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SONIA ALEXANDRINE PORELLE GRANT

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For Daniel, Kendra, Mario, and Samuel

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Acronyms

AIRR	American Indian Records Repository
APCG	All Pueblo Council of Governors
APD	Application for Permit to Drill
APE	Area of Potential Effect
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CAA	Clean Air Act
CBM	Coal bed methane
CCGG	Carbon Cycle Greenhouse Gases
CCNHP	Chaco Culture National Historical Park
CISD	Cuba Independent School District
CO_2	Carbon dioxide
Diné CARE	Diné Citizens Against Ruining our Environment
DOI	Department of the Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMNRD	New Mexico Energy, Minerals, and Natural Resources Department
ENLC	Eastern Navajo Land Commission
EPA	United States Environmental Protection Agency
FFO	Farmington Field Office
FHWA	Federal Highway Administration
FIMO	Federal Indian Minerals Office

FLPMA	Federal Land Policy Management Act
GCC	Greater Chaco Coalition
ICC	Indian Claims Commission
ICCA	Indian Claims Commission Act
ILCA	Indian Land Consolidation Act
IIM	Individual Indian Money (Account)
IRR	Indian Reservation Roads
LANL	Los Alamos National Laboratory
MAP	Methane Advisory Panel (New Mexico)
MLP	Master Leasing Plan
NAS	National Academies of Sciences
NDOT	Navajo Department of Transportation
NELI	Navajo Exchange Legislative Initiative
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMED	New Mexico Environment Department
NMSLO	New Mexico State Land Office
NNEPA	Navajo Nation Environmental Protection Agency
NNHPD	Navajo Nation Historic Preservation Department
NNHRC	Navajo Nation Human Rights Commission
NOAA	National Oceanic Atmospheric Administration
OCC	New Mexico Oil Conservation Commission
OCD	New Mexico Oil Conservation Division

RFD	Reasonably Foreseeable Development
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
RPFO	Rio Puerco Field Office
ROW	Right-of-way
SJCA	San Juan Citizens Alliance
SLO	New Mexico State Land Office
SRHA	Stock-Raising Homestead Act of 1916
TTP	Tribal Transportation Program
VOC	Volatile Organic Compound
WELC	Western Environmental Law Center

INTRODUCTION

Hotspot

A hotspot. A billowing concentration, an iterative process of emission, aggregation, and dispersal. An atmospheric anomaly.

The cloud of methane was there long before it was detected in 2014, hovering above the Four Corners region of the United States and radiating strongest in the air enveloping northwestern New Mexico. There it loomed over Dinétah, the place of emergence of Diné (Navajo) people. It stretched over the eastern edges of the Navajo Reservation, above a place that is known regionally as "the checkerboard" for its patchwork pattern of land ownership and jurisdiction. It hung over the city of Farmington, today a border town of the reservation, a place known by Diné people as Totah, where the three rivers of the San Juan, the Animas, the La Plata meet.[1] The cloud also floated above Chaco Canyon, where a national park currently protects a place of great cultural and spiritual importance for Diné people and the ancestral home of the Pueblo Nations. Here, some twelve hundred years ago, the ancestors of Pueblo and Diné peoples hosted kin from far and wide. They exchanged goods and knowledge, held ceremonies, and built

[1] Jennifer Nez Denetdale (2016) describes border towns on the Navajo Nation as mostly white settler towns on the edges of the federally recognized borders of the reservation that are largely economically dependent on spending by Diné people who travel in from the reservation, where there is very little infrastructure or shops for Diné citizens to procure essential items. Border towns are notoriously racist towards Indigenous peoples, and in New Mexico there is a long history of racist violence perpetuated against Diné people in cities like Gallup and Farmington. Denetdale writes: "Historically, border towns are established to take advantage of non-Indian settlers who have appropriated aboriginal Indigenous lands through various means, including abrogation of treaties, outright theft by forcibly displacing Native peoples, and setting up trading posts and other businesses to profit off the Indian trade" (2016: 114). On the meaning of and stories about Totah, see Redhouse (2018).

impressive great houses, kivas, and roads that remain etched on the high desert landscape today - at least for those who know how to look.[2]

Although some of the cloud's phantom traces had been present for decades - like the odors of volatile organic compounds released into the air when industrial sources emit methane, or the smoggy haze that forms when these compounds react chemically with sunlight and nitrogen oxide in the atmosphere - no one had seen the cloud as such. Its highly mediated visualization was made possible by advanced techniques of infrared spectroscopy. The cloud's signal was picked up by a spectrometer aboard a European satellite, an impressive school-bus sized hunk of metal that orbited the planet 102 times per day from nearly 500 miles above. The satellite enabled the recovery of data about trace gases in the atmosphere from 2003-2009. The cloud had been there since at least then.[3]

To verify that what the spaceborne spectrometer had glimpsed during its speedy rotations corresponded to actual present circumstances on Earth, the scientists conducted extensive ground-based measurements in the region. They then ran their verified data through a weather and chemical transport model that accounted for known conditions like wind and topography. In this process they found that the actual rate of methane emissions in the region must far exceed

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[2] In this dissertation, I do not write in detail about stories or archaeologies of Chaco Canyon. Others have done so extensively since the nineteenth century. More recently, studies have been authored by or in collaboration with Indigenous peoples (see Reed 2020; Stein et al. 2007; Van Dyke et al. 2016). I also purposely do not address disagreements within the literature and popular discourse about the historical accuracy of Diné claims of ancestral ties to Chaco. My approach has been to take at face value the stories that Indigenous peoples tell about their own histories – in this case, my Diné colleagues who are from the Greater Chaco region, as well as the official position of the Navajo Nation Historic Preservation Department. Rather than focus on areas of potential disagreement between Pueblo governments and the Navajo Nation regarding claims to Chaco, this dissertation looks primarily to an important moment of convergence, where all twenty-one nations came together to stand for the protection of a region that is sacred to them.

It should also be clarified at outset that while I worked alongside Pueblo organizations, individuals, colleagues, and friends during my research, I did not conduct research with any Pueblo Nation nor with the All Pueblo Council of Governors (APCG). Just as I do not attempt to summarize varied Diné perspectives on Chaco, I do not attempt to represent the positions of Pueblo Nations and refer only to official statements released by APCG.

[3] See "Methane Matters" and Chapter 3 for more on the cloud, its significance for the region's air quality, and methods used to detect it.

the estimates of existing national and international greenhouse gas inventories to produce such a concentration. The hotspot represented a deviation between what was expected to be in air, and what was actually there upon closer examination. A shock, if not a surprise.

The scientists published a visual rendering of the cloud along with a journal article describing the achievement of its measurement (see Figure 1). This was one of the first studies to show how space-borne observations could be used to quantify greenhouse gas emissions from particular terrestrial regions (Kort et al 2014). The pixelated map of the United States depicted methane emissions across the country relative to average background conditions. Amidst a sea of dark purples, blues, and greens – cooler colors that indicate lower concentrations of methane - one spot in northwest New Mexico stood out bright, red, hot. Follow-up studies soon confirmed what the first investigation hypothesized: that the cloud's primary sources are methane emissions from the region's extensive oil and gas infrastructures, with two mouth-to-mine coal plants also contributing to the mix (Frankenberg et al 2016; Smith et al 2017).

With its sources distributed across the region's oil and gas field, no single party was responsible for the cloud, and no single regulatory entity had the authority to reign in all of its sources. While the cloud directed attention to the ground, to the extensive industrial infrastructures that have expanded over a long century of extraction in the region, it had to be reckoned with as a *cumulative* effect of this industrial activity.[4] Yet as it drew attention to local extraction, the cloud also forced gazes up and around, to a shared atmospheric medium in which it stood out as the largest methane hotspot in the country. Methane, after all, is a powerful greenhouse gas. It traps up to 86 times more heat than carbon dioxide over a period of 20 years, and at least 28 times more over 100 years (IPCC 2019). The reduction of methane emissions

[4] However, Frankenberg et al. (2016) show that some oil and gas sources emit more than others. In a study of 250 oil and gas sources of methane in the region, the top 10% of emitters account for about half of methane emissions.

from the energy sector is thus widely recognized as one critical action that nation-states should take to lessen anthropogenic contributions to climate change (ibid). The hotspot viscerally implicated New Mexico in this project, drawing the state and its inhabitants into uneven relations with an increasingly recognized planetary threat.

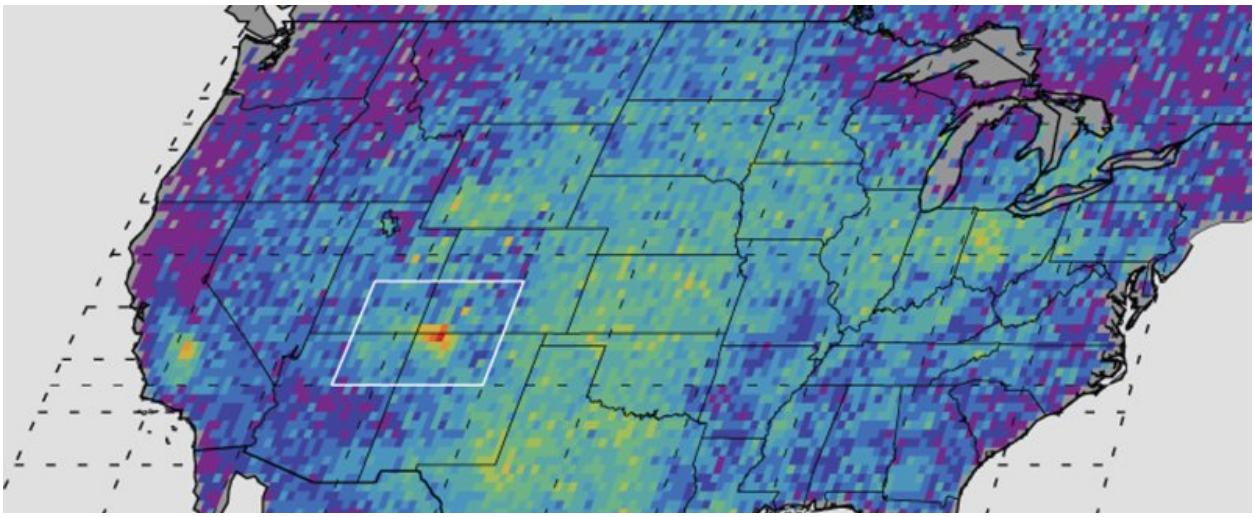

Figure 1 – The Four Corners methane anomaly. Kort et al. (2014). Image credit: NASA/JPL-Caltech/University of Michigan.

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This dissertation offers an ethnographic account of a managerial ecology in which the cumulative effects of extraction in northwestern New Mexico, like the methane cloud, tend to go unanticipated and unaddressed by the very institutions that exist to manage them. It is a study of lived instabilities immanent to structures of authority and responsibility that enable late liberal governance in the American settler colony.[5] "Patchwork" is the concept I use to name the

[5] By late liberal, I mean a mode of governance and a "terrain of social maneuver" in which the liberal state belatedly recognizes and incorporates social difference as cultural difference through a politics of recognition (Povinelli 2011: 28). Povinelli suggests that late liberal governance emerges when liberalism faces the crises of legitimacy spurred by the rise of new social movements, including anticolonial and Islamic movements (25). Late liberalism arises to manage social difference without breaking with core tenets of liberal justice (26). As Savannah Shange (2019)

jurisdictional imaginary that holds together the extractive regime of oil and gas that I track throughout the dissertation. Patchwork is a set of spatial, affective, and epistemic practices, grounded in settler ways of knowing and relating with land, through which settler authority reproduces itself.

The checkerboard that crisscrosses Dinétah is a particularly lively site to observe patchwork at work. Here, the chaotic multiplicity of settler jurisdiction is palpable, as legal title and responsibility for land and its inhabitants changes not only mile by mile, but also across the Earth's surface, subsurface, atmosphere, and across all the substances that flow between. Jurisdictional multiplicity is a visceral part of ordinary life for the Diné communities with whom I conducted research, and it poses complex questions of environmental governance for the institutions that attempt to order this fragmented landscape as well as for the watchdog groups that hope to hold governments accountable for their failures to prevent environmental harms.

However, patchwork isn't unique to the checkerboard. It is a jurisdictional imaginary that pervades the American settler colonial present, not only in how it organizes territory through dispossession but also in how it shapes onto-epistemic categories of bureaucratic and social action.[6] Rooted in a settler concept of land in which human relationships with land are conceived as relations of ownership (Bhandar 2018; Curley and Smith 2020; Manning 2015; Moreton-Robinson 2015; Murphy 2020; Tuck and Yang 2012), patchwork instills consequential incommensurabilities in the settler state's sedimented and legally enforced imaginaries of responsibility and kinship.[7]

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argues, late liberalism describes the reorganization of global markets after the collapse of Fordism and Keynesianism, while also containing continuities between the neoliberal era and years of transatlantic slavery and colonial settlement. The same hierarchies of the human that Silvia Wynter (2003) diagnosed as central to the liberal order continue to structure late liberalism.

[6] See Kahn (2017) on the jurisdictional imagination.

[7] Indigenous scholars have long argued that settler juridical practices operationalize concepts of land and relationality that are not relevant or true for Indigenous people. See for example Cook-Lynn 1997; Deloria 2003

When abstracted into intelligible categories of ownership, land becomes an object that can be claimed, in severed pieces, as resource, property, or territory. This is a concept of land that gives way to managerial infrastructures that are necessarily disjointed, disaggregated as they are across multiple jurisdictions. On the one hand, as this dissertation will emphasize, this patchiness is an index of the incompleteness of settlement, of the failure of technologies of Euromerican property-making to blanket over Indigenous continuance and relations with land.[8] On the other, patchwork lets so much – methane, for instance – slip through its cracks in ways that disrupt the very same land relations. This dissertation therefore takes the incoherence with which these managerial infrastructures operate alongside one another not as a flaw, but as a constitutive feature of their design.

Long before land was surveyed and abstracted into property, it was something else. It continues to be. As Indigenous scholars and practitioners insist, land is not a thing at all, but a relation, a shorthand for Earth's dimensions from surface to core; its waters, airs, and nonhuman relations; its ongoing Indigenous presence and practices (see for instance Carroll 2014; Lee 2017; Murphy 2020; Kanngieser and Todd 2020; Rowe & Tuck 2017; Styres et al 2013; Tuck and Yang 2012; Yazzie n.d.; Watts 2013).[9] Tuck and Yang (2012) argue that "the disruption of Indigenous relationships to land represents a profound epistemic, ontological, cosmological

[1973] and 2012; Goeman 2013; Hobart 2019; Styres et al 2013; Tuhiwai Smith 2012; Wildcat 2005. I draw on work by de la Cadena (2015 and 2018), Rancière (2004), and Tsosie (2006) in thinking about the ways in which the law and state institutions mediate debates over an object that is not shared, in this case "land".

[8] The incompleteness of settlement is an important point consistently emphasized by critical Indigenous studies scholars. See for example Dennison 2012; Simpson 2014; Estes 2019.

[9] Here, I do not intend to essentialize or reify Indigenous land relations across peoples, time, or places, but rather draw on a large body of scholarship in which Indigenous scholars echo similar sentiments and imperatives. As Goeman (2013) aptly writes "describing Native relationships to land is riddled with pitfalls and paradoxes, many of which are impossible to avoid given the nature of power and colonialism. I do not take the phrase "relationship to the land" as a given, unchanging part of Native American identities, especially as capitalism and colonization have produced new ways of experiencing time and space" (28).

violence" (5) that is not contained temporally in the arrival of the settler, but is rather "reasserted each day of occupation" (ibid) as land is transformed into a source of settler capital.

Diné concepts of land align with this general understanding put forth by Tuck and Yang (2012), where land is not an object to be owned but rather a living entity that comprises Indigenous peoples' distinct knowledges and lifeways rooted in place. As a Diné Policy Institute study on land reform put it, "Land is not just a place, it defines a people. Land is a critical basis for life, the future of our nation, and is the premise of tribal sovereignty" (DPI: 2017: 4). Diné scholar Lloyd Lee (2017) similarly states that "land is the embodiment of the Diné people's notion of humanity and what it means to live as a human being" (59). This dissertation is enriched by time spent with a group of Diné elders and knowledge keepers who began teaching me about the critical importance of land for Diné people, but I do not attempt to articulate the concepts or teachings they imparted here beyond what is already published. The object of this study is not to name or describe Diné concepts of land. Rather, I focus on the patchwork managerial logics that consistently sideline Diné land analytics in the process of land management, as well as the tactics and strategies that some of my Diné interlocutors employ to keep their jurisdictional claims and land relations alive.

As I learned over the course of my research on the checkerboard, rendering Indigenous jurisdictional claims intelligible to federal and State actors is no small feat. A century and a half of settler colonial administration has carved the landscape into tracts alternately managed by federal, State, tribal, and private entities in a process that attempted, but failed, to erase Diné sovereignty in the region (see Chapter One).[10] Across the checkerboard spans Eastern Navajo Agency, one of five subdivisions of the Navajo Nation government. Eastern Navajo Agency is in

[10] When referring to the State of New Mexico and its jurisdiction, I use "State" with a capital S.

turn divided into 31 Chapters, local units of governance (Rodgers 2004). While the Navajo Nation's territorial jurisdiction extends throughout Eastern Navajo Agency, the Nation does not currently hold title to much of the land in the area, either in fee or as the beneficiary of the federal trusteeship.[11] As I will explore throughout the dissertation, jurisdictional ambiguities across the checkerboard's unsettled terrain create immense challenges for local Diné governance and survival, and for environmental governance. These ambiguities also occasionally afford opportunities for Diné people to take matters into their own hands or to reassert jurisdictional claims in the midst of the confusion that the checkerboard creates.

When I use placenames like "the checkerboard" to refer to this part of Diné Bikeyah,[12] it is not to naturalize or validate the jurisdictional imaginaries that settlement continues to reproduce.[13] Instead, I intend to show how these imaginaries and spatial formations – think "public land" or "federal mineral estate" - draw into proximity different publics and relations, bolstering certain kinds of managerial actions (see Chapter Four). While both the legitimacy and stability of settler sovereignty may be challenged in the register of jurisdiction, settler authority is often hegemonic in its enactments of law and in how it orders Indigenous peoples in space

[11] As defined by Navajo Nation Code 7 N.N.C §254 "The territorial jurisdiction of the Navajo Nation shall extend to Navajo Indian Country, defined as all land within the exterior boundaries of the Navajo Indian Reservation or of the Eastern Navajo Agency, all land within the limits of dependent Navajo Indian communities, all Navajo Indian allotments, all land owned in fee by the Navajo Nation, and all other land held in trust for, owned in fee by, or leased by the United States to the Navajo Nation or any Band of Navajo Indians". As per United States Code 18 U.S.C. §1151, "Indian Country" "means (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same".

