uranium mining near the BENM could interfere with Indigenous residents' ability to gather firewood and medicinal herbs from the area, which many people rely on for daily life.

**Limitations**

There are limitations in the overall research design, which warrant some discussion. In Grants and (particularly) Crownpoint, the sample skews towards older and more highly educated individuals, which almost certainly influences the findings. In Blanding, the sample size is relatively small and skews toward women—which also likely influences the results. Further, while my dissertation contributes to a more holistic picture of FCR residents' concerns about uranium development by incorporating the views of Navajo Nation and non-Navajo Nation residents, my exploration of three communities does not produce findings that are wholly representative of the FCR. Several tribal nations in the FCR, including the Laguna (*Kawaika*), Acoma (*Haaku*), and Zuni (*Shiwinna*) Pueblos, the Hopi Tribe (*Hopituh Shi-nu-mu*), and the Ute Mountain Ute Tribe (*Wʉgama Núuchi*), are not represented. Although communities in the FCR share several similarities, each has a unique history, social system, and association with uranium production.

Some of this dissertation's limitations are associated with the COVID-19 pandemic, which impacted many aspects of the data collection process. The 72 interviews

that the three papers in this dissertation rely on were conducted in two waves. The first wave, which took place from August 2021 to April 2022, focused on Grants and Crownpoint. The COVID-19 pandemic severely limited my ability to recruit or interview participants face-to-face during the first phase, particularly in Crownpoint, which was hit hard by the pandemic and was largely shut down during most of my visits to northwestern New Mexico. Subsequently, I relied heavily on newspapers, public directories, and the like to identify potential participants. As a result, many of the Grants and Crownpoint participants were public officials, members of the public that have publicly spoken about uranium issues, professors, and teachers—although snowball sampling was beneficial in deepening the respondent pool beyond these groups. The second wave of interviews took place from July to August 2022. During this phase of the data collection, I focused on Blanding and did significantly more face-to-face recruitment and interviewing. As a result, there are fewer public officials, members of the public who have publicly spoken about uranium issues, professors, and teachers in the Blanding sample.

**Positionality**

My positionality as a researcher also presents limitations that need to be acknowledged, particularly given that one of the study communities is located in the Navajo Nation. The identities and characteristics of a researcher (including their status as an "insider" or "outsider") have a profound impact on their interactions with participants in the field and, ultimately, the results of their research (Baca Zinn 1979:210). I know personal biases and blindspots are pervasive in my research, even though I have made a concerted effort to remain reflexive throughout the research process (including keeping a

research journal to document and reflect upon my interactions with participants). I am a White male—racial and gender identities that have always been hegemonic in American society. I have not experienced political and racial marginalization (Brayboy 2005). Thus, my experience navigating society fundamentally differs from the Indigenous FCR residents I interviewed.

Even in Blanding, where I have lived for most of my life, my interactions with participants were still, to some extent, shaped by the insider/outsider dichotomy. Although I knew (or knew of) many of the participants, my conversation with them was for human subject research in my capacity as a graduate student researcher. This created a distance between myself and the participants that was, at times, palpable.

**Implications**

This dissertation has several important implications, both theoretical and practical. I applied two frameworks which have not commonly been utilized in EJ research. In the case of the first (the spectrum of community responses to environmental injustice), the shift from viewing this topic as a spectrum rather than a resistance/acceptance dichotomy is a step forward, but researchers should be cautious when using this framework to characterize communities, because context matters. Further, more work is required to determine which characteristics (or "mechanisms") are distinct among the different pathways on the spectrum, and which mechanisms overlap (Malin et al. 2023:1). My research joins other emerging studies that consider communities that do not fit within the acceptance/resistance dichotomy (Greenberg 2023; Malin et al. 2023). A more nuanced understanding of these communities has important implications for policymakers and activists because it "may help move past stereotypes"

of communities with a history of uranium industry dependence and provide a fuller picture of the wants and needs of residents in these communities in relation to uranium development (Greenberg 2023:9).

Although my research only scratches the surface of the potential connections between TribalCrit and environmental injustices affecting Indigenous peoples, it does contribute to an increased understanding of the political and racial dimensions of Indigenous FCR residents' uranium-related views and experiences. It also highlights the profound environmental injustices that Indigenous FCR residents have worked tirelessly to overcome. It is important that the perspectives of Indigenous peoples are well-represented in the EJ literature, because tribal nations and communities continue to face the worst of the lasting environmental and human health effects of the uranium boom (Eichstaedt 1994; Voyles 2015; Redvers et al. 2021).

Taken together, the findings from the three papers in this dissertation also provide a solid conceptual and theoretical basis for a broad survey effort focused on FCR residents' uranium-related views and experiences. While this approach would sacrifice the depth that interview-based research (such as the present dissertation) can provide, it would allow for an investigation of the topics explored within the three papers across a broader range of communities and constituencies in the FCR. A drop-off/pick-up survey design—where survey team members deliver the survey to sampled residents and return later to gather it from them—could be an excellent method of implementation for this survey, since this method has been noted to significantly boost response rates in many rural settings (Jackson-Smith et al. 2016). Further, this approach is arguably less "extractive" than a mail survey approach because it requires the research team to have

more direct social interactions with research participants (Kouritzin and Nakagawa 2018). This provides more opportunities for participants to ask questions and voice concerns about the survey. Because drop-off/pick-up survey efforts require a survey team, this approach could also provide research opportunities for students at the tribal and majority-Native American colleges and universities in the region. Involvement in such projects could contribute to students' agency in understanding local issues and developing locally driven solutions to them.

Ultimately, the residents of places in uranium-rich lands should carry the most weight in discussions about new (and present) uranium production since they are the ones who are forced to deal with the long-term environmental and health impacts of these risky activities. This particularly applies to tribal FCR communities like Crownpoint, which have dealt with the most severe environmental contamination and health impacts associated with the uranium production era and have continued to face unprecedented uranium industry and US government pressure to accept new uranium mines in and near their communities (Jantz 2018). The loopholes and specious reasoning that the uranium industry and US government have consistently used to ignore tribal energy sovereignty and circumvent the wishes (and laws) of tribal nations and communities in the FCR should be subject to increased scrutiny from scholars, lawmakers, and the public alike.

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# APPENDICES

**Appendix A: Interview Protocol (Grants and Crownpoint, New Mexico)**

1. Tell me a little bit about yourself. How long have you lived in the community?
2. What is your main occupation in the community (if one)?
3. What do you like best about your community? What do you dislike (if anything)?
4. What have you heard about uranium activity in the area?
    - If they seem overwhelmed by this question or answer something like "I have heard a lot," ask them to just start with the first thing that comes to mind.
    - If the participant answers "nothing," probe by asking about uranium features like underground or open-pit mines, mills, waste (tailing) piles, reclamation projects, etc.
5. What have you heard about new uranium development activity in the area (if anything)?
6. Where do you get your information about uranium activity?
7. Would you support or oppose revitalized uranium activity in the area?
    - If support: What are the primary reasons that you would support new uranium activity in the area?
    - If oppose: What would be your primary concerns associated with new uranium activity in the area?
    - If mixed: Ask about perceived positives and negatives.
8. Have you heard about the Roca Honda Project?
    - If yes: How do you feel about the Roca Honda Project?
9. Have you heard about the Church Rock and Crownpoint *In-Situ* Recovery Projects?
    - If yes: How do you feel about the Church Rock and Crownpoint *In-Situ* Recovery Projects?
10. Return to important themes established throughout the interview that need more exploration.
11. Return to background characteristics to ensure that information has been collected about:
    - Age
    - Racial/ethnic background
        - If respondent identifies as Native American or multiracial: Do you identify with a specific tribe or tribal community?
    - Socioeconomic status (most importantly, educational attainment and occupation; do not specifically ask about income)
    - Were you born and raised in the community?
12. I want to ensure I am getting all viewpoints on these issues; do you have people you would recommend that have strong thoughts on them, one way or other, or those who you haven't heard express their thoughts on them?

13. Is there anything I didn’t ask about here that you think would be important for me to know about your community? It doesn’t necessarily need to be related to uranium.

**Appendix B: Interview Protocol (Blanding, Utah)**

14. Tell me a little bit about yourself. How long have you lived in the community?
15. What is your main occupation in the community (if one)?
16. What do you like best about your community? What do you dislike (if anything)?
17. What have you heard about uranium activity in the area?
    - If they seem overwhelmed by this question or answer something like "I have heard a lot," ask them to just start with the first thing that comes to mind.
    - If the participant answers "nothing," probe by asking about uranium features like underground or open-pit mines, mills, waste (tailing) piles, reclamation projects, etc.
18. What have you heard about new uranium development activity in the area (if anything)?
19. Where do you get your information about uranium activity?
20. Would you support or oppose revitalized uranium activity in the area?
    - If support: What are the primary reasons that you would support new uranium activity in the area?
    - If oppose: What would be your primary concerns associated with new uranium activity in the area?
    - If mixed: Ask about perceived positives and negatives.
21. There have been several uranium mines proposed near the Bears Ears National Monument (west of Blanding) in the past few years. Have you heard of any of those?
    - How do you feel about new uranium mining near Bears Ears?
9. What do you think has influenced your views about new uranium activity in the area?
10. Have your views about new uranium activity in the area changed over time?
    - If yes: Why?
10. How do you feel about the White Mesa Mill?
11. Return to important themes established throughout the interview that need more exploration.
12. Return to background characteristics to ensure that information has been collected about:
    - Age
    - Racial/ethnic background
        - If respondent identifies as Native American or multiracial: Do you identify with a specific tribe or tribal community?
    - Socioeconomic status (most importantly, educational attainment and occupation; do not specifically ask about income)
    - Were you born and raised in the community?
    - Have you or a family member ever worked in the uranium industry?