[12] Diné Bikeyah is a commonly used Diné term to describe traditional Diné homelands within the six Sacred Mountains. These homelands are much larger than the present-day reservation. Dinétah and Diné Bikeyah are sometimes used interchangeably, while in other instances Dinétah is used to describe a specific place in present-day Eastern Navajo Agency where Diné people came into the world.

[13] Some critical Indigenous studies scholars note how even the governmental units and corresponding reservations or reserves of tribes and First Nations within settler states like the U.S. and Canada reflect colonial values. See for example Alfred (2005) and Barker (2005).

(Pasternak 2017; Simpson 2014).[14] So although in many ways the checkerboard is a work of pure settler fiction in which pieces of land are imagined as sealed off from their relations, this jurisdictional configuration nonetheless has devastating material consequences for Diné people and local ecologies.

This study takes place across a contested "space that is not only the same space" (de la Cadena 2018). It has multiple placenames and meanings that correspond to its overlapping histories of habitation and use. To say that the space of this study is multiple, that its location is, as Palmer puts it, one of "multiply-entangled landscapes that are both non-contiguous and overlapping" (2020: 806), is to insist that claims, concepts, and enactments to and of the space are incommensurable. These partially connected spaces do not only have distinct and contested legal geographies but consist of discrete worlds (de la Cadena 2015; de la Cadena and Blaser 2018; Murphy 2020, Povinelli 2001). In many ways, this dissertation is an account of antagonisms, exchanges, and negotiations between these worlds, across their uneven conditions.

[14] In her comparative history of Indigenous and settler relations in the United States and Australia, Lisa Ford shows that "sovereignty and jurisdiction have always been intertwined, but they have not always been territorial in nature" (2010: 2) Settler polities territorialized sovereignty in the mid-nineteenth century through the legal obliteration of Indigenous customary law, claiming jurisdiction not only over certain people or activities, but also over territorial space (ibid Pasternak 2014).

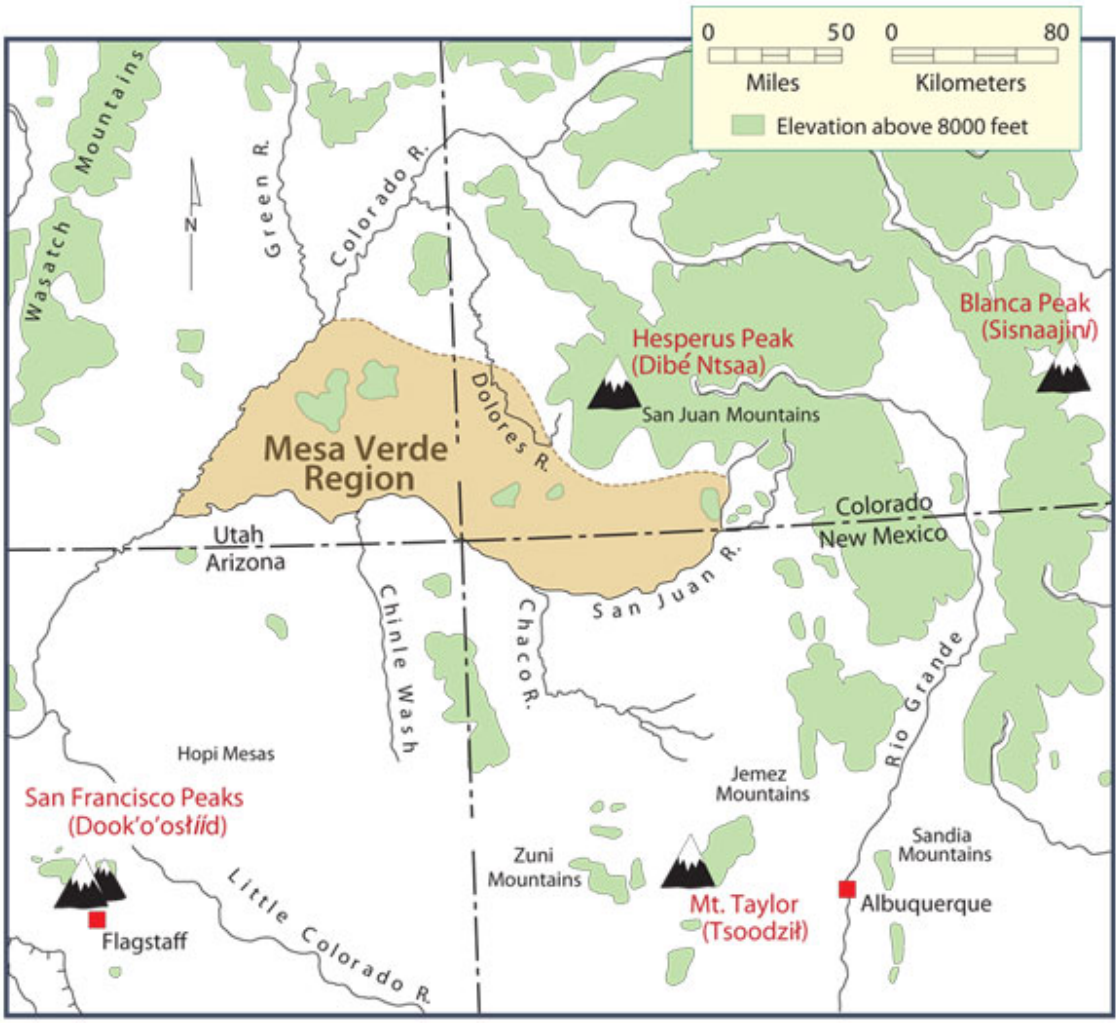

Figure 2: The four sacred mountains of Dinétah, courtesy of Crow Canyon Archeological Center. Dzil Ná'oodilii and Ch'óol'í'í not pictured.

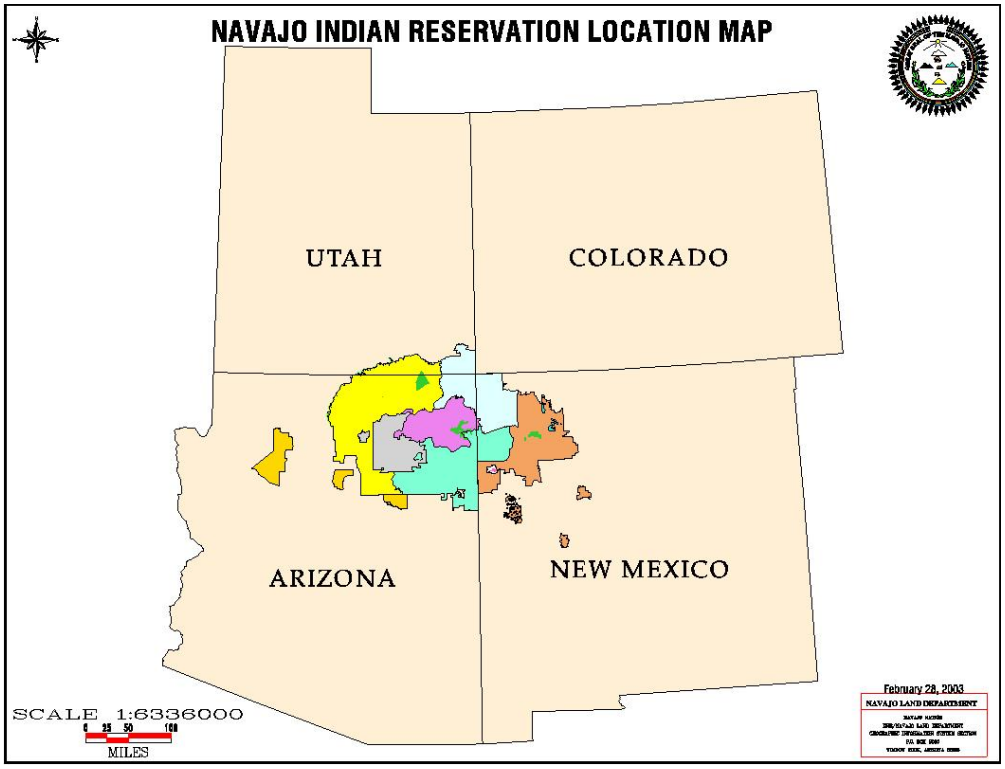

Figure 3 – Map of the Navajo Nation, courtesy of the Navajo Land Department.

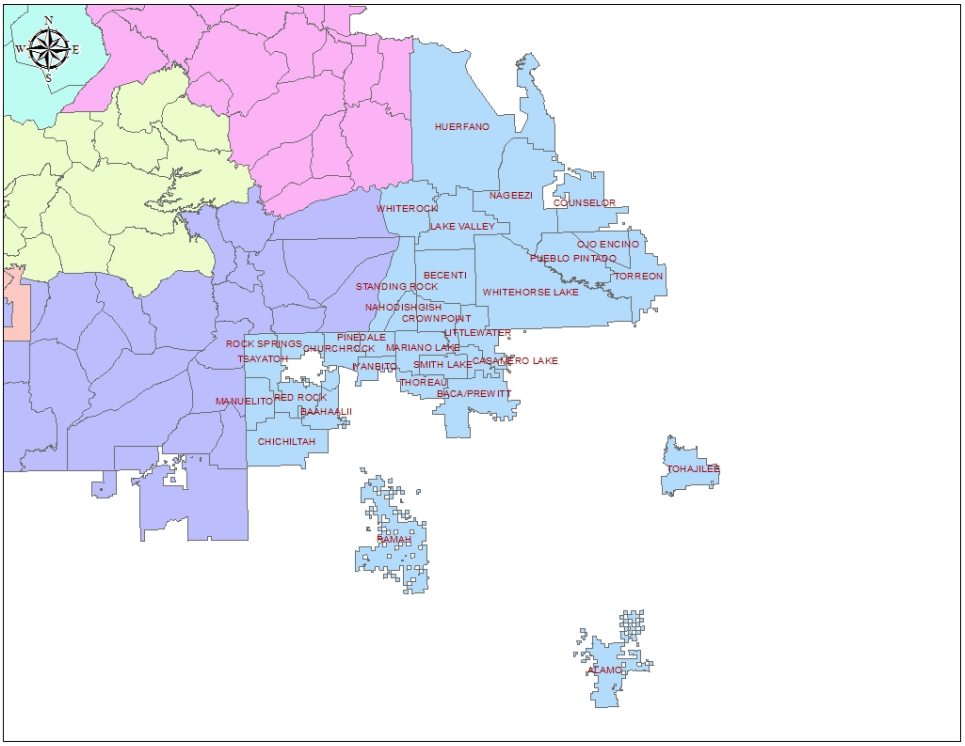

Figure 4 – Map of Eastern Navajo Agency with Chapter Boundaries, courtesy of the Navajo Land Department.

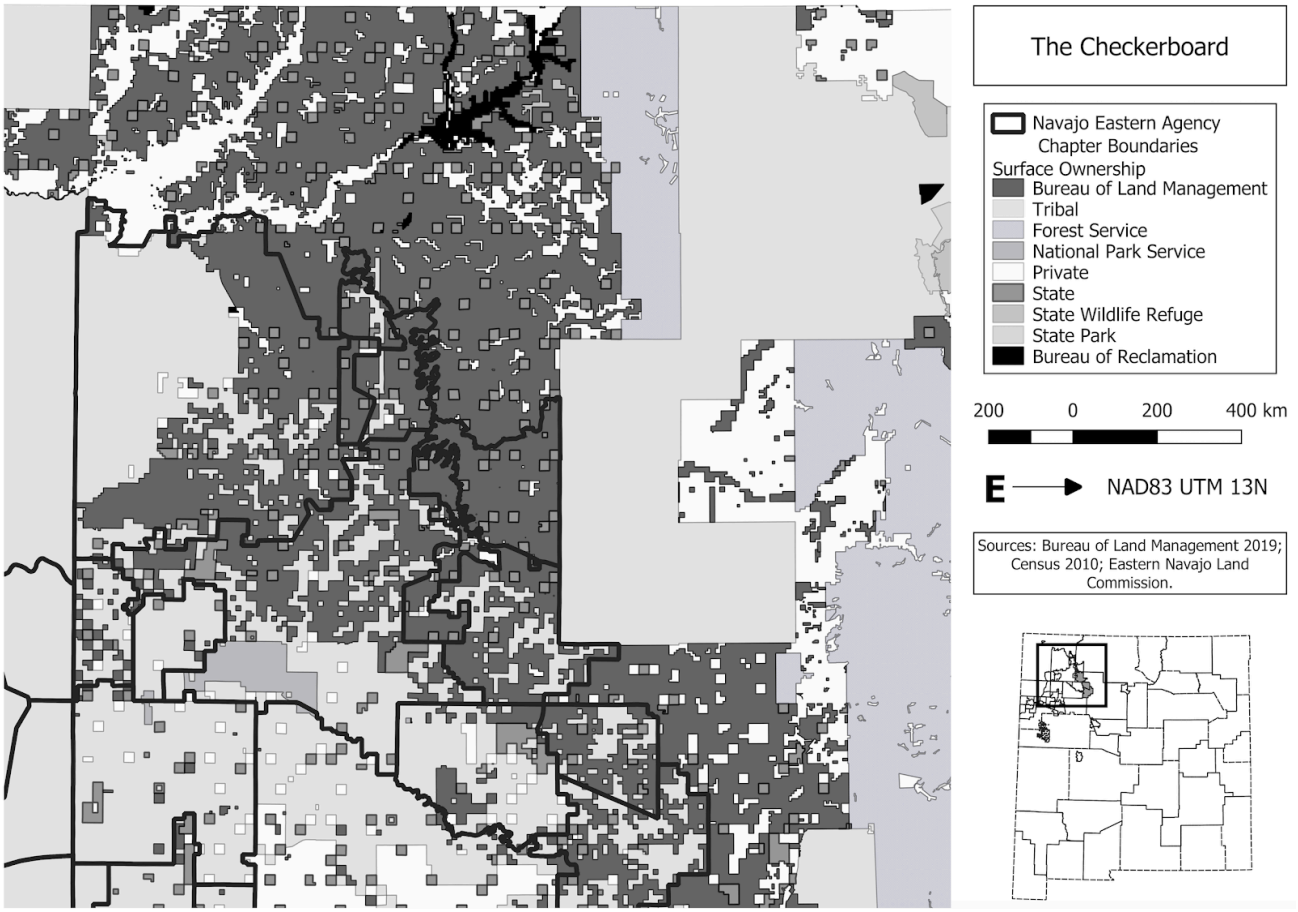

Figure 5 – Map of the checkerboard area, courtesy of Brandon Velivis.

National Energy Sacrifice Zone

> *"The Arab oil embargo, while it lasted, made us keenly aware that in twentieth century America, a fourth essential has been added to the age-old necessities of life. Besides food, clothing, and shelter,* we must have energy. *It is an integral part of the nation's life support system. And we can no longer expect to get it with so little trouble and expense as we did in the recent past."*[15]

With these words, the Ford Foundation opened its 1974 book, *A Time to Choose: America's Energy Future.* The book was the culmination of the Foundation's "Energy Policy

[15] Energy Policy Project of the Ford Foundation. *A Time to Choose: America's Energy Future*. Cambridge, MA: Ballinger Publishing Company, 1974. p.1

Project", a multi-year $4 million study that explored alternatives to national energy policies in the context of anticipated energy shortages. *A Time to Choose* assessed three possible scenarios for domestic energy consumption, choices the country could make: a "Historical Growth Scenario", which examined continued growth in energy consumption by 3.4% annually through the year 2000; a "Technical Fix Scenario", which would see less energy demand through the adoption of energy-saving technologies; and most radically, a "Zero Energy Growth Scenario", in which decreased consumption, an emphasis on the durability of products, and investment in social services would enable the United States to eventually achieve zero growth in energy demand. Across all scenarios, the authors emphasized that arriving at an energy policy for the future was as much a social and political charge as it was a technical one.[16]

Americans had been concerned about energy supply well before the 1973 oil embargo. By the 1960s, the U.S. was becoming increasingly dependent on fossil fuel imports, no longer able to satisfy American demand for energy from domestic sources alone like it had up until the 1950s. With these growing demands for energy, coal mining and processing began moving from the Eastern U.S. to Western and Southwestern parts of the country.

As part of the "Energy Policy Project", the Ford Foundation funded the National Academy of Sciences (NAS) to independently produce a report entitled "Rehabilitation Potential of Western Coal Lands". Foreseeing an increase in demand for surface-mined Western coal, the NAS asked "can man [sic] rehabilitate the land on the basis of existing technology?" (NAS 1974:

[16] Between 1975 and 2000, energy consumption in the United States increased by approximately 37%, representing an average annual growth in consumption of 1.215% that aligned more closely with the Ford Foundation's "Technical Fix Scenario". The authors both recommended and predicted the Technical Fix, anticipating that Historical Growth would not be possible or desirable as oil shortages would drive technological innovation. I thank Becca Grady for help with this math. See U.S. Energy Information Administration, "New Mexico State Energy Profile," February 20, 2020. https://www.eia.gov/state/print.php?sid=NM.

10).[17] The NAS found that the rehabilitation in desert lands like those of Dinétah, where annual precipitation averages just under 10 inches, would not be feasible. Pursuing surface coal mining in these areas, the NAS concluded, would cause such irreparable damage that it would be tantamount to declaring the lands "national sacrifice areas" (85).

In a national sacrifice area, where restoration would not even be attempted, the NAS classified the rehabilitation objective as one of "abandoning the spoils" (86), of leaving extraction's detritus to become part of the land and transform it. The implication of choosing to pursue energy production in locations where rehabilitation is not possible is that domestic energy production is more important to the United States than the people, sovereign nations, and places sacrificed.

By the time the NAS issued these dire warnings, there were already two coal plants and adjacent surface mines in northwestern New Mexico, sitting just 8 miles apart on either side of the San Juan River not far from the Arizona and Utah border. The Four Corners Power Plant and Navajo Mine began operating in 1963, followed by the San Juan Generating Station and San Juan Mine in 1972. These major facilities would power metropolises like Phoenix while many Diné households would continue to go without electricity for decades (Needham 2014; Powell 2018). In this same period, the region was experiencing its third oil and gas boom. With rising gas prices in the 1970s, the San Juan Basin bore witness to a flurry of drilling the likes of which it hadn't seen since the 1950s, when El Paso first built a pipeline to transport gas to California (Dugan 1977).[18] When, decades later, the methane hotspot was discovered, the basin would host

[17] For the purposes of its study, NAS defined rehabilitation to imply that "the land will be returned to a form and productivity in conformity with a prior land use plan including a stable ecological state that does not contribute substantially to environmental deterioration and is consistent with surrounding aesthetic values" (11).
[18] Changes that allowed greater well density also spurred further development in the 1970s and 1990s (Duggan 1977; see also "Double Drilling"). The Crude Oil Windfall Profit Act of 1980, prompted by the 1973 embargo, helped encourage investment in coalbed methane extraction throughout northwestern New Mexico and southwestern Colorado.

over 40,000 active and abandoned oil and gas wells. Meanwhile, in the second half of the twentieth century, mining companies unearthed vast quantities of uranium in Eastern and Northern Navajo Agencies, eventually accounting for over 37% of all uranium mined in the United States from 1948-2001 and leaving behind a toxic legacy that would haunt Diné communities for generations to come (Brugge et al. 2006; Hunter et al 2015; Voyles 2015).