13. I want to ensure I am getting all viewpoints on these issues; do you have people you would recommend that have strong thoughts on them, one way or other, or those who you haven't heard express their thoughts on them?
14. Is there anything I didn't ask about here that you think would be important for me to know about your community? It doesn't necessarily need to be related to uranium.

# MATTHEW J. BARNETT
CURRICULUM VITAE

## FORMAL EDUCATION

**Doctor of Philosophy (ABD)**, Sociology, Utah State University (Logan, Utah), 2022 (anticipated). Ph.D. Dissertation: "Toward a more holistic understanding of uranium-related views and experiences of residents in the Four Corners Region of the United States." Committee Co-Chairs: Dr. Jessica Ulrich-Schad and Dr. Peggy Petrzelka.

**Master of Science**, Environment and Natural Resources, The Ohio State University (Columbus, Ohio), 2018. M.S. Thesis: "A multilevel analysis of social, built, and natural drivers of household water use in northern Utah." Committee Chair: Dr. Douglas Jackson-Smith.

**Bachelor of Science,** Sociology, Utah State University (Logan, Utah), 2016, *Magna Cum Laude*.

## POSITIONS HELD

**Graduate Research Assistant**, Department of Sociology, Social Work, and Anthropology, Utah State University, 2018–2021, 2022.

**Graduate Instructor**, Department of Sociology and Anthropology, Utah State University, 2021.

**Graduate Teaching Assistant**, Department of Sociology, Social Work, and Anthropology, Utah State University, 2018–2019.

**Graduate Research Associate**, School of Environment and Natural Resources, The Ohio State University, 2017–2018.

**Graduate Teaching Associate**, School of Environment and Natural Resources, The Ohio State University, 2016–2017.

**Social Science Research Assistant**, iUTAH (innovative Urban Transitions and Aridregion Hydro-Sustainability), Utah State University, 2015–2016.

**Undergraduate Teaching Fellow**, Department of Sociology, Social Work, and Anthropology, Utah State University, 2015–2016.

## RESEARCH PUBLICATIONS

### Peer-Reviewed Journal Articles

PR6. Haeffner, Melissa, Douglas Jackson-Smith, and **Matthew J. Barnett**. 2023. "Categorizing relative water use perception bias using household surveys and monthly water bills." *Journal of Environmental Management* 334:117443.

PR5. **Barnett, Matthew J.**, Kaitlyn Spangler, Peggy Petrzelka, and Jennifer Filipiak. 2020. "Power dynamics of the non-operating landowner-renter relationship and conservation decision-making in the midwestern United States." *Journal of Rural Studies* 78(1):107-114.

PR4. **Barnett, Matthew J.**, Douglas Jackson-Smith, Joanna Endter-Wada, and Melissa Haeffner. 2020. "A multilevel analysis of the drivers of household water consumption in a semi-arid region." *Science of The Total Environment* 712(10):136489.

PR3. **Barnett, Matthew J.**, Douglas Jackson-Smith, and Joanna Endter-Wada. 2019. "Implications of nontraditional housing arrangements for urban water management in the United States Intermountain West." *Society & Natural Resources* 32(5):508-529.

PR2. Fergen, Joshua T., Jeffrey B. Jacquet, Bishal Kasu, **Matthew Barnett**, Anne Junod, and Sandeep Kumar. 2018. "Out where the West begins: Measuring land use preferences and environmental attitudes across the Great Plains transition zone." *Great Plains Research* 28(2):155-172.

PR1. **Barnett, Matthew J.**, Douglas Jackson-Smith, and Melissa Haeffner. 2018. "Influence of recreational activity on water quality perceptions and concerns in Utah: A replicated analysis." *Journal of Outdoor Recreation and Tourism* 22(1):26-36.

### Editor-Reviewed Publications

ER1. Petrzelka, Peggy, **Matthew J. Barnett**, Gabrielle Roesch-McNally, and Jennifer Filipiak. 2021. "Advancing understanding of conservation practices on rented land." *Journal of Soil and Water Conservation* 76(2):35A-40A.

### Manuscripts Under Review

R1. Ulrich-Schad, Jessica, **Matthew J. Barnett**, and Erika-Danielle Lindstrom. "New urbanism in a rural town: Sense of community and community attachment in a nontraditional rural context." Currently under review at *Journal of Rural Social Sciences*.

**Manuscripts in Preparation**

M4. **Barnett, Matthew J.** "Applying TribalCrit to highlight Indigenous residents' uranium-related views and experiences in *Diné Bikéyah*"

M3. **Barnett, Matthew J.** "Applying the spectrum of community responses to environmental injustice: ambivalence, quiescence, and uranium production in Blanding, Utah."

M2. **Barnett, Matthew J.** "'You've already made the deal with the devil': Evaluating residents' views about uranium revitalization in the Grants Mining District of Northwestern New Mexico"

M1. Jackson-Smith, Douglas, Peggy Petrzelka, **Matthew J. Barnett**, Jennifer Filipiak, and Gabrielle Roesch-McNally. "The importance of social ties to conservation behaviors among non-operator landowners."

**Non-Refereed Reports**

NR13. Ulrich-Schad, Jessica, and **Mathew J. Barnett**. 2022. "Population growth is related to natural hazard exposure in the rural Western U.S." Brief # 2022-7. Rural Population Research Network.

NR12. Petrzelka, Peggy, Jennifer Filipiak, Gabrielle Roesch-McNally, and **Matthew J. Barnett**. 2020. "Understanding and activating non-operator landowners: Non-operator landowner survey multi-state report." American Farmland Trust.

NR11. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Indiana results." American Farmland Trust.

NR10. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: North Carolina results." American Farmland Trust.

NR9. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Texas results." American Farmland Trust.

NR8. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Ohio results." American Farmland Trust.

NR7. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Iowa results." American Farmland Trust.

NR6. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Illinois results." American Farmland Trust.

NR5. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: California results." American Farmland Trust.

NR4. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Arkansas results." American Farmland Trust.

NR3. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Washington results." American Farmland Trust.

NR2. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: Kansas results." American Farmland Trust.

NR1. Petrzelka, Peggy, and **Matthew J. Barnett**. 2019. "Non-operator landowner survey: New York results." American Farmland Trust.

## CONFERENCE PRESENTATIONS

### Oral Presentations as Lead Author and Presenter

O6. **Barnett, Matthew J.** "Have your yellowcake and eat it too: Evaluating views about uranium production in Blanding, Utah." 2022 Virtual International Association for Society and Natural Resources (IASNR) Conference. October 6, 2022.

O5. **Barnett, Matthew J.**, and Courtney Flint. "Exploring the multi-dimensionality of well-being in Utah communities using an agglomerative clustering approach." International Symposium on Society and Resource Management (ISSRM). Oshkosh, Wisconsin. June 6, 2019.

O4. **Barnett, Matthew J.**, and Douglas Jackson-Smith. "Structure, agency, and detached single-family household water use: Social, built, and natural determinates in a multilevel context." International Symposium on Society and Resource Management (ISSRM). Snowbird, Utah. June 20, 2018.

O3. **Barnett, Matthew J.**, and Douglas Jackson-Smith. "Assessing water use attitudes and behaviors among renters and multi-unit housing dwellers." Rural Sociological Society Annual Meeting. Columbus, Ohio. July 30, 2017.

O2. **Barnett, Matthew J.**, Douglas Jackson-Smith, and Melissa Haeffner. "Water-based recreation and environmental concern among Utahns". International Symposium on Society and Resource Management (ISSRM). Houghton, Michigan. June 25, 2016.

O1. **Barnett, Matthew J.**, Douglas Jackson-Smith, and Melissa Haeffner. "Water-based recreation and water quality perception and concern among Utahns." Utah State University Spring Runoff Conference. Logan, Utah. April 5, 2016.

**Co-Authored Oral Presentations**

CO2. Jackson-Smith, Douglas, Peggy Petrzelka, **Matthew J. Barnett**, Jennifer Filipiak, and Gabrielle Roesch-McNally. "Got ties? Unpacking land tenure and conservation" International Symposium on Society and Resource Management (ISSRM) Virtual Conference. July 17, 2020.