While no formal designation of "national sacrifice area" was ever made in Dinétah, the energy policies and practices of the federal government in the second half of the twentieth century and into the twenty-first have amounted to as much. An ethos of "abandoning the spoils" still pervades, for instance, in the failure of state and federal governments to require sufficient bonding from oil and gas operators. In New Mexico, as in many states, oil and gas industries hold massive liabilities for wells that will, one day, stop producing economically. But bonding and financial assurance requirements sorely underestimate the costs of operating, let alone reclaiming oil and gas wells – especially those from drilled with 21st century fracking techniques. Unless federal and State governments make changes to the management of oil and gas bonding regulations, they may end up shouldering the financial and environmental burdens of industry.[19]

As the cumulative effects of coal, uranium, and oil and gas extraction in the region became increasingly palpable, and as federal decision-makers continued to intensively pursue domestic extraction despite increasing knowledge of its environmental harms, the term "national sacrifice area" began to stick. It became a powerful referent for those who sought to draw attention to the disproportionate impacts of extraction in the region, especially for Diné communities living on, and just east of, the Navajo Reservation (see McLeod 1982).

[19] See Schuwerk and Rogers (2020) and Government Accountability Office, 2018, "Oil and Gas Wells: Bureau of Land Management Needs to Improve Its Data and Oversight of Its Potential Liabilities."

Figure 6 – Sign in Counselor Chapter that reads "Entering Energy Sacrifice Zone". Erected by Counselor residents in 2018. Photo by Sonia Grant (2019).

The term "sacrifice zone" was popularized by the American environmental justice movement of the 1980s and 90s, led by people of color and Indigenous groups and with roots in the American civil rights movement (Allen 2003; Bullard 2005; Gillio-Whitaker 2019; Lerner 2010; Taylor 2014). The environmental justice movement continues to grow its base and expand the scope of its impact. It has developed national and international principles for organizing,[20] and has significantly influenced State and federal policies, such as President Clinton's 1994 Executive Order on Environmental Justice, which directed federal agencies to identify and

[20] Delegates to the First National People of Color Environmental Leadership Summit, 1991, "Principles of Environmental Justice", Washington, D.C.; Southwest Network for Environmental and Economic Justice, 1996, "Jemez Principles for Democratic Organizing", Jemez, New Mexico.; "Bali Principles of Climate Justice", Johannesburg, South Africa, 2002.

mitigate the environmental impacts their actions may have in minority and low-income populations.[21]

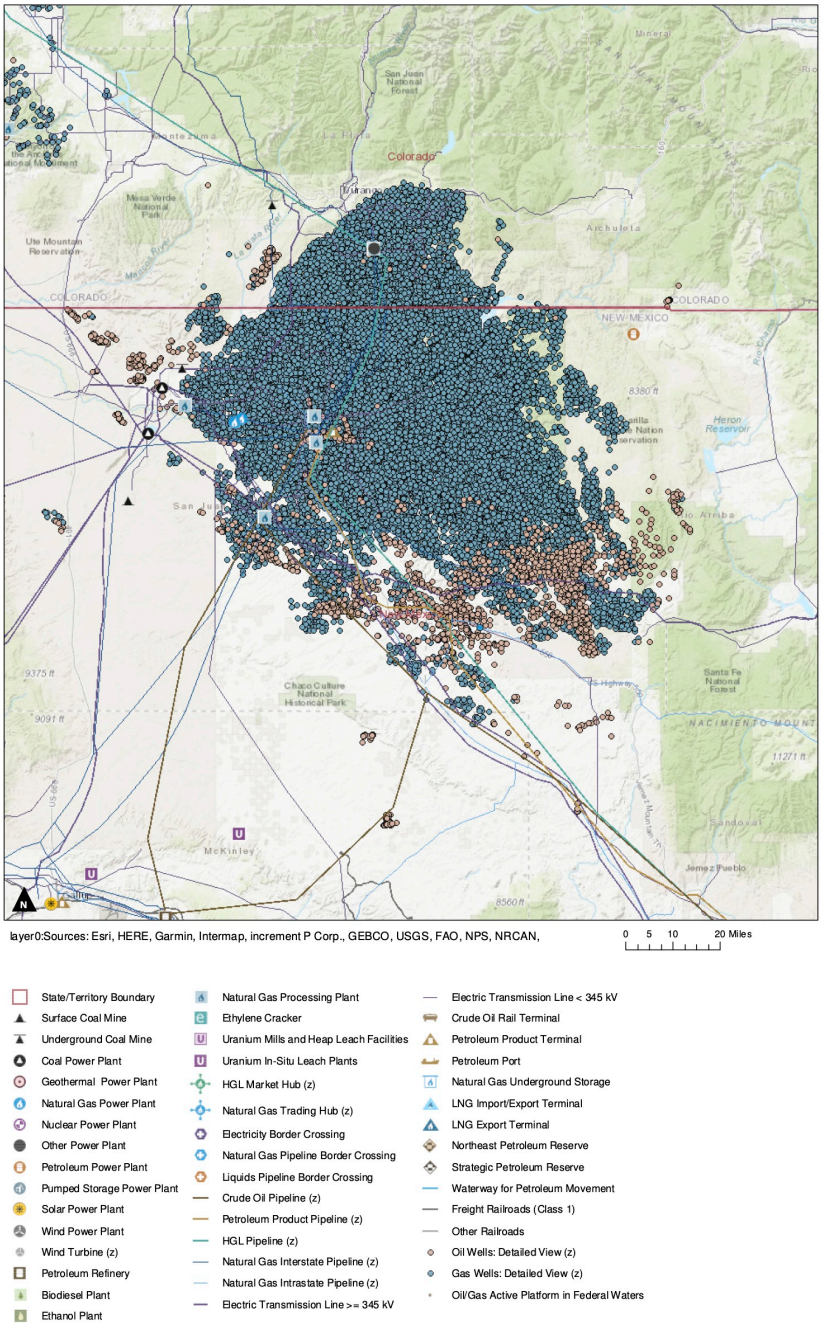

Figure 7 – U.S. Energy Information Administration map of energy infrastructure in northwest New Mexico and southwest Colorado (San Juan Basin)

[21] Executive Order 12898 of February 11, 1994, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", Federal Register 59:32.

Still, despite these gains, sacrifice zones continue to bubble up and persist. Robert Bullard, an important figure of the environmental justice movement, defines sacrifice zones as "the toxic hot spots or corridors where high concentrations of polluting industries are found" (2005:13). These hotspots, he elsewhere specifies, are often "fenceline communities of low-income and people of color… Quite often, this pattern of unequal protection constitutes environmental racism" (Bullard 2011: A266).

A persistent challenge for communities living in the glow of a hotpot has been to meet the burden of legal proof when arguing that the concentration of polluting facilities or the dispersion of downstream/downwind toxins in low-income, Indigenous, or communities of color is no accident but rather constitutes an act of discrimination on the part of the governments who authorize or help fund industrial development. The U.S. Constitution's equal protection clause, or Fourteenth Amendment, provides an avenue to bring this type of claim. However, the clause requires that plaintiffs show not only that the implementation of a particular policy had disproportionate *effects* on certain groups, but crucially that it was discriminatory *in its intent*. Despite volumes of statistical evidence compiled by experts like Bullard to support claims that waste and toxic facilities are disproportionately sited in already marginalized communities, courts have consistently ruled that such evidence fails to meet the standard discriminatory intent (Brougher 2013, Taylor 2014).

When, in the 1990s, it was clear that the equal protection clause would bring few successes for the environmental justice movement, advocates began turning to Title VI of the 1964 Civil Rights Act. People who believe they have been subject to discrimination under a program or activity that receives federal funding (including, for example, the actions of a government agency that permits industrial processes) may file a complaint under Title VI.

However, a series of Supreme Court decisions have all but gutted the statute by requiring that individuals filing under a right of private action prove discriminatory intent in order to establish a violation of Title VI (Cole and Farrell 2006). Here, plaintiffs encountered the same nearly impossible burden of proof as with the equal protection clause. The only avenue for bringing a claim of discriminatory *effect* under Title VI is through an administrative complaint. These complaints generally fall to agencies themselves to resolve and have tended to languish in a bureaucratic backlog (Huang 2012; Taylor 2014).

What sustains the gap between discriminatory intent and effect? Between the foreseeable and the accidental production of a hotspot? How does one prove a claim about the violence of a structure that sets its own parameters of adjudication? Chasms between intent and effect in arenas of environmental governance, I will argue, are enabled, multiplied, and stretched wider by patchwork. Spiraling outwards from a fragmented onto-epistemology of land, patchwork produces systematic confusion about the relationship between what can be known or reasonably anticipated about the effects of managerial action, and the possibility of accountability for these effects. A patchwork jurisdictional imaginary enforces spatial and temporal logics in which the questions posed vis-à-vis the long-term cumulative effects of industrial activity take on a retrospective structure - how to determine responsibility for what can only be apprehended in hindsight? The methane cloud is one such patchwork formation. Even though its conditions of possibility were decades in the making, and even though tacit knowledge of these conditions was visceral on the ground, the hotspot takes on the affective quality of a shock, if not a surprise.

Patchwork

A hotspot does not materialize overnight. It takes time for a concentration to accumulate. Uneven densities, like the extraction in Dinétah and the air pollution that accompanies it, build up over durations in particular spaces. Here, a settler colonial geography of management (Trouillot 2002) has produced the conditions in which both industrialized extraction and its largescale cumulative effects have bloomed, largely unchecked. The harmful effects of this expansion have not gone unnoticed by local populations. But the authorities that citizenries expect will contain the harms produced by the activities they authorize often fail to take notice of a hotspot in the making until it burns fiery red.

This dissertation explores the conditions that make such ignorance possible by tracing the contours of a jurisdictional arrangement that gives way to such uneven concentrations. This arrangement is what I call "patchwork". The term is a play on how people talk loosely about jurisdictional multiplicity in northwestern New Mexico. It calls up how locals describe mapped representations of land ownership in the region, where the checkerboard is often likened to the patchwork on a detailed quilt. But more than a description of how terrain is organized, patchwork conceptualizes an active and lived process. It comprises a suite of jurisdictional practices through which land is imagined and managed as resource and property. As Moreton-Robinson (2015) argues, in settler colonies like the United States, the possessive rationalization of land is grounded in patriarchal logics of whiteness. White possessive logics, Moreton-Robinson writes, are "underpinned by an excessive desire to invest in reproducing and reaffirming the nation-state's ownership, control, and domination" (xii), shoring up a set of meanings about white ownership of the nation as part of the national commonsense.

But there is nothing given or uncontested about patchwork, this jurisdictional imaginary that helps maintain white possession. It is reproduced every day in the spatial, affective, and epistemic practices through which the law performs its own authority (Cormack 2008; Ford 2012; Kahn 2019; Pasternak 2017; Simpson 2014; Richland 2013). Jurisdiction, as Cormack argues, produces "the normative order it expresses" (2008: 9) and becomes itself the grounding authority of the law. Sovereignty, in this light, is contingent on regular practices of boundary-making through which power and authority are distributed (Kahn 2017). While a patchwork imaginary underwrites the spatial reorganization of Dinétah into a checkerboard (see Chapter One), it also breaks up land's relations into distinct categories of administration. Surface, mineral, air, water, vegetable, animal, and cultural inheritance become resources whose management falls under the scope of distinct experts, laws, and institutions.

As a technique of settler governance, part of patchwork's efficacy lies in compelling oppositional responses that are themselves often partial or makeshift in nature (see Chapter Two). That is, the multiplicity of patchwork's managerial infrastructures, divided across land's relations, forces people to engage authorities with respect to a problem in discrete ways, corresponding to the jurisdictional scope and spatial reach of settler institutions rather than to the shape and character of the problem itself. Crucially, then, responding to harm perpetuated by and within patchwork often involves (strategically) adopting the very terms by which patchwork governs (such as "resource" or "property"), even if these terms fail – and devastatingly so – to capture what is at stake for Indigenous peoples in struggles to maintain or protect land relations. As such, an important part of patchwork is the labor – patching, patch*work* – in which actors I followed in my research engage, sometimes in the hopes of making their present conditions more bearable, and sometimes with aspirations towards future-oriented projects through which they

hope to shift the terms of relation and debate. Across the chapters, I highlight moments where my interlocutors decide to expend enormous energy on fights that they know will at best only help keep the most pressing crises at bay. In the context of Mancos shale extraction, these responses often take the form of advocating for regulations that would limit air pollution from drilling operations, protect certain spaces from development, or enforce public health and safety measures. Hard-won victories that achieve some of these goals do not stop or even necessarily reduce extraction, but they soften its blows.

The cloud and the pixelated image of it that alerted the region to methane's disproportionate presence is what first cued me to an indeterminate relationship between knowledge and accountability that I would later come to see as a defining feature of patchwork, but soon I began to notice it everywhere. Patchwork first emerged for me as an ethnographic concept that describes a distinctly settler colonial formation when I encountered it from the perspective of Diné colleagues who engage in ongoing negotiations about extraction with surrounding federal and State jurisdictions. These other governments exercise a totalizing yet fragmented authority over Diné lands and lives but do so in terms that are at best irrelevant to, and at worst at odds with, Diné survival. Patchwork's multiple arrangements of power constitute an exhaustive and exhausting form of rule for Diné people living on the present-day checkerboard, leaving them with little room to maneuver. Slippages occur within arrangement (see Chapter Two and Chapter Three), not because the settler colonial administrative state is inadequately present or centralized, but because patchwork sustains a confusing organization of bureaucratic knowledge in which it is immensely difficult to account for the production of environmental harms as they occur.

At its core, patchwork names a jurisdictional imaginary stitched together around a fungible concept of land. This imaginary upholds a system of settler colonial environmental governance that has profound consequences for land relations. Across this dissertation I track two significant effects of patchwork that became central in the controversy around fracking that I will explore in the chapters that follow. The first is the way in which land's dual fragmentation - into property on the one hand, and into resource categories on the other - produces a form of environmental governance that is itself highly fractured. This is a system of rule in which the cumulative effects of extraction most often go overlooked by the jurisdictions that exist to manage them. The second effect of patchwork that I attend to is how it diffuses throughout settler governance structures an onto-epistemology of land that is incommensurable with Diné analytics. As I will demonstrate in the chapters that follow, a patchwork understanding of land informs not only how settler institutions manage ecologies, but also how they imagine the very concepts of responsibility, reciprocity, and relationality. Reproducing the normative order it claims, patchwork disguises the ongoing dispossession of Indigenous lands as an ordinary process of environmental regulation.[22]

Managing Extraction in the Greater Chaco

The Mancos Shale

I first came to know the Greater Chaco region by the placename given to it by geologists: The San Juan Basin (see figure 8). A geologic depression formed as the Western Interior Seaway began to retreat some 70 million years ago, the basin spans 7,500[2] miles across most of northwest

[22] The structure of this argument is learned from Cormack (2008) and his analysis of jurisdiction as well as from Pasternak (2017).

New Mexico and a small corner of southwestern Colorado. Surrounded by mountains and uplifts on all sides, it is, as a geologist of the basin once put it to me, like a “giant bathtub”. Rich in coal, uranium, oil, and one of the largest natural gas fields in the United States the San Juan Basin has experienced a century of booms and busts that characterize resource-dependent economies ever since oil companies began exploratory drilling on and just east of the Navajo Reservation in the early 1920s.

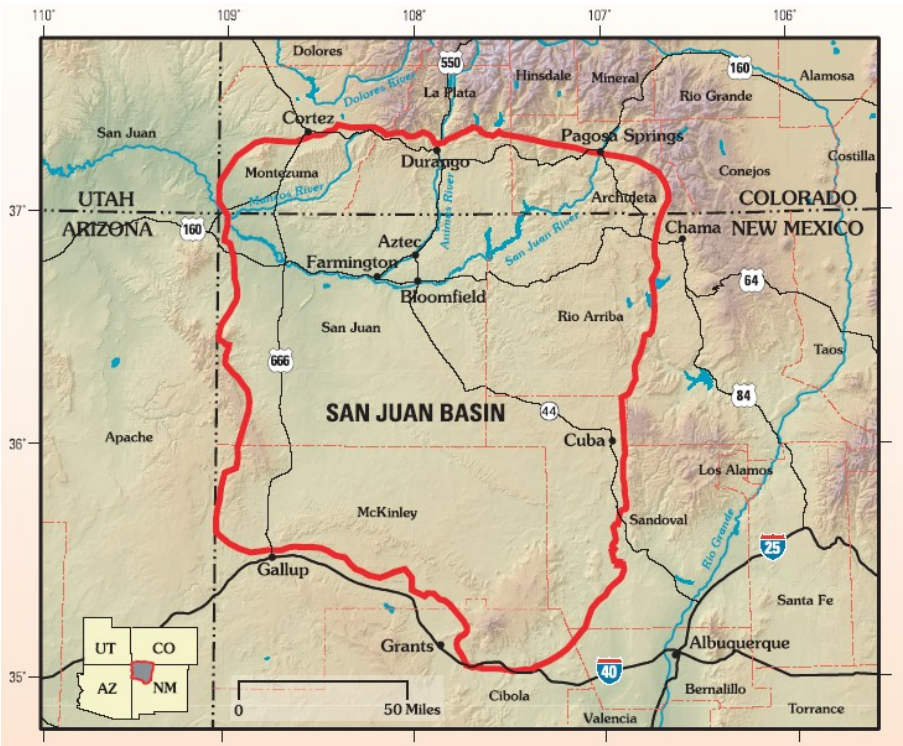

Figure 8 – Contours of the San Juan Basin. Map by the United States Geological Services. Cite. United States Geological Survey, 2002, “Assessment of Undiscovered Oil and Gas Resources of the San Juan Basin Province of New Mexico and Colorado, 2002.” National Assessment of Oil and Gas Fact Sheet, p.1.

Times were flush in the 2000s, with high gas prices spurring a frenzy of drilling. But before long a glut in the market, brought on by a surge of production across the country, caused prices to crash. And as prices crashed, so too did production in the San Juan Basin, where an estimated 5,000 jobs were lost. Unemployment rates skyrocketed in Farmington, the basin’s

largest city (Thompson 2015). Then, for a brief but earth-shattering moment from about 2011-2016, there was cause for optimism, this time in oil. The local oil and gas industry hoped that the Mancos shale, an underground formation some 6,500 feet below the surface (Broadhead 2018), might be the ticket to the next boom (Cowan 2013; Robinson-Avila 2013; Slothower 2011).

While the San Juan Basin was already replete with tens of thousands of oil and gas wells, these had tapped other, more permeable underground formations: layers of sandstone, coal, and limestone. These formations contain hydrocarbons in large quantities, the remnants of organic oceanic matter deposited during the seaway's withdrawal. Unlike the Mancos shale, these hydrocarbons are, in industry speak, "conventional". This means that they can be extracted with the use of conventional vertical drilling techniques that harness the natural pressure of an underground reservoir to pump oil and gas up to the surface. In shale, however, hydrocarbons are tightly held in the rock's minuscule pores. The innovation of 21st century fracking is to horizontally drill through the rock and open up its pores by injecting large volumes of water, sand, and chemicals sent through the drill bore at high pressures.[23] With fracking - a technique that was by then then rapidly spreading across the country in places like Pennsylvania and North Dakota - the San Juan Basin's Mancos shale, a previously untapped geological reservoir, was accessible for the first time. A new resource was made.

The Mancos shale attracted the most investment in the southern San Juan Basin, a historically less densely drilled area where the shale formation happens to be richest in oil. Significantly, this pocket of hydrocarbon potential surrounds Chaco Culture National Historical Park (CCNHP) and traverses, underground, through the three Navajo Nation Chapters where I conducted my research – Counselor, Ojo Encino, and Torreon, as well as through several nearby

[23] For more on the technique of hydraulic fracturing, see Wylie (2018).

Diné communities, including the Chapters of Nageezi, Huerfano, Pueblo Pintado, White Rock, and Lake Valley.[24] Within a short period between 2014-2016, this quiet, rural area was heavily industrialized. It became a hotspot of its own.

Deferred Management

When I first began this research in 2014, it was with an interest towards understanding how the San Juan Basin's multiple jurisdictions would grapple with the introduction of a novel extractive technology. At the time, the local Bureau of Land Management (BLM) Farmington Field Office (FFO), which manages a large portion of land and a majority of oil and gas extraction in the basin, had just announced that it would undergo a new planning process to amend its major land-use plan in order to account for unprecedented interest in the Mancos shale.[25] Its last Resource Management Plan (RMP) had been completed in 2003. Then, geologists had predicted that fracking was unlikely to become an economically viable or technologically feasible means of extracting hydrocarbons in the San Juan Basin within the next twenty years (Engler et al. 2011). This conclusion led BLM to vastly underestimate the near-term cumulative potential for oil and gas development on federally managed lands.

[24] Mancos shale development has been concentrated in Nageezi, Huerfano, Counselor, Ojo Encino, and has begun moving into Torreon and Pueblo Pintado.
[25] Federal Register, Vol.79, No. 37, Tuesday, February 25, 2014.

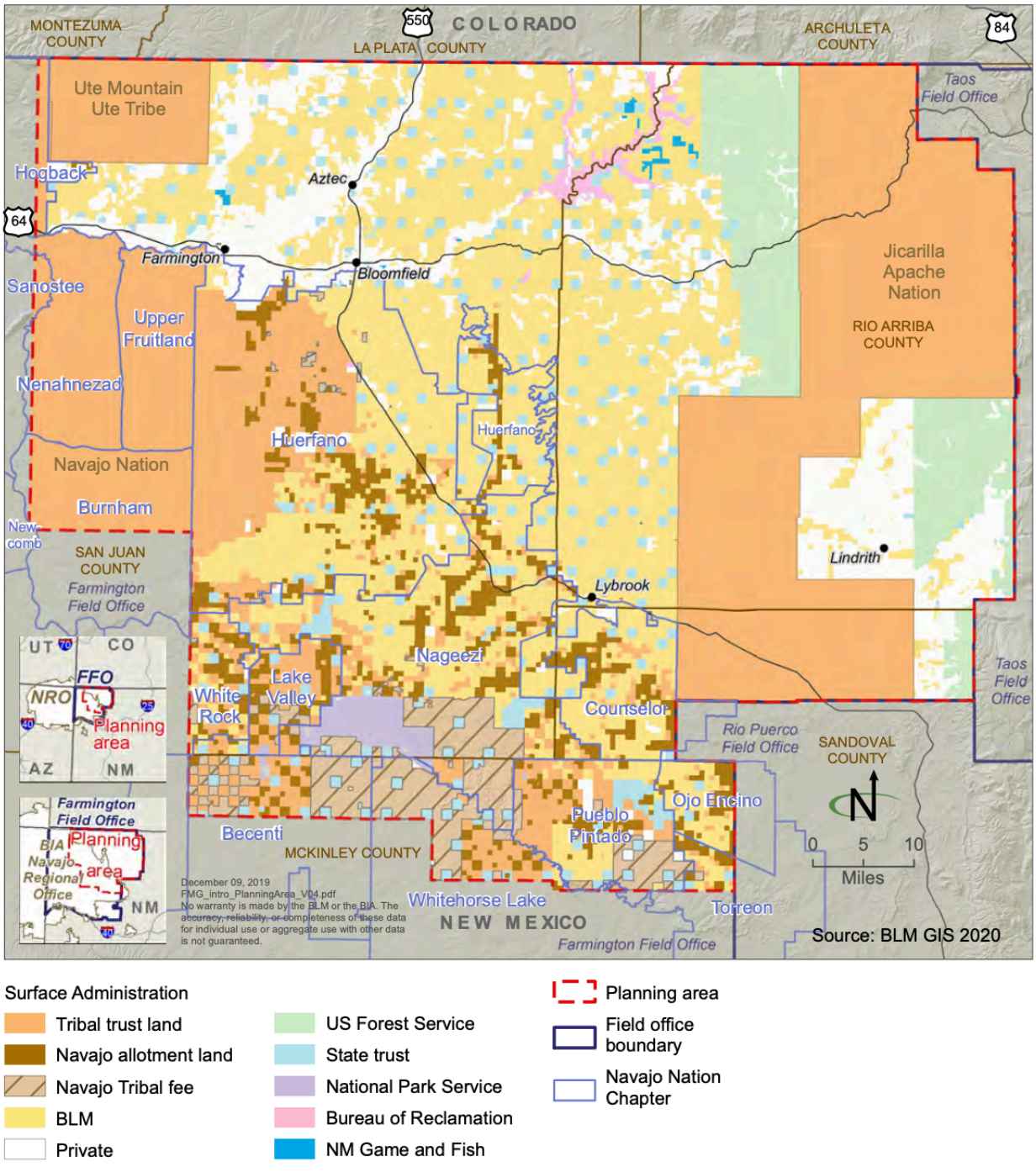

Figure 9 – BLM Farmington Field Office Administrative Boundary, Color-Coded for Surface Administration. "Farmington Mancos-Gallup Draft Resource Management Plan Amendment and Environmental Impact Statement: Volume 2." 2020. Department of the Interior, p. A-1.

An RMP is a complex document with generational effects. Although there is no legally mandated expiration for an RMP, it is agency practice to update these documents every 20 years or so and to use them as guides in all management actions in the interim. It was significant, then, that the 2003 RMP appeared to be losing relevance less than a decade in. The first horizontal hydraulically fractured and horizontally drilled well was completed in the San Juan Basin in 2010.[26] When, in 2014, BLM announced it would amend its RMP to account for Mancos shale development, it had already approved hundreds of drilling permits for fracked wells whose potential cumulative consequences the agency had not analyzed.

The Resource Management Plan *Amendment* (RMPA) - the formal term for the process that BLM launched in 2014 to update the RMP - was perpetually deferred.[27] I, along with the Diné communities and environmental advocates with whom I conducted research, waited and waited for a document to materialize on BLM's website. It did not.

In 2016, the Department of the Interior (DOI) announced that the Bureau of Indian Affairs (BIA) would join BLM as a co-leading agency in the RMPA process to include an analysis of shale development on tribal trust and allotted lands. This marked the first time in the country's history that BIA and BLM would formally collaborate on such a substantial planning process.[28] To inform the RMPA, both agencies conducted a series of public hearings and solicited written public comments in early 2016 and 2017. Nearly 1,700 individuals and groups

[26] Bureau of Land Management, 2003, "Farmington Resource Management Plan with Record of Decision." Farmington, New Mexico: United States Department of the Interior Bureau of Land Management Farmington Field Office.
[27] A Resource Management Plan Amendment (RMPA) is not a new RMP. It does not consider the breadth of management issues across a field office boundary, but instead analyzes series of questions about the management of a specific resource – in this case, the Mancos shale.
[28] Department of the Interior, "Interior Department Announces Broader Plan to Review Management of Lands in Northwestern New Mexico," October 20, 2016, https://www.doi.gov/pressreleases/interior-department-announces-broader-plan-review-management-lands-northwestern-new.

provided unique spoken or written comments, while over 15,000 people submitted form letters or signed petitions. Overwhelmingly, those who participated in this process expressed concerns about or completely opposed additional extraction in the region.[29]

Years passed, but no draft RMPA and accompanying Environmental Impact Statement were released. It was not until 2020 that BLM and BIA would publish a first draft document for public review. By then, conditions in the San Juan Basin had changed dramatically. On the one hand, the region appeared to be heading towards another bust. Not only had the region's two coal plants announced that they would shutter within the next decade, but the economic viability of exploiting the Mancos shale was no longer as alluring as it had been just a few years prior. Drillers were exiting the San Juan Basin, and fast. Major players, like British Petroleum and ConocoPhillips, sold their assets to smaller operators and headed south to the next rush in the State's booming Permian Basin. On the other hand, the fracking that had been authorized so far had already affected transformative and perhaps irreversible changes to local ecologies and cultural sites. It altered local kinship and community relations, politics, and economies. It birthed new local leaders and outspoken advocates within rural Chapters. It activated alliances between Diné and Pueblo citizens and governments towards the protection of sacred places, and between Indigenous groups and environmentalists. But I am getting ahead of myself.

As BLM and BIA continued to allow unanalyzed shale extraction to spread across the landscape, a movement opposed to fracking in the region was growing. Fractal in nature, different parts of the movement had different goals that overlapped at times and diverged at others. The insistence upon meaningful tribal consultation, the prevention of further deterioration

[29] Bureau of Land Management Farmington Field Office and Bureau of Indian Affairs Navajo Regional Office, 2017, "Farmington Mancos-Gallup Resource Management Plan Amendment and Environmental Impact Statement Scoping Repoert Volume I and II." Department of the Interior.

to local air quality and public health, and the reduction of greenhouse gas emissions meant that the goals of Pueblo, Diné, and environmental groups converged around the reduced expansion, if not the outright stoppage, of fracking in proximity to Chaco Culture National Historical Park. With this shared goal, a strategic naming practice became a gathering point.

All parts of the movement began calling the region they sought to protect by a new name: the "Greater Chaco". While the San Juan Basin invokes the region's hydrocarbon stores, and the Four Corners affirms colonial State boundaries, the Greater Chaco conjures the region's central place in past and present ceremony, pilgrimage, and ancestral connections for Indigenous peoples.[30] As a placename, Greater Chaco also asserts a second fact: while Chaco Culture National Historical Park, protected from extraction by its national park status, sits in the center of this region, the vast landscape that surrounds the park boundaries remains critically important to Indigenous peoples.

I was not there, but I have heard the scene recounted so many times I can almost picture it – a pivotal moment in the formation of the Greater Chaco Coalition. It happened during a community gathering at Counselor Chapter House sometime in 2015. Inside the large main room of the Chapter House, residents of the area and board members of Diné Citizens Against Ruining our Environment (CARE), an established Diné-led environmental organization working across Diné Bikeyah, gather for food and conversation. Attendees are having an open-ended discussion about the new drilling activity in the community. Counselor and nearby Chapters are being inundated by workers from outside the area with their big trucks and heavy equipment. The dirt roads, already in rough shape, can't take it. The new infrastructure is an eyesore, and the air is starting to smell bad. People are concerned, but this is not an easy subject: some families in the

[30] "Greater Chaco Region", "Greater Chaco Landscape", or simply "Greater Chaco" are interchangeably used regionally. In this dissertation I use Greater Chaco.

community stand to profit significantly if they own shares in an allotment that they choose to lease, while others may not have the opportunity or may not want to see the land used in this way. Residents are positioned unevenly vis-à-vis one another depending on how the colonial engineering of the checkerboard has shaped their families' inheritances. Some attendees listen quietly, perhaps nodding along or staring into space. Others deliver long monologues or simply signal their agreement with the occasional "ao'!".

By the end of this meeting, three people who will feature prominently in this dissertation are appointed by their community to organize not only within their Chapters but, significantly, to seek help from outsiders. This is how Daniel Tso, Samuel Sage, and Mario Atencio came to represent their communities in reaching out to mostly (and historically) white environmental organizations like San Juan Citizens Alliance, Sierra Club, Western Environmental Law Center (WELC), and WildEarth Guardians, to collaborate in holding federal agencies accountable for management of the Mancos shale. Led by plaintiffs Diné CARE, these groups soon filed suit against BLM FFO for its continued approval of Mancos shale drilling permits prior to the completion of the RMPA.[31] They sought a preliminary injunction against BLM, enjoining the agency from approving further drilling permits until its planning process was complete. Losing in district court and again on appeal in the 10th Circuit, the plaintiffs kept appealing (see Chapter 3 for a discussion of how this case unfolded). Meanwhile, the emergent Greater Chaco Coalition continued to grow and would soon come to encompass hundreds of other organizational and individual affiliations.

An event that further catalyzed opposition to fracking in the region and drew additional membership to the emergent Greater Chaco Coalition occurred late on a summer night in 2016.

[31] *Diné Citizens et al v Jewell et al* No. Civ 15-0209.

A well pad in Nageezi Chapter that hosted six horizontal wells operated by WPX burst into flames. One after the other, 36 tanks containing oil, wastewater, and chemicals exploded. The blaze was left to burn for three days, catalyzing further concern about the growing industrial presence in Eastern Navajo Agency. Approximately 55 residents evacuated their homes, and many lost livestock to the flames and fumes (Romeo 2016). The explosion highlighted a pervasive problem on the checkerboard: not only did WPX and other companies operating in the region lack an emergency plan to implement in the case of accidents like this one, but in the aftermath of the incident, local agencies could not come to timely agreement about their respective responsibilities for addressing the causes and consequences of the blast.[32]

The explosion occurred on allotment land, muddying the already complex question of which government authorities should be called upon to respond in the event of a disaster. While BLM had approved the drilling permits on the site for WPX, BLM staff insisted they did not have jurisdiction over incidents that occurred from the extraction of minerals held in trust for "Individual Indians".[33] But BIA was nowhere to be seen, having helped negotiate the lease on behalf of allottees but deferred to BLM on permitting. State agencies did not know what to do, and while the County sent emergency crews, they had no environmental management expertise. The United States Environmental Protection Agency (EPA), deployed to assess the air quality impacts of the disaster, took three days to determine which regional branch of the agency had the authority, and therefore the responsibility, to continue with response operations in this blurry territory.[34]

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[32] While I was in the region conducting fieldwork at the time of the WPX explosion, I was not immediately on site in the days after the blast. The information presented here is collected from conversations with people who were.
[33] "Individual Indian" is a term employed in federal law to designate an Indigenous person who owns an Individual Indian Money account, an account managed in trust by DOI. For example, allotment owners receive lease and royalty payments from oil and gas development to their IIM accounts.
[34] On Scene Coordinator (OSC), "WPX Nageezi Fire," Nageezi: Environmental Protection Agency Region IX, 2016. https://response.epa.gov/site/site_profile.aspx?site_id=11711.

As grassroots opposition to Mancos shale grew, tribal governments also took a strong stance against the rampant development. In Eastern Navajo Agency, several Chapters adopted resolutions expressing their dissent. By 2016, the Navajo Nation passed legislation opposing the fracking within its jurisdiction because of the environmental and health risks associated with the practice. In 2017, the Navajo Nation requested that BLM enact a moratorium on new Mancos shale development until the completion of the RMPA (Begaye and Nez 2017).[35] That same year, the Navajo Nation joined in an "historic meeting" with the All Pueblo Council of Governors to reiterate this demand.[36] Calls like these continued to mount. Soon, the National Congress of American Indians adopted a resolution supporting a moratorium on oil and gas leasing and permitting in the Greater Chaco region until BLM and BIA fulfilled their obligations to conduct meaningful tribal consultation and complete an RMPA informed by an ethnographic study about the cultural importance of the region done collaboratively with tribes.[37] Still, no draft RMPA was released.

It was not only the lack of an up-to-date land management plan that left tribal governments, environmentalists, and communities in the Greater Chaco with a feeling that careful consideration of new Mancos shale extraction was being deferred. Indeed, a logic of deferral is embedded in the federal and New Mexican oil and gas programs. This dissertation will unravel examples of how federal and State institutions delay, pass off, set aside, and

[35] Navajo Nation, "An Action Relating to Health, Education and Human Services, Resources and Development; Naabik'iyati' Committees; Opposing Hydraulic Fracturing Within the Navajo Nation" 0121–16, 16-288–01 (2016).
[36] Navajo Nation, 2017, "OPVP Protect Chaco Canyon Region Through Collaboration with All Pueblo Council of Governors"; All Pueblo Council of Governors, 2019, "Tribal Leaders Host Historic Summit to Support the Protection of the Greater Chaco Landscape," https://www.apcg.org/uncategorized/historic-joint-convening-between-the-all-pueblo-council-of-governors-and-navajo-nation-2019/.
[37] Riley, Kurt, 2017, "To Support Moratorium on Leasing and Permitting In Greater Chaco Region." Resolution, Cultural Protection & NAGPRA, Milwaukee: National Congress of American Indians, http://www.ncai.org/resources/resolutions/to-support-moratorium-on-leasing-and-permitting-in-greater-chaco-region.

withdraw responsibility for the cumulative effects of extraction. I track two primary techniques, both symptomatic of patchwork, through which such deferral is accomplished. The first is the fragmentation of authority across the relations altered by extraction. Because of this, it is nearly always possible for one institution to point the finger at the next when dealing with extraction's consequences. The second is in how these institutions scale their decision-making, unable to hold together consideration of site-specific concerns with broader landscape-level and even climate-related analyses of extraction's impacts. In these ways, the federal and State oil and gas programs reproduce the relationship between unknowability and unaccountability characteristic of patchwork.

Alignments

Unresolved Antagonisms

Cradled gently by the sand in the dry arroyo where I slept, I barely noticed the wind pick up and violently shake the walls of my tent. Before I stirred fully into consciousness, a paperback copy of Vine Deloria Jr.'s *Custer Died for Your Sins* came crashing down on my head. I scrambled for my headlamp. Turning it on, I realized what had happened. There in the middle of the night, by myself, I burst into laughter.