CO1. Fergen, Joshua T., Jeffrey B. Jacquet, and **Matthew J. Barnett**. "Across the Northern Plains: Comparing environmental attitudes, values, and practices of ag producers." Rural Sociological Society Annual Meeting. Columbus, Ohio. July 28, 2017.

**Poster Presentations**

P4. Becerra, Marisol, **Matthew J. Barnett**, and Kerry Ard. "Nuclear colonialism: A political ecology of uranium mining on Navajo lands." Energy Impacts Symposium. Columbus, Ohio. July 26, 2017.

P3. Fergen, Joshua T., Jeffrey B. Jacquet, and **Matthew J. Barnett.** "Across the Northern Prairie: Looking at environmental attitudes and supplemental land use patterns across the Northern Plains." Energy Impacts Symposium. Columbus, Ohio. July 26, 2017.

P2. **Barnett, Matthew J.**, Douglas Jackson-Smith, and Melissa Haeffner. "Links between water-based recreation and environmental concern among Utahns." Research on Capitol Hill. Salt Lake City, Utah. January 26, 2016.

P1. **Barnett, Matthew J.**, Douglas Jackson-Smith, and Melissa Haeffner. "Does water-based outdoor recreation have an impact on the environmental perceptions and concerns of Utahns?" Utah Conference on Undergraduate Research. Salt Lake City, Utah. February 19, 2016.

## TEACHING EXPERIENCE

**Instructor of Record**

- Social Statistics (Online via Canvas), Utah State University, Spring 2021, Fall 2021.

### Teaching Assistant

- Rural Sociology, Utah State University, Spring 2019.
- Social Problems, Utah State University, Spring 2019.
- Criminology, Utah State University, Fall 2018.
- Religion and Environmental Values in America, The Ohio State University, Spring 2017.
- Introduction to Rural Sociology, The Ohio State University, Fall 2016. Introduction to Sociology, Utah State University, Fall 2015, Spring 2016, Fall 2018, Spring 2019.

## RESEARCH EXPERIENCE

### Data Collection

- Survey implementation (mail, online, face-to-face iPad surveys).
- Gathered and processed secondary data (US Census, ACS, EPA).
- Conducted, transcribed, and coded semi-structured interviews.

### Data Analysis

- Software: SPSS, STATA, R, NVIVO, ArcGIS (developing proficiency).
- Methods: hierarchical clustering, generalized linear models, categorical data analysis, multilevel models, demographic techniques, event history analysis.

## SERVICE

### Service to Professional Organizations

- Graduate Student Representative, Rural Sociological Society Diversity Committee, 2018–2021.
- Graduate Student Representative, Rural Sociological Society Development Committee, 2017–2018.

### Departmental Service

- Graduate Student Representative, Search Committee—Assistant/Associate Professor of Environmental/Natural Resource Sociology Position, Department of Sociology and Anthropology, Utah State University, 2022.
- Treasurer, Sociology Graduate Student Association, Department of Sociology, Social Work, and Anthropology, Utah State University, 2020–2021.

**Ad Hoc Peer Reviewer**

- *Rural Sociology*, 2021.
- *Environmental Science & Technology Letters*, 2021.
- *Society & Natural Resources*, 2020.
- *Science of the Total Environment*, 2020.
- *Urban Studies*, 2018.
- *Journal of Outdoor Recreation and Tourism*, 2018.

## AWARDS AND HONORS

- Doctoral Student Researcher of the Year, College of Humanities and Social Sciences, Utah State University, 2023.
- Doctoral Student Researcher of the Year, Department of Sociology and Anthropology, Utah State University, 2023.
- Nazih al-Rashid Fellowship, Utah State University, 2021.
- Leslie Hewes Award for best social science paper, "Out where the West begins: Measuring land use preferences and environmental attitudes across the Great Plains transition zone," *Great Plains Research*, 2018.
- Honors in University Studies with Departmental Honors, Department of Sociology, Social Work, and Anthropology, Utah State University, 2016.
- Undergraduate Research Scholar, Utah State University, 2016.
- Cal Black Memorial Endowment, Utah State University Blanding, 2013.

## GRANTS AND RESEARCH FUNDING

- Mountain West Center Graduate Student Research Grant, Utah State University ($1,000), 2021.
- Graduate Research and Creative Opportunity (GRCO) Grant, Utah State University ($1,000), 2021.
- Charles Redd Center for Western Studies Research Award for Off-Campus Upper Division and Graduate Students, Brigham Young University ($1,000), 2021.

## PROFESSIONAL ORGANIZATIONS

- International Association for Society and Natural Resources.
- Rural Sociological Society.