I was camping on a piece of land that had changed title at least three times in Kendra's grandmother's 90-some years. Now, Kendra tells me, the surface in that particular spot is managed by BLM. In in the rare chance that someone stumbled upon me in the night, they could not question my right to be there: this is "public land". It would not have occurred to me, at that particular moment, tucked in a quiet grove of junipers on the edge of the arroyo, to worry about who owned the land where I had been invited to sleep. But Kendra is hypervigilant of these

issues, having listened to a lifetime of her grandmother's stories about moving around the area as land exchanges between the State, BLM, the National Park Service, and the tribe would suddenly render her occupancy on a patch of ground – even if only in a canvas tent or hand-built hogan – illegal.[38]

My tent was planted just a few minutes' walk from the small house that Kendra now shares with the matriarch of her family just outside of Counselor Chapter on a parcel of tribal trust land that sits above federally managed minerals. Mineral ownership became important for Kendra and her family in 2018, when BLM leased the mineral estate out from under them to an anonymous bidder representing one of the oil companies operating locally.[39] The home is clustered with those of several other family members among sandy bluffs and high desert brush, just off Highway 550 and south of Turtle Mountain. That summer, Kendra and I had begun working together on a film project. We had planned to do some brainstorming that afternoon on her porch. But the exigencies of elder care, childcare, and animal care, ended up taking priority that day, as other family members had to make a last-minute trip to Farmington to take care of a sick relative and pick up supplies. There is always so much to do.

After getting through many of the day's chores, Kendra, her cousin, and I decide to take advantage of the lingering summer light and go for a hike through the cliffs and bluffs that extend for miles, undulating like waves, away from the highway. Our steps are labored through the sand, but soon enough we come to our first destination: a flat rock face, slick with moisture. This is the natural spring that Kendra and her cousin wanted to show me, where their family used

[38] A hogan is a traditional Diné one-room dwelling, with a door facing to the east, typically made from ponderosa or cedar logs and mud. See Chapter One on the issue of "unauthorized occupancy" of Diné people on the checkerboard.

[39] At the time of writing, BLM's decision to lease this particular parcel is in dispute with the Interior Board of Land Appeals.

to collect water before it was piped in. Today it barely trickles, but Kendra places a plastic water bottle she had brought along beneath the biggest drip. We venture up higher and climb atop a bluff with an expansive view of the landscape all around us, where we sit and take in the cooling evening breeze. When we descend, the plastic bottle is nearly full. We drink, making sure to save some gulps for Kendra's grandmother. The water tastes great – or rather, it tastes like nothing in the best of ways. It is clear.

Back at Kendra's house, I haul my camping gear from the trunk of my car and out into the arroyo to set up my tent for the night. I then volunteer to drive up the highway and get chocolate and graham crackers from the gas station. On the hike, we had been fantasizing about smores and other campfire treats. Kendra informs me that she has plenty of marshmallows, so we are good on that front. The Red Mesa store, newly rebranded as a Sinclair, is the nearest spot to purchase essential food items, like canned and frozen meats, bread, cheese, tomatoes, iceberg lettuce, snack foods, and sodas, if you don't have time or gas money to drive the 60-100 minutes to the grocery stores in Farmington or Rio Rancho. When I get back from my errand, it is dusk, and the fire is roaring. Kendra's cousin has set up a string of solar lights that illuminate a path back through the arroyo where I will sleep later, and I am touched by the thoughtful gesture. We sit out until late, roasting bits of food on sticks and enjoying the stars, which are as bright and multiple here as they are at Chaco Canyon.[40]

I was well into my fieldwork by the time Vine Deloria Jr. whacked me on the head. *Custer Died for Your Sins* was one of several books I had grabbed hurriedly from my bedside

[40] Chaco is known for its incredible night sky. Chacoan people expertly built structures and oriented agricultural and ceremonial practices in concert with the astronomy they observed. Chaco Culture National Park is designated a "Dark Sky Park" and hosts an observatory where it holds free astronomy programming. Light pollution from the oil and gas industry threatens night sky viewing for visitors of the park, Diné people living nearby, and other Indigenous peoples who travel to visit the area.

table in Santa Fe, along with a mystery and a couple of new ethnographies, not knowing how exactly the days I had planned to spend in and around Counselor that week would unfold and whether I would have any time or energy to read in the evenings. The wind might have easily shaken loose one of the other books from my tent's overhead compartment. Still, the moment stuck with me, a poignant reminder of the long and violent genealogy of scholarship about Diné people and lands produced by non-Native scholars like me, which I work actively against, but from which I cannot claim to be separate.

In the fourth chapter of *Custer Died for Your Sins*, "Anthropologists and Other Friends", Deloria delivered a scathing critique of the anthropologist, that creature who, every summer, "from every rock and cranny in the East" emerges "as if responding to some primeval fertility rite" (1988: 78) and flocks to the reservations to make observations of Indians. The anthropologist will return home and publish these observations so that future anthropologists may memorize them and "come out to reservations years from now and verify the observations they have studied" (1988: 79). First published in 1969, Deloria's critique of the extractive nature of anthropological inquiry in Indian Country and its utter irrelevance to Indigenous peoples reverberated throughout the discipline of Anthropology and the emergent field of critical Native American and Indigenous Studies (Biolsi and Zimmerman 1997; Cook-Lynn 1997; Estes 2019; Powell 2018; TallBear 2013; Wildcat 2005). It was a critique that, by the time of my doctoral training in anthropology nearly fifty years later, the discipline was supposed to have fully integrated. Yet as I conducted my fieldwork, a bilagáana[41] body often in Diné spaces, I was keenly aware of the ways in which my presence might conjure the creature Deloria described, the

[41] Bilagáana is a Diné word for an Anglo white person.

young man – as I was often misgendered for my nearly shaved head, tall stature, and outdoorsy attire – with the overfull knapsack and the camera dangling around his lanky frame.[42]

Anthropologists and other researchers have long sought to document every facet of Diné lands and life, though they have often done so by categorizing Diné existence into Euro-American categories of knowledge that often do not correspond to Diné ways of being in the world (Denetdale 2007; Lee 2014 and 2017).[43] Bibliographies of studies about Diné people document over 12,000 unique entries between 1638-1990 (Bahr 1999; Correll et al 1969).

Diné historian Jennifer Nez Denetdale (2007) traces how anthropological accounts of Diné people have gradually shifted over the course of the nineteenth and twentieth century. Early studies tiered closely to racist evolutionary schemas like the one promoted by Henry Louis Morgan, in which Diné people were portrayed as "savages". By the 1930s-1950s Franz Boas' genre of cultural relativism was in vogue and a new generation of anthropologists flocked to Diné Bikeyah.[44] In the 1950s, the Navajo Tribe hired a team of Anglo anthropologists (Richard Van Valkenburgh, J. Lee Correll, and David Brugge) to collect existing interdisciplinary sources on Diné people to help inform the Tribe's Indian Claims Commission cases and the evidence it would present in *Healing v. Jones* leading up to the Navajo-Hopi Land Settlement Act of 1974.[45]

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[42] Admittedly, I rarely wore a camera or took pictures during fieldwork unless out on a fracking tour with colleagues. Deloria's anthropologist also boasts a hula hoop, life jacket, tape recorder, and other items (79).

[43] As Powell (2018) notes, the presence of anthropologists on the Navajo Nation is such a cliché that Diné scholar John Redhouse once quipped that the average Diné family has "one father, one mother, three children, and an anthropologist" (24). In her ethnography of energy politics on the Navajo Nation, Powell describes her arrivals on the Navajo Nation, in the home of a family I would also come to know (but not live with) during my research through my work with Diné CARE, and with whom another anthropologist before Powell also lived and conducted research (Sherry 2002). Powell and Sherry's work had also been informed by Deloria's critique of the discipline.

[44] Drawing on the work of Diné artist Gloria Emerson, Denetdale (2007) writes that Diné people often have ambivalent relationships to these nineteenth and early twentieth century anthropological investigations: "On the one hand, we have objected to the predatory ways in which studies have been conducted and how they have been used; on the other hand, as we continue to experience the consequences of colonialism, including language loss and knowledge of cultural ways, especially as a result of Western education, we have turned to studies … to recover traditional knowledge" (21).

[45] Healing v. Jones was a case argued between the Hopi and Navajo Tribe before the US District Court of Arizona. A 1958 Public Law passed by Congress allowed both Tribes to go to the courts to sort out a decades long conflict

Denetdale (2007) argues the eventual dissemination of this knowledge in research articles and tribal newspapers was for many Diné people "their first exposure to Western concepts of Navajo history and has been instrumental in shaping a Navajo sense of the past" (41).

These encounters with the vast knowledge produced about them spurred Diné people to begin taking an active role in research on Diné life, history, and culture. Diné educators and intellectuals like the late Ruth Roessel founded the Navajo Community College in 1968, which would become Diné College, a tribally controlled institution of higher learning, and Rough Rock Press, a Diné-led publication that printed books by Diné scholars, sometimes in collaboration with white authors, on important topics and events in Diné history (Begay 1983; Lamphere 2002; Roessel 1981; Roessel and Johnson 1973, 1974; Yazzie 1984). Denetedale (2007) characterizes these efforts as "foundations for the movement toward indigenizing Navajo education" (42), while Lamphere (2002) describes the same moment in the trajectory of Diné research as one in which research projects in Diné Bikeyah became more oriented towards cultural preservation, with Diné people no longer viewed as "subjects" or "objects" of research but as collaborators in research design. In 1997, the Navajo Nation established its Historic Preservation Department. NNHPD would not only assume for the Navajo Nation responsibilities of engaging with federal and State governments on historic preservation matters but would also regulate ethnographic and archaeological research in Diné Bikeyah, further asserting a degree of Diné control over research that involves Diné people.[46]

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spurred by the 1882 creation of the 2.5 million-acre Hopi Reservation within the Navajo Reservation. In 1962, the U.S. District Court set aside 631,000 acres of (surface and subsurface) land for exclusively Hopi use, while the remaining 1.9 million acres became a joint-use area (NNHRC). The Navajo-Hopi Settlement Act that followed relocated 3,660 Navajo and 27 Hopi families off disputed lands to enforce the land partitioning. See United States Government Accountability Office, 2018, "Office of Navajo and Hopi Indian Relocation: Executive Branch and Legislative Action Needed for Closure and Transfer of Activities," GAO-18-266.

[46] One year prior to the establishment of NNHPD, the Nation also established the Navajo Nation Human Research Review Board, whose mission is to guarantee ethical research for the Diné people. I was advised by Diné colleagues to seek a permit from NNHPD rather than NNHRB because of the nature of my research.

The early twenty-first century has seen a proliferation of research by Diné scholars and practitioners that centers Diné epistemology, taking Diné teachings and knowledge as analytics with which to explore and seek solutions to social and environmental challenges (see John 2019; Lee 2014 & 2017; Marek-Martinez 2016; Tsinnajinnie et al 2019; Tsosie-Paddock 2019; Werito 2014; Yazzie 2014). Alongside this scholarship that affirms Diné cultural and intellectual sovereignty, Indigenous studies scholars and other social scientists, some Diné and some not, have turned their critical attention to contests over sovereignty and jurisdiction in the settler colonial present, paying particular attention to fraught questions of energy production, land management, and environmental contamination in and around Diné Bikeyah (Baca 2016; Curley 2018a, 2018b; Montoya 2016 & 2019; Powell 2018; Voyles 2015). This dissertation, while informed by time spent with knowledge keepers who partake in the former genealogy of Diné-centered knowledge production, takes after the latter strand of scholarship that inquires critically into the shifting structures of authority, governance, and capital that shape Diné lives and environments.

The Research

This dissertation is grounded in two years of field and archival research conducted in New Mexico and parts of Arizona, Colorado, and Utah between 2015-2020, the majority of which occurred over a period of 20 months from January 2018 to October 2019. During this time, I lived in Santa Fe, New Mexico, though I also spent much time in my old Nissan hatchback, my tent, the guestrooms of generous friends, and a handful of motels throughout the region.

Most often, the fieldwork took me Northwest on Highway 550, where the fast-food restaurants and box stores on the outskirts of Rio Rancho soon gave way to incredible red cliffs as I passed through Zia Pueblo. Just as I would crest the hill leaving the border town of Cuba, I saw signs indicating I was within the administrative boundary of the Farmington Field Office, having just left the zone of BLM's Rio Puerco Field Office. Soon, I would begin seeing oil gas wells from the highway. I would often drive on 550 for hours, sometimes turning West before Cuba to head to Ojo Encino or Torreon Chapters, other times continuing straight to Counselor, past the Jicarilla Apache Nugget casino and travel center, or even further to Farmington or Shiprock. On other days, the research took me West on I-40 to Crownpoint, Gallup, or Window Rock; and still other places within the region. Driving became a way of being and a way of relating to colleagues who also drove all over Diné Bikeyah and its border towns to get their work done, get supplies, and take care of their relatives. In the cities of Santa Fe and nearby Albuquerque, on unceded Tewa and Tiwa lands, where the offices of many state and federal agencies are currently located, I attended hearings, met with agency staff, participated in demonstrations, observed the state legislative process, and consulted archives.

After completing this period of research, I stayed in New Mexico to write this dissertation, which allowed me an additional year of sustained engagement with research colleagues. At first, staying in New Mexico meant that throughout the Fall of 2019 and early 2020, I could continue regularly attending Chapter meetings and other community events in the Greater Chaco, discussing research findings with colleagues as I wrote. It also afforded me the opportunity to continue collaborating with the Greater Chaco Coalition on advocacy efforts, albeit in a reduced capacity. I continued attending public hearings on oil and gas issues, and

generally continued to see the people with whom I had been working during the research. But conditions rapidly shifted by early March 2020 with the onset of the Covid-19 pandemic.

The Navajo Nation was devasted, and disproportionately so, by the pandemic. By May of 2020, the Nation had the highest infection rate in the United States. The virus drew attention to longstanding health inequities that Diné people experience, as well as infrastructural disparities that particularly impacted the ability of Diné people to protect themselves from exposure. One third of Diné households do not have access to running water, having to haul water for miles for their families and livestock. An estimated 30% of households do not have electricity – let alone broadband internet and phone lines – that would enable them to communicate from a distance with relatives (see Anguiano 2020; Clahchischiligi 2020; Nelson 2020). The Navajo Nation responded quickly to the pandemic, issuing stay-at-home orders and curfews, but the virus still spread. Meanwhile, in a feat of incredible community organizing, multiple Diné groups across the Nation sprung up to provide mutual aid in the form of food boxes, personal protective equipment, medicines, and other necessary items to tens of thousands of families across Diné Bikeyah (Lakhani 2020; see for example the work of the Navajo & Hopi Families Covid-19 Relief Fund and K'é Infoshop).

As the pandemic spread across Diné Bikeyah and New Mexico, much political life moved online, including the process of public involvement that BLM and BIA were required to host in order to solicit feedback on the Draft RMPA. The agencies had finally released the 1300-page document on the last day of February 2020, just weeks before the pandemic hit. For the first time in the agencies' history, they attempted to engage their publics virtually (see "The Virtual Public Comment"). For many who had been waiting since 2014, the release of the Draft RMPA could not have come at a worse time. Predictably, the plan laid out a proposed course of

administrative action that was consistent with BLM and BIA's previous managerial approaches in the region as well as with the Trump Administration's policy platform of "energy dominance", but which was at odds with the overwhelming public sentiment expressed thus far in the process by tribal governments, environmental organizations, and individuals.[47] The Draft RMPA proposed to open further lands within the FFO for leasing and anticipated authorizing up to another 3,101 Mancos shale wells in and around Diné communities. It proposed, in other words, to make this hotspot even hotter.

I studied the jurisdictional imaginary in which it is possible to derive such a predictable proposal and represent it as an outcome of thorough study and reasoned debate by attending to the production of environmental knowledge across four sites:

1. The Tri-Chapter

Three adjacent Navajo Nation Chapters - Counselor, Ojo Encino, and Torreon/Star-Lake - in the heart of the Greater Chaco were particularly vocal early on in articulating their concerns about expanding Mancos shale development in and around their communities. People within these three Chapters share elements of a regionally specific culture, with songs, stories, and dialects that are distinct from those of other Diné communities. In 2014, the three Chapters forged a unique political alliance. Calling themselves the Tri-Chapter Council, they began meeting on a monthly basis to discuss issues of regional importance. The central purpose of the alliance was initially to help coordinate initiatives across Chapter boundaries in the hope of

[47] "Energy Dominance" was a phrase employed by President Trump to name a policy goal of achieving new levels of American energy production and exports: The White House, "Fact Sheet: President Donald J. Trump Is Unleashing American Energy Dominance," May 14, 2019. https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-unleashing-american-energy-dominance/.

working more efficiently with non-Diné governments upon whom the Chapters depend for many essential services and infrastructures, but with whom most projects seem to move at a snail's pace (see Chapter Two). As the Tri-Chapter Council gained a public voice, institutions like BLM, the local school district, or the nearest private healthcare provider increasingly began to see the Council meetings as a critical venue to convey information to Diné people the region.

With the support of colleagues like Mario Atencio, Samuel Sage, Daniel Tso, and elected Chapter officials, each Chapter community passed resolutions in support of my conducting research in the region, which helped me obtain an ethnographic permit from the Navajo Nation Historic Preservation Department. I first met Daniel Tso in 2016 at an environmentalist event in Durango, Colorado. When I began long-term fieldwork for this project in 2018, I reached out to Daniel and we quickly began conversations and then collaborations, sometimes alongside efforts of the Greater Chaco Coalition (see below), and sometimes on more locally based projects in Dinétah. A respected community leader and elder, Daniel soon connected me with his colleagues and communities. About a year into my fieldwork, Daniel's leadership and steadfast advocacy for the wellbeing of Diné people in the face of fracking was recognized favorably by the majority of residents of Eastern Navajo Agency. In November 2019, Daniel was elected as Navajo Nation Council Delegate, where he would represent eight Chapters (including Counselor, Ojo Encino, and Torreon) on the 24th Navajo Nation Council and become the Chair of the Health, Education & Human Services Committee.

Over the course of two years, I regularly attended Tri-Chapter Council meetings, and often partook in individual Chapter meetings as well as community events. I became the unofficial notetaker for the Tri-Chapter, producing long transcripts of each meeting for the archive that the Council was building for itself. While my notes were always detailed, they were

also always replete with gaps, indexing moments when the conversation spiraled from English into Diné Bizaad, sometimes for a few minutes, sometimes for a few hours.[48] It was in attending these meetings and listening to Chapter officials and residents discuss the challenges of realizing their goals for governance within homelands where they had little recognized jurisdiction, and where the entities that did employed an entirely different concept of land to administer the landscape, that I began to understand what it means to live within patchwork from this specific place. Hearing elders' stories about the land prompted me to conduct archival research into the history of jurisdictional claims in the region, which I detail in Chapter One.

Much of my research in the Tri-Chapter consisted of collaborating with a group of close interlocutors in their own claims-making and worldbuilding projects. I supported their work as I was asked to, mostly by producing or contributing to various forms of research and writing with their direction, such as meeting notes, grant proposals, letters, or reports.[49] One such collaboration was with a group of residents who undertook to study the health, cultural, and spiritual impacts of fracking in the Tri-Chapter (see Chapter Three). Another close collaboration was with the Diné-led San Juan Collaborative for Health Equity and its partner and advisory board, the Diné Centered Research and Evaluation (DCRE) team, a newly formed group of elders, knowledge keepers, medicine people, and community organizers that develops research methodologies grounded in Diné epistemologies to help inform Diné-led research projects. Across these projects and others, my colleagues carried forward a consistent objective and practices of affirming - and making space for - Diné land relations.

[48] While I did eventually pick up some words, phrases, and expressions, I did not attempt to learn the Diné language for this research. I do not speak or read the language.

[49] The editorial process of receiving and incorporating feedback from interlocutors as I attempted distill their work into written form was always very instructive. I first learned to think about this kind of collaboration as method from Kim Fortun (2001).

2. The Greater Chaco Coalition

Over the course of my fieldwork, I worked closely with the Greater Chaco Coalition (GCC), particularly with non-profits that play a prominent role in the group. The Tri-Chapter Council and some of its membership also participate in and offer critical direction to the GCC, so there was significant overlap between these sites and relationships. A volunteer position with the environmental non-profit San Juan Citizens Alliance allowed me to become intimately involved in some of the GCC's activities early on in my fieldwork.[50] I did not collect interview data with GCC members or record meetings for the purposes of my research. Instead, I sought to gain a background understanding of the legal, legislative, and activist strategies that environmentalists and Indigenous groups alike employ – sometimes in unison and sometimes separately – to slow or stop extraction.

3. Sites of State Knowledge Production about Land

A third site where I tracked the production of environmental knowledge was across federal and state institutions involved in the management of oil and gas. This research took many forms as I negotiated questions of access as well as my own political commitments to working in solidarity with the Tri-Chapter first, and the Greater Chaco Coalition second.

One of the initial ways in which I sought to learn about how institutions like BLM think about and operationalize a concept of land was through interviews with employees at the BLM Farmington Field Office (FFO), the office in charge of drafting the Mancos/Gallup RMPA. This

[50] San Juan Citizens Alliance (SJCA) has offices in Durango, Colorado and Farmington, New Mexico. I initially completed an internship with SJCA in the summer of 2015. The organization's staff helped me establish contacts and taught me a great deal about the region's environmental politics. During my long-term fieldwork, I spent a year (January 2018-January 2019) volunteering with the organization. From January 2019-September 2019, I fulfilled a part-time paid contract for SJCA to support the continuation of my fieldwork.

proved much more difficult than I had anticipated. At the time of my interviews, in 2018 and 2019, oil and gas drilling near Chaco had become a charged issue. Staff were not permitted to speak with me on the record about oil and gas projects. When we did speak, it was in the presence of a communications officer who mediated the conversation, pausing us at times to steer the staffer back on message. I had better luck meeting with staff at the BLM State Office and Rio Puerco Field Office for interviews that pertained to agency's oil and gas program in general, without discussing specific and contentious projects like the RMPA. I was also able to interview staff at BIA offices in Crownpoint and the Navajo Regional Office in Gallup, as well as staff with the New Mexico Environment Department.

When I felt I had reached the limit of what regional BLM staff would or could share about their approaches to land management, I pursued other means of supplementing my understanding of BLM's knowledge practices. I did so by completing a number of modules and courses on the online platform DOI [Department of the Interior] Learn, now called DOI Talent. These courses are designed to instruct DOI employees in topics as varied as how to comply with environmental and historic preservation laws; how to consult with tribes; or how to balance contentious public interests in making land management decisions.

Another key strategy for interfacing with federal land managers as well as industry representatives was to attend BLM "on-site inspections" in the Greater Chaco. On-sites, as they are called, are held after a lease has been granted but prior to the approval of an Application for Permit to Drill (APD) or drilling permit. While open to the public, they are poorly advertised and seldomly attended by anyone other than a handful of BLM employees, environmental consultants working for the oil company, and the company representatives. At eight or nine in the morning, the group would meet in their vehicles (reliably, white pickup trucks) at a

predetermined gas station or spot on the side of the highway. Then, the group caravans to a patch of Earth that has already been staked with wooden poles and nylon ribbons: a future well pad. Here, they spend a couple of hours "walking the pad" and discussing where the company hopes to dig its culverts and place its infrastructure, whether the water will be pipe or trucked in, or what color it proposes to paint the compressors and tanks (FFO staff have a strong preference for "juniper green" over "Carlsbad canyon brown", shadow gray", or "covert green"). A natural resource specialist wanders about looking for, or verifying the absence of, endangered cacti. Attending on-sites afforded me the opportunity to ask questions of BLM staff, industry, and consultants in an open setting, and to observe their exchanges, including when BLM did or did not insist on modifications to a project – for instance, to divert a pipeline by a foot in order spare a lone pine tree, or to require that the company erect a temporary sound barrier during the frack to reduce noise pollution for a family living some five hundred feet away. But regardless of the mitigation measures that might be devised at this stage, APDs in the FFO are never denied outright (see Chapters Three and Four).

Finally, scenes of public engagement, where federal and State agencies solicited the audience and/or input of publics living within, or with varying attachments to, the Greater Chaco region, became important sites. I observed how regulatory agencies conceptualize the resources they manage, and how these understandings often butt up against the environmental knowledges of the publics to whom they are accountable. I describe some of these moments of friction in Chapters One-Four, as well as in "Double Drilling", "Relaying", and "The Virtual Public Comment".

4. National Oceanic and Atmospheric Administration

A fourth and final site, somewhat separate from the others but critical nonetheless, was with scientists who make up the Carbon Cycle Greenhouse Gases (CCCG) group at the National Oceanic and Atmospheric Administration (NOAA) in Boulder, Colorado. Here, I conducted several short stints of fieldwork, usually spending about a week at a time in the lab interviewing atmospheric scientists who study the lives of greenhouse gases in the atmosphere. I initially visited NOAA in 2015 to better understand the global knowledge infrastructures (Edwards 2010) that made possible the detection of the Four Corners methane hotspot. As I describe in "Methane Matters", conversations with these scientists helped me reframe how I would come to see the cloud - less as a sensation, object, or event, but as a process that spoke to a set of sedimented relations with the land. My weeks at NOAA always included a process of knowledge exchange, which seemed be part of the ethos of the CCCG group. I attended presentations that members and guests gave to one another (or sometimes just to me, a crash course in carbon isotopes or the planetary boundary layer), and at the end of each week I would in turn give a presentation on the progress of my dissertation research and the questions that motivated it. In this way we edged closer to understanding one another's intellectual projects, always finding common ground in a shared concern about rising greenhouse gas concentrations and the spiraling effects of climate change.

The Text

What follows are four substantive chapters, which I describe below, and a brief speculative conclusion. Peppered in between the chapters are shorter interludes in which I share stories and ethnographic materials that resonate with their surrounding chapters. The purpose of

these interludes is not to advance additional arguments but rather to reverberate questions, contradictions, and stakes that run through the chapters.

Chapter One, "Chess or Checkers?", offers a genealogy of jurisdictional claims in Dinétah since approximately 1868, tracing the making of the present-day checkerboard. I show how three processes of colonial settlement in the region – railroad construction, homesteading, and allotment – parceled out constitutive elements of land's relations. In particular, I trace how the surface and the subsurface of the Earth came to be seen, claimed, and administered as separate resources and forms of property. Almost as soon as checkerboarding was underway, colonial administrators recognized it would pose immense managerial challenges and amplify conflicts between Diné people and settlers who had begun moving to the area, but they quickly lost control of the process of patchwork they had unleashed. At the same time, the emergent jurisdictional order proved advantageous to extractive industries that took interest in the region. The co-constitutive infrastructures of settler jurisdiction and resource extraction articulated with one another, further entrenching patterns of rule. Yet despite sedimented systems of colonial administration, the checkerboard's boundaries were never completely fixed in place. The chapter traces how, through legal challenges and legislative initiatives brought by Diné groups, land exchanges between the Navajo Nation and state and federal governments, and a land buy-back program designed to consolidate fractional interests held by Diné allottees, the checkerboard continues to shift – albeit ever so slowly – and with it, so too do the rules of the game.

Chapter Two, "Gridlock", follows Tri-Chapter residents as they move through a region engineered for their immobility. The chapter focuses in particular on the example of roads torn up by oil and gas traffic to show how settler jurisdiction produces conditions of impasse that slow down or perpetually defer investment in life sustaining infrastructures in Indian Country. I

examine scenes of road disrepair, school access, and emergency medical transport, across which rough roads combine with jurisdictional friction to get in the way of Diné mobility and life chances. I develop the concept of "gridlock" to describe the space of frustration, stasis, and improvisation that residents inhabit in trying to move about and get things done for their communities on the checkerboard, amid patchwork.

Chapter Three, "Aggregate Airs", examines how atmospheric qualities in the Greater Chaco have shifted under the pressures of Mancos shale extraction. I argue that extraction's cumulative atmospheric effects are experienced by Diné residents in the Tri-Chapter in ways that cannot be accounted for by the agencies that manage oil and gas. The presumption of atmospheric commensurability is reinforced by techniques of settler governance that fragment land's relations. This fragmentation – patchwork at work – often preempts the possibility for Indigenous claims to meaningfully disrupt administrative or judicial actions. Unfolding extraction's atmospheres across three cases, I show how scale mediates the problem of commensurability. Looking at air quality regulations and cultural resources litigation, I describe how prevailing approaches to the regulation of the oil and gas industry manipulate scale in ways that obscure the cumulative effects of extraction. Drawing on fieldwork with Tri-Chapter residents who have mobilized to study how fracking affects their wellbeing, I show how this scalar work facilitates the commensuration of extraction's impacts across Indigenous and non-Indigenous worlds – as well as when this commensuration fails.

Chapter Four, "Buffering", focuses on a dispute fueled by the Chaco Cultural Heritage Area Protection Act of 2019, a piece of federal legislation that catalyzed what I call the checkerboard's "mineral publics" into conflict. The legislation proposed to withdraw federal minerals from future leasing within a 10-mile circumference of Chaco Park, creating a "buffer

zone" that would protect the area from extraction. As a response to the increasingly tense politics of oil and gas in the region, the Act's "buffer zone" emerged as an imagined resolution to social antagonisms around land-use and tenure that left the jurisdictional order of the checkerboard unchallenged. The chapter highlights perspectives of Diné people who supported the Chaco Protection Act as a positive development in the struggle to protect lands and lifeways in the region, and the perspectives of Diné allotment owners who opposed it out of concern that its passage would devalue their mineral estates and threaten their livelihoods. I examine how, through the buffer zone controversy, Diné people forged at times uneasy alliances with environmentalists and Democrats, oil companies and Republicans, as all parties became embroiled in an increasingly fraught debate. While the Act attempted to resolve competing claims to land-use in the Greater Chaco by arriving at properly balanced apportioning of resources and access, for Diné people, it stirred up and left unresolved questions of jurisdiction, liability, and obligation vis-à-vis the land and its histories of care and alienation.

These questions remain in the air, condensing at times into recognizable debates or perceptible forms. The methane hotspot is one such object. Over the course of my research, I learned to see the relations of possession and dispossession that produced the cloud. While a patchwork imaginary would intuit bewilderment regarding the hotspot, Diné people who I worked with already had an intimate understanding of the uneven relations that would cause so much pollution. In the eyes of the federal and State institutions that reproduce patchwork in their management of the oil and gas industry, the hotspot had no responsible agent. But for my colleagues in the Tri-Chapter, there was no question. Clearing the air would require restoring the land.

CHAPTER ONE

Chess or Checkers? Making a "No-man's Land" in Dinétah

On a bright October morning, Daniel Tso and I stood in the gravel parking lot of Counselor Chapter House watching the oil trucks go by on Highway 550. By 10 o'clock the autumn sun had turned the air from crisp to warm. The glow was beginning to melt the frost on the sagebrush throughout the small field beneath Arrow Mesa, a rocky outcrop that shelters the Chapter House. As we chatted about the upcoming Navajo Nation election in which Daniel would soon be elected as Council Delegate, we kept a lookout for the vanloads of high school students from Santa Fe who would be meeting us here partake in Daniel's famous "Fracking is Fracking Reality Tour".[1] As he had done countless times over the past several years with groups large and small, Daniel was preparing to lead the students through the backroads of nearby Diné communities to show them the impacts of oil and gas extraction on the landscape.

When the students stumbled out of their vans bleary-eyed from a cold night at Chaco Culture National Historical Park, Daniel asked them to form a circle in the parking lot. He positioned himself in the center and launched into a story of this place. He explained that Diné people had lived in this place for a *long* time – since time immemorial. His ancestors were here when the U.S. government rounded up the Diné on the Long Walk to Hwéeldi in the early 1860s, and his ancestors returned to this area in 1868 upon the signing of the U.S.-Navajo Treaty. Yet this part of Diné homelands never became reservation trust land. The Diné lived here, along with settlers recently arrived in the area, as the land was slowly alienated from them in the early 20th

[1] In November 2018, Daniel Tso was elected as Council Delegate of the 24th Navajo Nation Council, representing eight Chapters in Eastern Navajo Agency: Baca Prewitt, Counselor, Littlewater, Torreon/Star-Lake, Ojo Encino, Whitehorse Lake, and Casamero Lake, Pueblo Pintado

century, leaving sections of surface land and minerals alternately controlled by federal, state, tribal, and private entities.

Residents in the Tri-Chapter area often underscore land – and specifically "land status" or jurisdiction – when they talk about oil and gas. Land is not only the space where extraction takes place: land's status produces the conditions of possibility for its extraction and for the forms of regulation and accountability available. Land *status* is especially important in this part of northwestern New Mexico, on the eastern edges of the Navajo Reservation, because jurisdiction is so fragmented here that even with an intimate knowledge of place it is at times hard to know exactly where one is standing in relation to the law.

Several of the students were wearing flannel plaid shirts that day, just the right layer for autumn in the high desert. Daniel called attention to one shirt in particular worn by an attentive young woman, a checkered mix of browns, off-whites, and yellows. He asked the group to imagine the shirt as this land, with a neat tangle of authorities overlaying the landscape.[2] He explained how each color represented a different jurisdiction, with the dominant brown being federal land, crisscrossed by many others. He concluded that in a way, this tightly woven jurisdictional configuration, known locally as "the checkerboard", transforms this place into a "no man's land". There are so many rules that it is hard to know which ones apply where, or to pinpoint who has the authority to make decisions about land-use.

"No man's land" struck me as a corollary to another metaphor Daniel often uses to explain the checkerboard to outsiders: "they call it the checkerboard," he says, "but they never tell us if we are playing chess or checkers". The "they" here is the set of agencies that authorize

[2] Writing on land struggles among the Algonquin of Barriere Lake, Pasternak (2017) argues "there has not always been a unified logic of jurisdictional imposition that ties up the knot of sovereignty, because it is precisely the *tangle* of authorities that creates the overlays of Indigenous and settler claims to territorial jurisdiction" (8, emphasis in original).

oil and gas extraction on the checkerboard, and with whom Daniel and his colleagues in the Tri-Chapter are constantly engaged in a game that feels deeply rigged.

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The struggle to control land in the present-day checkerboard has been active and ongoing for centuries. In this chapter, I trace the making of the checkerboard from the mid-nineteenth century into the present, elaborating on the abbreviated history that Daniel narrated before we started off on the "Fracking is Fracking Reality Tour". I begin, roughly, with the return of Diné people from a traumatic period of forced internment at Hwéeldi and the signing of the 1868 Treaty between the Diné and the United States.[3] The making of the checkerboard is a story of territorial dispossession by means of the forced institutionalization of patchwork - settler ways of knowing and being in relation with land - even as Diné people maintain their land relations with determination. As land in Dinétah was gradually parceled out into distinct categories of ownership, new ways of thinking about and relating with land were introduced. In its administration by federal and State actors, land was treated as a resource understood through two of its constitutive relations: Earth's surface and subsurface. Abstracted in such a way, the surface and subsurface became objects of property, a racialized commodity form (Palmer 2020; Pasternak 2017).

Property, both public and private, is a social relation whose existence depends on others' non-property (Blomley 2003; Goldstein 2018). A property right is not about the object of

[3] The four years prior to the signing of the US-Navajo Treaty were among the most traumatic in Diné history. By 1863, it had become clear to the United States that the Diné would not consent to relocating to a reservation. Under the direction of Officer James Carleton, Colonel Kit Carson led a violent "scorched earth" campaign to force the Diné out of Dinétah. Approximately 9,000 Diné were forcibly removed from their homelands and marched in groups over 300 miles east to Fort Sumner, or Hwéeldi as the Diné call it, where they were imprisoned in camps. Many people died on the journey to Hwéeldi – remembered as the 'Long Walk' – and during imprisonment. Much has been written about Hwéeldi and the Long Walk (Denetdale 2007; Iverson and Roessel 2002; Powell 2018; Yazzie 2018; Young 1978).

possession but is rather a claim enforced by the law and social conventions (MacPherson 1978; Tsosie 2001). In her seminal piece "Whiteness as Property", Harris (1993) shows how "property rights in the United States are rooted in racial domination" (1716). The racial identities of Black and Indigenous peoples became the legal justifications for slavery (ownership of a person) and territorial dispossession (ownership of land), tethering the institutions of whiteness and property. Moreton-Robinson (2015) dissects the possessive logics through which white subjects come to "invest in reproducing and reaffirming the nation-state's ownership, control, and domination" (xii) over Indigenous lands and bodies. Bhandar (2018) builds on Harris and Moreton-Robinson's work to trace the emergence of "racial regimes of ownership", a juridical formation in settler colonial states in which racial identities and property law are produced through one another. Bhandar argues that the appropriation and commodification of land and labor produce a hierarchy of racial subjectivities that organizes modern property law around whiteness.

While Harris, Moreton-Robinson, and Bhandar focus on the racialization of property in settler colonies, recent scholarship on territory and sovereignty has challenged topographical representations and concepts of terrain itself. Anthropologists, geographers, and architects have argued that the space of state sovereignty is, or at least aspires to be, volumetric (Billé 2020; Braun 2000; Elden 2013; Sloterdijk 2002; Zurita et al. 2018; Weizman 2002). In contrast to a two-dimensional cartographic view, attention to the spatiality of terrain across volumes allows scholars to track forms of power and knowledge that operate below, above, and in parallel to the surface of the Earth.

This chapter is indebted to these critical insights about race, property, and the multiple dimensions of territory, but my aims here are slightly different. I trace techniques of jurisdiction through which settler authority over Dinétah was claimed and is maintained, and practices

through it continues to be contested. On the checkerboard, where action is often strangled by tangled authorities, jurisdiction – rather than an abstract concept of settler sovereignty – comes into view as the conduit through which power is exercised (see Cormack 2008; Ford 2010; Kahn 2017; Pasternak 2017; Richland 2013; Simpson 2014). Centering jurisdiction, I am less interested in pointing out when state power is exercised across multiple dimensions like the "surface" and "subsurface", but rather in examining how these elements of Dinétah come to be seen as separate parts to begin with, and to what consequences.[4]

In this sense, more relevant for my purposes than the burgeoning literature on voluminosity is a longstanding body of Indigenous studies scholarship and practice that conceptualize land, which is inclusive of but not reducible to Indigenous territory, as a relation encompassing the Earth's strata, its air, water, living beings, and storied places (Goeman 2008; Tuck and Yang 2012; see also Introduction). To speak of collective Diné self-governance – whether in the language of sovereignty or in Diné-specific terms (see Emerson 2017) – is already to invoke a multi-dimensional relation. In what follows, I show how three imperial projects to advance the settlement of the American West – railroad construction, homesteading, and Indian allotment – disrupted this relation by fragmenting land into components over which settler ownership was claimed. Combined, these projects unleashed a complex process of dispossession that continues to this day. While the checkerboard had no sole architect, and while its multiple progenitors quickly lost control of the process of fragmentation their actions set into motion, the resulting spatial and juridical arrangement has not ceased to serve the conjoined agendas of settlement and extraction. Situating the checkerboard within a history of its jurisdiction shifts the question of land management from the difficult task of managing for multiple uses – as the

[4] See Ballestero's (2019) comments on the limits of a volumetric analysis when it takes for granted the categories of the surface and subterranean.

federal government often frames its task - to a question about who has the authority to invoke authority on these lands.[5]

By the late 1930s, all hopes of solving what even colonial administrators by then recognized as the *problem* of the checkerboard were abandoned. But that does not mean that boundaries ceased to move. Rather, through legal challenges and legislative initiatives brought by Diné groups, land exchanges between the Navajo Nation and State and Federal governments, and a land buy-back program designed to consolidate fractional interests held by Diné allottees, the checkerboard continues to shift to this day – albeit ever so slowly – and with it, so too do the rules of the game.

This chapter is organized around three distinct yet entangled processes that produce the spatial and legal categories over which jurisdiction is exercised in Dinétah: the surface, the subsurface, and the boundaries of Diné territory.[6] These processes partake in a patchwork jurisdictional imaginary, which treats land as resource and property. Yet, the categories of land, mineral, and reservation, which settlers took for granted as foundational to this jurisdictional imaginary, were never stabilized. Instead, what patchwork unleashed is a generative ambiguity about the very terms by which jurisdictional claims in the region can be made. To highlight this point, I end the chapter by considering the example of a recent oil and wastewater spill at a Mancos shale well site in Counselor Chapter. This example reveals a chaotic side of patchwork, where federal and State agencies scramble to determine who has the authority to respond to an environmental disaster on lands across which legal title belongs in part to the federal government

[5] On jurisdiction as the authority to invoke authority, see Pasternak (2017). "Multiple use" is the ethic that guides federal land management agencies like BLM. There is similar ethos within the New Mexico State Land Office.
[6] To help the reader keep track of the competing jurisdictional claims through which the checkerboard was carved, I have provided a partial timeline in the appendix to this dissertation.

and in part to individual Diné allotment co-owners. As regulators negotiate the limits of their jurisdiction, Diné lands are harmed as pollutants seep deeper into the ground, while the oil company's accountability is deferred.

Checkering the Surface

In a 1938 address to the Navajo Nation Tribal Council, then Vice Chairman Howard Gorman, like Daniel Tso 80 years later, used the term "no-man's land" to describe the checkerboard, where he said 9,000 Diné were "struggling along on barest subsistences [sic]". At the time, Gorman was advocating for the passage of the New Mexico Boundary Bill, a federal bill that would have consolidated Diné land holdings in the checkerboard area. The bill proposed, in Gorman's words:

> "To return to the Navajos this land which was ours, and which we have always occupied. The return of residual public Domain can make possible the addition of State-owned, privately owned land by purchase from tribal funds[7] or by exchange, when the New Mexico Boundary Bill is passed the Navajos will occupy a consolidated body of land" (Gorman 1938; emphasis in original).

At stake in the consolidation of Diné land holdings was nothing less than "the salvation" of the 9,000 Diné living on the land in question, Gorman emphasized (ibid).

Congress would ultimately fail to ratify the New Mexico Boundary Bill, as I will discuss below. Albeit the most comprehensive, this bill would neither be the first nor the last effort by Diné and federal actors to attempt a solution to the problem of the checkerboard. As this chapter will show, the problem would only grow weedier over time as parties acquired legal title to parcels of land in the area, as fractionation of Indian allotments increased exponentially, and as people living on the checkerboard continued to forge attachments to land and place.

[7] The tribal funds in question here are largely funds from oil royalties collected from extraction on executive order reservation lands (Chamberlain 2000; Kelly 1970)

The United States-Navajo Treaty of 1868 granted the Diné a reservation that was but a small part of their former territory between the Six Sacred Mountains. During Treaty discussions, U.S. General W. T. Sherman told the Diné that they were to live upon a newly established reservation. Those who refused to do so could live on unoccupied land outside of the reservation boundaries only if they consented to subject themselves to the laws of the United States (Brugge 1980). To the dissatisfaction of white settlers who would soon arrive in Dinétah, many Diné people chose the latter option, returning from Hwéeldi to their former homes east of the newly established reservation on what was now claimed as the public domain of the United States.[8]

Railroads and Homesteaders

Congress chartered the Atlantic & Pacific Railroad Company in 1866 to build a railroad from Springfield, Missouri to the California State line. For forty miles on either side of the planned line, the Atlantic & Pacific was granted alternate sections of 640 acres of surface land.[9] In Dinétah, a long stretch of land was already becoming checkered, with the railroad holding alternate tracts of surface land and the federal government retaining rights to the subsurface.[10]

[8] The Mexican-American War of 1846-1848 ended with the signing of the 1848 Treaty of Guadalupe Hidalgo. The United States acquired from Mexico 55% of its territory (over 525,000 square miles), including parts or all of present-day Arizona, California, New Mexico, Texas, Colorado, Nevada, and Utah. With the Treaty of Guadalupe Hidalgo, Americans staked a territorial claim to Diné homelands, but it would nearly two decades before Diné people were forced into treaty negotiations.

[9] These grants were made with the purpose of subsidizing railroad construction, providing the railroad company with leasable land along the line. Most of this grant was forfeited in 1886 after eastern portions of the rail line were built, but it remained valid between Albuquerque, New Mexico to California (Mosk 1944). As a condition of the 1868 treaty, the Diné were to "make no opposition to the construction of the railroads now being built or hereafter to be built across the continent" (Kappler 1904: 1016).

[10] In 1876, the St. Louis and San Francisco Railroad Company took over the Atlantic & Pacific, and in 1880 the Atchison, Topeka & Santa Fe Railroad bought a half interest share. Four years later, in 1884, the Aztec Land and Cattle Company bought one million acres of the grant land. In 1894, when the Atlantic & Pacific Railroad Company was liquidated, the remaining grant was divided between two railroad companies. The Atchison, Topeka & Santa Fe share went to an affiliate called the Santa Fe Pacific Railroad Company, while the St. Louis and San Francisco transferred its share to its subsidiary, the New Mexico and Arizona Land Company (Mosk 1944: 12-13).

Anglo-American settlement in the region was gradual. Some settlers leased sections of railroad lands whereas others applied for homesteading permits. The Homesteading Act of 1862 and other homesteading acts to follow encouraged American citizens to move west and settle on 160-acre plots of land. For a minimal application fee and 5 years of continual occupancy on the land, the male adult head of the family could gain title to the tract – provided that over the course of their stay they had made improvements to the land through cultivation and the construction of a home (BLM 2006).

By the late 1870s the white settlers who had arrived in the area expressed considerable anxiety to government officials about Diné people living and grazing animals on the "public domain". Diné people living east of the reservation became classified as "off-reservation", "nonreservation" or "public domain" Navajos, a quasi-juridical categorization that bolstered anxieties about Native presence among settlers recently arrived in the area and facilitated state interventions to manage a people now "out of place" (Smith 1897; Stacher 1926; Stacher n.d.).

A petition signed by 148 individuals in present-day Farmington area sent to Indian Agent Alexander Irvine in 1877 read:

> "There are bands of Navajoe [sic] Indians scattered along the river who make it very annoying to the settlers by means of threatening to drive them away and driving stock and scattering them. … We don't want to have anymore [sic] trouble with the Indians; it has come very near to bloodshed two or three times, and we wish to avoid it if possible and if there is not something done there will be trouble and very likely bloodshed, as some of the settlers are annoyed beyond endurance" (quoted in Brugge 1980: 71)

This expression of settler entitlement to property undisturbed by Native presence is an early sign of the tension and hostility over the control of the range that would only continue to rise over the coming decades.[11]

[11] See Goldstein (2018) on how an expectation of property emerges out of economies of dispossession of Indigenous peoples in the United States. See Moreton-Robinson (2015) on the white possessive logics that produce racial

The General Allotment Act

A third and devastating process through which Dinétah was parceled into distinct pieces of land was through allotment. The General Allotment Act of 1887, also known as the Dawes Act, had transformative effects east of the Navajo Reservation in the early twentieth century, and its legacy continues to be felt daily in Dinétah. As Judith Rosyter (1995) notes, the General Allotment Act marked a shift in the federal Indian policy that preceded it. Whereas earlier nineteenth century policy was "primarily oriented towards the separation of tribes and citizens" into discrete reservations (1995: 8), allotment was aimed at the assimilation of Indigenous peoples through the gradual replacement of communal land ownership with private property.[12]

In his 1910 annual report, then Commissioner of Indian Affairs Robert G. Valentine summarized the essential feature of allotment, or what Valentine called "the Government's great educational program for the Indians", as:

> "the abolition of the old tribal relations and the treatment of every Indian as an individual. The basis of this individualization is the breaking of up tribal lands into allotments to the individuals of the tribe. This step is fundamental to the present Indian policy of the Government. Until their lands are allotted, the Government is merely marking time in dealing with any group of Indians" (Commissioner of Indian Affairs 1910).

The General Allotment Act allowed for tribal lands and reservations to be surveyed and divided into "allotments" of approximately 80-160 acres.[13] These small tracts of land were granted to individual tribal members, who became beneficial owners of allotments over which

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hierarchies and sets of meanings about ownership of the nation and property. See also Harris (1993) on the constitutive links of whiteness and property.

[12] Royster (1995) notes that early nineteenth century separationist Indian policies contained within them the salvationist impulses of allotment: to encourage Christianity, farming, and eventually citizenship. However, in the allotment era, the federal government sought to achieve assimilation of indigenous peoples within the general body of American citizens.

[13] The size of allotments varied. Individual heads of household received 160 acres. Individual adults received 80 acres. Orphaned children often received less (Royster 1995).

the federal government would act as trustee for a 25-year period. After this probationary period, or sooner if an allottee was proven as "competent and capable of managing his or her affairs",[14] allottees would receive fee patents to the allotments and the allottee would become a United States citizen, subject to the laws of the country.

Lands not allotted to Indigenous peoples were opened up for use by settlers. After allottees received patents on their allotments, many were allowed to sell their land to non-Indians. In these ways, allotment resulted in extraordinary territorial dispossession – Indian land holdings in the United States decreased from 138 million acres to 48 million acres between 1887, when allotment began, and 1934, when it ended (Guzman 2000).

Original allottees were denied the right to determine how allotments would be distributed upon death. Instead, allotments typically passed on through state intestacy laws, wherein each heir to the original allottee would inherit an undivided fractional interest in the allotment (Goldstein 2018; Guzman 2000).[15] Legal reforms to address accelerating fractionation have been introduced over the years with only marginal success (Ruppel 2008). As a result of this continued fractionation of ownership, many allotments on the checkerboard today - and throughout Indigenous lands in the United States - have hundreds and even thousands of co-owners.[16]

[14] The Burke Act of 1906 eliminated the 25-year transition period and authorized earlier issuance of fee patents (Burke Act 1906; Royster 1995)

[15] For instance, upon the death of both parents of a family with a 160-acre allotment, the parcel would not be divided evenly into 32-acre tracts between the five surviving children. Instead, the children would inherit a twenty percent share in the entire tract. Their children and grandchildren, and perhaps other kin relations too, would continue to inherit undivided interests in the same parcel.

[16] In 2012, the average fractionated tract with undivided trust interests had 31 co-owners, but many tracts greatly exceed this average (Shoemaker 2016). See also Guzman 2000; Ruppel 2008.

As fractionation increases, it becomes nearly impossible for families to keep track of all the co-owners with whom they are tied to a piece of land.[17] The land itself becomes difficult to use. This results in what Kristin Ruppel (2008) calls "virtual land ownership", a form of property that is known primarily through the administrative practices of the Bureau of Indian Affairs (BIA), and through the lease and royalty checks disbursed by the BIA to allottees.[18] These checks, too, are affected by fractionation, as any income generated from leasing allotments is split evenly between all co-owners. On the checkerboard, some Diné allottees rely on royalty checks from oil and gas extraction on their allotments for basic subsistence, while others whose allotments are more fractionated (or who have not leased their land) may receive as little as $1/month in royalties (see Chapter 4).

Approximately 4,000 allotments were patented to Diné individuals between 1906 and 1934, with about 3,900 of those tracts located in northwestern New Mexico and the rest in Arizona (ILCA 2000).[19] These parcels cover over 750,000 acres of land with over 40,000 known co-owners.[20]

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[17] There are at least 2,601 Diné interest holders who are classified as WAU – whereabouts unknown (DOI 2018). Across the United States, there are 32,300 WAU interest holders (DOI 2016).

[18] Of course, allottees also know *land* in other term, but nevertheless have to navigate the political-legal realities of the trusteeship. Ruppel (2008) explores this tension throughout her book *Unearthing Indian Land*. "Indian land" is at once a legal term that refers to land held in trust by the U.S. government for tribe, but from the perspective of individual allottees and indigenous nations, land can also be much more (p.5).

[19] The Office of Indian Affairs had ordered for allotment to begin as early as 1890 east of the reservation and had sent the Agent Vandever 400 allotment application forms to begin the work. At the time, there were not sufficient agents on the ground lacked the staff to undertake the work of surveying and issuing allotments (Brugge 1980). In 1894, Agent E.H. Plummer wrote to the Commissioner of Indian Affairs asking for an allotting agent to be sent to the area. The Commissioner could spare no staff, but again sent blank allotment application forms. No allotting occurred until 1906, when allotting agent George A. Keepers arrived in Farmington, New Mexico. He set up a small headquarters where he began an allotting program for Diné people living outside of the reservation, as provided by Section 4 of the General Allotment Act (Brugge 1980: 204). Keepers got the program off the ground quickly – by June 1907, he reported to the Commissioner of Indian Affairs that he had made 275 allotments on the public domain in New Mexico: Commissioner of Indian Affairs. "Report of the Commissioner of Indian Affairs." Washington, D.C.: Office of Indian Affairs, September 30, 1907. Pp. 66. By August 1908, the number had risen to 493. Commissioner of Indian Affairs. "Annual Report of the Commissioner of Indian Affairs." Washington, D.C.: Office of Indian Affairs, 1908. P. 94

[20] The Land Buy-Back Program for Tribal Nations finds that as many as 6,369 fractionated tracts (not all allotments per se, but other forms of fractionated land holdings) exist on Navajo – the majority in New Mexico, with a

Allotment in Dinétah

Of all the people who worked for the Office of Indian Affairs (later to become the Bureau of Indian Affairs, or BIA) who played key roles in the allotment process in Dinétah, Samuel Stacher has had the most enduring legacy. Stacher was appointed as superintendent of the Crownpoint jurisdiction (later to become known as Eastern Navajo Agency) in 1907, where he would serve until 1935. In this position, Stacher was put in charge of all "Navajo Indians allotted or living on public lands in New Mexico, east of those of the original Navajo Reservation" (Stacher n.d.).

As the overseer of "off-reservation" Diné, Stacher quickly became concerned with the land problem. He saw that Diné people were being choked off the "public domain", lands that he believed they had a right to occupy. Stacher was a proponent of extending the reservation, and he made multiple requests to the Indian Office to that effect (Brugge 1980; Stacher n.d.). In a reflection on his tenure as superintendent, Stacher wrote:

> "The Indians have always been at the mercy of the politicians. Political pressure brought about stopping the allotting of lands to the Indians before it was completed. The remainder of the public domain was sold to whites when it should have been held for use of the Indians. Inherited lands were sold and in later years many Indians were without land or homes. The management of Indian Affairs, particularly with the unwise land management, has been tragic. Often Congressmen and Senators forced the leasing of even reservation lands to the whites. The white stockmen would influence their men in Congress to bring pressure on the Indian Commissioners to grant leases even when we would recommend against it. Such abuses would require many pages to fully cover the situation" (Stacher n.d.: 6)

Without an extension of the reservation to provide a secure and consolidated land base for Diné people living on the public domain, Stacher viewed the allotment program as an

significant number in Arizona and some in Utah. Department of the Interior. "2016 Status Report: Land Buy-Back Program for Tribal Nations," 2016.

imperfect means to protect Diné land interests. He recognized, however, that 160-acre parcels in the high desert were not sufficient to graze stock, leading to the continuation of conflict between settlers and Diné people over control of the range (Brugge 1980; Weber 1914).[21] Nevertheless, allotment was at the time the only legally and politically feasible means available for Diné people to obtain title to land – albeit to unconsolidated parcels. Stacher and the allotting agents that served under him thus encouraged Diné people to file allotment applications (Brugge 1980; Stacher n.d.). This is why, in 21st century Dinétah, elders still recount hearing stories from their relatives of Stacher hastily "lining people up" to apply for allotments (see Chapter Four).

Despite the federal government's emphasis on allotment, in practice the policy could not be implemented smoothly. As Stacher noted in his 1912 annual report, "There seems to be a systematic political attempt to prevent the Indians from securing patents to the lands allotted them and many applications are held for cancellation" (quoted in Brugge 1980: 275). Indeed, the archival record regarding allotment applications in the region is replete with correspondences from the Indian Office and Stacher's jurisdiction about the cancellation, suspension, or rejection of allotments.[22] Cancellations and rejections seem to have been justified primarily on three grounds, all of which demonstrate the assimilationist concepts of land and land-use at the heart of the General Allotment Act.

First, an allotment could be cancelled if the allottee failed to make "improvements" – such as the construction of a home, corral, or a fence to facilitate grazing - on their parcel. To

[21] As Stacher would note in 1921: "It is to be hoped that it will be possible to block up the checkerboard land in such a way as to permit the stockmen both Indian and white to protect himself. Now he must shift for himself, his allotments of 160 acres have no value unless he is fortunate enough to have water thereon for his stock but otherwise he must depend on the other fellow and trespass is the result with much hard feeling on the part of all concerned" (quoted in Brugge 1980:388).

[22] For evidence of cancellations, see Record Group 75-053A182 8NN-075-88-085, Records of the Bureau of Indian Affairs Navajo Area Office, Gallup N.M., Land Allotment Applications 1913-1918 Boxes 1-3, National Archives. See also Brugge 1980.

improve the land effectively meant to change it in some way to indicate that it was being used economically. The ideology of "improvement", as Bhandar (2018) shows, is common in settler colonies. Fusing values of land and people, the logic of improvement is inflected with a Lockean concept of property in which rational economic actors generate economic benefits from land through labor. To improve land is also to improve its owner-occupants, who must become industrious workers to increase the value of the land (ibid).

Secondly, if an allottee failed to "settle" on their parcel, their allotment could be revoked. To successfully settle meant to live on an allotment permanently, such that if an agent came to check up on the status of an allotment, they would find the allottee living there. Allottees had two years to make settlement on their tract (Brugge 1980: 311). This requirement of the General Allotment Act was out of sync with the way in which Diné families lived at the time (and some live today), migrating to and from seasonal dwellings and grazing sites (ibid: 296).

Finally, married women whose husbands were alive were unable to obtain allotments because the regulations governing allotments on the public domain made no specific "provision for an Indian woman whose husband is entitled to an allotment".[23] The General Land Office interpreted Congress' restriction of homesteads to "heads of families" to mean men, even though Diné society is decidedly matrilineal and property ownership was not traditionally gendered but rather complexly configured and balanced through clan relations and creation stories (Denetdale 2007; 2017; Todacheene 2015). Regulations restricting allotments to male heads of families changed in 1920 when the allotment program was nearing its end, but very few allotments were made to Diné women in Dinétah (Weisiger 2009).

[23] See Record Group 75-053A182 8NN-075-88-085, Records of the Bureau of Indian Affairs Navajo Area Office, Gallup N.M., Land Allotment Applications 1913-1918 Boxes 1-3, National Archives.

Land Buy-Back

Almost a century later, in 2015, the Navajo Nation would launch the first phase of a buy-back program to purchase fractional interests in allotments from willing sellers. This program was carried out in partnership with the Department of the Interior's (DOI) Land Buy-Back Program for Tribal Nations, initiated as part of the 2009 settlement agreement in *Cobell v. Salazar*.[24] First filed as a class-action in 1996 by Eloise Cobell (Niitsítapi Blackfoot Confederacy) and four other plaintiffs representing all individual Indian trust beneficiaries (allottees and other trust interest holders), the suit charged the Department of the Interior and the Department of the Treasury with gross mismanagement of Native American trust funds. With thousands of filings over 14 years of litigation, *Cobell* was one of the largest suits ever filed against the federal government. Through research and discovery, the plaintiffs were able to show egregious misconduct on the part of the federal government, who simply could not provide an account of the money it currently held in trust in Individual Indian Money accounts, and who was found in civil contempt of court for failing to maintain, losing, and in some cases destroying physical records of trust assets (New York Times 2002).[25]

The landmark *Cobell* settlement agreement resulted in a $3.4 billion-dollar fund, of which $1.9 billion was set aside for the purchase of fractionated individual trust lands (interests in allotments).[26][27] On Navajo Nation, over 11,000 people (or 43% of those who received offers) elected to sell their interests back to the tribe in the first phase of the buy-back, returning

[24] *Cobell et al v. Salazar* et al 573 F.3d 808 D.C. Cir. 2009.
[25] In Dinétah, a class action lawsuit filed by Diné allottees affiliated itself with and lent support to the *Cobell* case. In *Shii Shi Keyah v. USA* (1991), an association of Diné allottees won a settlement that would force the federal government to disburse royalty payments on time and to establish a special office (the Federal Indian Mineral Office) to assist allottees with the management of their mineral resources. See Chapter Four.
[26] In addition, $1.4 billion was disbursed among *Cobell* class plaintiffs, and an Indian Education Scholarship Fund of up to $60 million was created.
[27] The *Cobell* settlement was not celebrated across the board by all individual Indian interest holders and their advocates. See Goldstein 2014 for a representative critique.

fractional percentages of 160-acre tracts and a handful of entire tracts to Navajo Nation jurisdiction (DOI 2018). Through the buy-back program, the checkerboard continues to shift, above and below ground, into the 21st century.

Checkering the Subsurface

So far, I have sketched how railroad grants, homesteading, and allotment parceled out surface land in Dinétah. But these processes also had profound and differential effects on concepts of the region's subsurface, institutionalizing regimes of property in which the surface of the Earth and its subsurface could be seen as separate spaces of interest and administration. Before examining what the underground checkering of Dinétah looked like, it is worth briefly asking what counts as a mineral estate, and indeed a mineral, in the United States.

Mineral Rights

The United States' first thirteen colonies generally integrated into their jurisprudence a presumption of English common law: that the subsurface accrues to the surface owner (Harrison 1989). This assumption prevailed after American Independence. The Land Ordinance of 1785, drafted by Thomas Jefferson and adopted by the United States Congress of the Confederation, established the standardized Public Land Survey System, in use to this day, which divided land into rectangular townships of 36 square miles with 36 rectangular sections of approximately one square mile. This system of surveying facilitated sale and transfer of lands from the central federal government to private parties and state government (Gates 1968).[28] As Palmer (2020) shows, at the heart of the Jeffersonian survey were racial tenets about the inferiority of

[28] A detailed accounting of the development of public land law in the United States is beyond the scope of this chapter but see Gates (1968) and Harrison (1989).

Indigenous peoples vis-à-vis white settlers and a Lockean concept of labor as that which mediates between a body and property.

Through a violent process of western expansion and settlement, the United States established what it claimed to be its public domain, which included a public surface and public mineral estate. In New Mexico, federal lands were transferred first through railroad grants, which split surface and mineral ownership across much of Dinétah. The surface was granted to private railroad companies to lease or sell to settlers, but the United States reserved for itself the mineral estate along the railroad grant in New Mexico. In 1912, New Mexico was formally admitted into the United States, shedding its classification as a territory. The federal government granted the new state one square mile of surface *and* subsurface land per township, totaling over 13 million acres. This land was to be held in trust by the state for the benefit of public schools, universities, and other public institutions.

The Land Ordinance of 1785 remained the prevailing land law until the Homesteading Acts were introduced, beginning in 1862. Homesteading policies contained provisions that would have lasting consequences for twentieth and twenty-first century oil and gas development in Dinétah, because they checkered not only the surface but also the subsurface.

The first Homesteading Act of 1862 conveyed mineral rights to homesteaders along with title to their surface plot. However, by 1909, the federal government recognized differential values of surface and subsurface resources and began allowing settlement on surface lands while reserving mineral rights.[29] The 1910 "Act to provide agricultural entries on coal lands" stated

[29] See Ch.270, 35 Stat. 844 (1909) (codified in 30 U.S.C. § 81 [1982]) and Ch.317 36 Stat 583 (1910). The Stockraising Homestead Act of 1916, which would remain in place until 1976, provided 640 acres to homesteaders and reserved mineral rights to the federal government. This act contributed significantly to split estate formations. Other earlier homesteading acts across the country included the Preemption Act of 1841, the Donation Land Claim Act of 1850, the Timber Culture Act of 1873, the Desert Land Act of 1877, and the Timber and Stone Act of 1878.

that "unreserved public lands of the United States … which have been withdrawn or classified as coal lands, or are valuable for coal, shall be subject to appropriate entry under the homestead laws to actual settlers only" (36 Stat., 583), while the 1909 Act gave the United States the authority to retrospectively reserve minerals on lands where coal potential was later recognized (35 Stat., 844). Homesteaders who complied with the provisions of the Homesteading Act (occupancy and improvement of the land) would receive a patent to the land which reserved the mineral rights to the United States. And so, in the West, began the legal fragmentation of the surface from the subsurface.

Obtaining knowledge about the mineral potential of Dinétah required geological investigations. The first geological work in the area began in the early twentieth century (Schrader 1906; Shaler 1906) for the United States Geological Survey (USGS). Prior to this, small independent petroleum companies had drilled wildcat wells, the first in 1901, but without much luck until the 1920s (Chamberlain 2000). In 1917, geologist Herbert Gregory wrote of his "reconnaissance" of Navajo Country, including areas east of the reservation. Gregory's objective was to "to "spy out the land" with a view to suggesting ways in which the country could be more fully utilized" (Gregory 1917: 9). He described the region as a geological frontier: "Satisfactory maps are lacking, roads are few, and trails are poorly marked, water is scanty and generally poor, and food for animals is scarce" (ibid). Of the region's inhabitants, Gregory wrote that the white population was small and concentrated around the railroad line and the San Juan River. The Indians, however, were numerous and "none too friendly" (ibid). "Geologic fieldwork in such a country", Gregory summed up, "is necessarily a reconnaissance; some of it, in fact, is exploratory" (ibid).[30]

[30] Over the next several years, more geologic investigations of Dinétah were conducted both by USGS staff and geologists contracted by oil companies (Sears, Hunt & Dane 1934 and 1936; Dane et al 1966). In 1920, geologists

In 1919, two years after the release of Gregory's report, allottees who had met the requirements in the General Allotment Act (Brugge 1980; *Mescal v. United States* 1983) began receiving patents to their allotments.[31] Unbeknownst to Diné applicants at the time, the early twentieth century coal acts (and later the 1946 Atomic Energy Act) would affect them too. While allotment policies did not provide for a severing of surface and subsurface rights, the United States nevertheless used the 1909 and 1910 coal acts to reserve minerals for itself. Take, for example, the allotment patent received by "Bah, an Indian of the Navajo Reservation" in 1919 for 160 acres in San Juan County, New Mexico. At the bottom of the page, in fine print hovering just above the date and Woodrow Wilson's signature, appears the following condition of the patent: "reserving, also, to the United States, all coal in the lands so granted, and to it, or persons authorized by it, the right to prospect, mine, and remove coal from the same".[32] (Patent 679749).

Bah was not alone. Many years later, in 1983, eight Diné allottees filed suit against the Secretary of the Interior and handful of coal and oil companies upon the discovery that the patents to their allotments had reserved mineral rights to the United States.[33] Representing a class that would grow to 15,000 allottees, the plaintiffs laid out a story that began in 1906 with the allotment program in Dinétah. They alleged that no applicant for any of the approximately 2,500 tracts at suit had voluntarily or knowingly received a trust patent that reserved minerals to the

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Sickler and Beall prepared a small tome on the geology of northwest New Mexico for Midwest Refining Company (Sickler and Beall 1920). Midwest famously struck oil two years later in the Hogback formation near Shiprock, within the borders of the Navajo Reservation, thereby establishing New Mexico's first commercial oil well (Chamberlain 2000). See Hu (forthcoming) on the conjunction of imperialism and geology as a form of knowledge.

[31] The General Land Office records show that large numbers of patents were given out in 1919 in the checkerboard compared to other years. Some allottees did not receive patents until the 1920s, 1930s, 1940s, with some as late as the 1950s.

[32] Allotment Patent for Bah, an Indian of the Navajo Reservation, United States 679749, New Mexico, 1919.

[33] The original plaintiffs were Frank Etcitty, Bertha Mescal, Bert Mescal, Carl Johnson, Helen Chee, Billy Chiquito, Juanita Jim, and Mary Chee Boyd (*Mescal v. United States* 1983).

United States.[34] Meanwhile, DOI had issued mineral leases, exploration permits, and prospecting permits for minerals that the federal government still reserved for itself. These permits, the plaintiffs claimed, had been granted "without the voluntary and informed consent of the beneficial owners of the allotments at suit, and without provision for rents and royalties".

After thirteen years of litigation, the parties settled the case in 1996. As per the terms of the settlement, BLM was ordered to re-issue approximately 2,500 trust patents to some 15,000 fractional owners whose allotments were affected, conveying to them their rightful beneficial mineral titles. [35] These titles would ensure that any mineral extraction on allotment parcels would need to be negotiated with the co-owners.[36] The *Mescal* settlement was a huge victory for Diné allottees. While the need to bring the case underscored how the ordering of the region had been shaped by settler and extractive interests, the plaintiffs' win showed that there was nothing settled about this legal geography.

When and Where is a Mineral?

Federal law is ambiguous about the definition of a mineral. The Code of Federal Regulations for the Department of the Interior defines it in a rather tautological manner:

> *Mineral* refers to any substance that (1) is recognized as mineral, according to its chemical composition, by the standard authorities on the subject, or (2) is classified as mineral product in trade or commerce, or (3) possesses economic value for use in trade, manufacture, the sciences, or in the mechanical or ornamental arts. (43 CFR § 2400.0-5)

[34] Moreover, the federal government had failed to issue supplemental trust patents relinquishing mineral reservations for allotments that had, since their original patenting, been classified as non-coal. The authority for issuing supplemental patents relinquishing the reservation of coal minerals comes from the Act of April 14, 1914, ch. 55, 38 Stat. 335; 30 U.S.C. S82.

[35] It would take the BLM several years to issue all these patents. See *Mescal v. United States,* affidavit of Michelle Chavez. The re-issuing of 2,500 patents represented over half of the 4,000 allotments made to Diné individuals between 1906-1934.

[36] The *Mescal* settlement also created a fund out of which the plaintiffs' counsel fees and expenses were paid, and out of which money would be disbursed to allottees whose allotments (a total of 79 tracts) were encumbered by existing leases.

What the federal government meant by "mineral" when it reserved for itself the minerals beneath a parcel of land it granted to settlers has since been subject to much debate with significant consequences.[37] Courts have tended to interpret controversies over land grants as constructed in favor of the government. Even so, what has come to count as a mineral in U.S. law has involved articulating spatially and temporally specific questions of value.

Consider, briefly, two examples from influential Supreme Court cases. In the first, *Watt v. Western Nuclear, Inc*, (1983) then Secretary of the Interior James Watt sued the company Western Nuclear for mining gravel on lands that had been patented under the Stock-Raising Homestead Act of 1916 (SRHA), which reserved to the United States "all coal and other minerals". Western Nuclear mined the gravel on this land to pave roads and sidewalks in a company town in Wyoming where its employees resided. When BLM issued Western Nuclear a notice of trespass, the case eventually made it to the Supreme Court of the United States. The question for the court to decide was: does gravel count as a mineral, as reserved under the SRHA?

The Supreme Court found that yes, gravel is a mineral, but not only because it is "a mineral familiar within that definition of the term", but because gravel is "the type of mineral that Congress intended to reserve to the United States in lands patented under the [Stock-Raising Homestead] Act" (36). Coming to this decision required significant philosophizing on the part of the court. As Justice Thurgood Marshall wrote:

> "In the broad sense of the word, there is no doubt that gravel is a mineral, for it is plainly not animal or vegetable. But "*the scientific division of all matter into the animal, vegetable or mineral kingdom would be absurd as applied to a grant of lands, since all lands belong to the mineral kingdom*." *Ibid* (*Northern Pacific Ry. Co. v. Soderberg, 188* U. S. 526, 530 [1903]). *While it may be necessary that a*

[37] See *Amoco v. Southern Ute Tribe; Northern Pacific Ry. Co. v. Soderberg; United States v. Toole; Watt v. Western Nuclear, Inc*.

> *substance be inorganic to qualify as a mineral under the SRHA, it cannot be sufficient. If all lands were considered "minerals" under the SRHA, the owner of the surface estate would be left with nothing*" (43, emphasis added).

Ultimately, the court found that the purpose of the SRHA – to facilitate the development of both the surface and subsurface– supported the government's contention that mineral reservations under the SRHA included gravel. "Finally," the court wrote, "this conclusion is further buttressed by the rule that land grants are construed favorably to the Government" (36).

In the second example from the northern tip of the San Juan Basin in southwestern Colorado, *Amoco Production Co v. Southern Ute Indian Tribe* (1999), the Supreme Court still issued a ruling in the federal government's favor, but this time found that a natural gas was *not* a mineral. In 1938, under the authority of the Indian Reorganization Act of 1934, the Southern Ute Indian Tribe was granted, in trust, subsurface lands that had been previously taken through colonial settlement.[38] The surface lands at issue were now privately owned, but the coal beneath these lands had been patented under the 1909 and 1910 coal acts and title was now restored to the Tribe. In 1981, Amoco contracted with private surface owners to lease and extract coal bed methane gas (CBM) from these lands without consent from the Tribe. In the early twentieth century CBM was considered a dangerous byproduct of coal extraction, but by the 1980s it had become a valuable form of unconventional natural gas. The Southern Ute Indian Tribe sued federal agencies, Amoco, and the private surface and royalty owners with whom it had contracted, seeking a declaration that the CBM has been reserved by the 1909 and 1910 coal acts, and now belonged to the Tribe.

The Supreme Court found that in this instance, "the term "coal" as used in the 1909 and 1910 Acts does not encompass CBM gas" (865). For the court, this was not a question of

[38] The lands patented under the 1909 and 1910 Acts were former reservation lands. The Southern Ute Indian Tribe had ceded these lands to the U.S. in exchange for certain allotment lands in 1880 (*Amoco v. Southern Ute*).

whether CBM is contemporaneously known to be a constituent of coal, but rather how the substance was interpreted in the early twentieth century and whether Congress meant to reserve it. With the Supreme Court's conclusion, Amoco and other operators could legally contract with private surface owners to extract CBM from Southern Ute lands.

The Supreme Court's seemingly opposite findings on what counts as a mineral in *Watt v. Western Nuclear* and *Amoco Co. v. Southern Ute Indian Tribe* highlight that in U.S. jurisprudence, "mineral" has no fixed ontology or spatial coordinates. The jurisdictional question becomes not "what is a mineral?", but rather "when, where, and to whom is a mineral?". As Justice T. Marshall wrote in his decision for *Watt v. Western Nuclear*, if the common-sense definition of "mineral" (as opposed to "animal" and "vegetable" matter) were applied across the board, there would be no clear separation between the Earth's surface and what lies – at various depths – below it.[39]

Binding the Reservation

Through the late nineteenth century, tension between white stockmen and Diné people living East of the reservation continued to mount. In light of this growing strain - and to provide enough land for Diné people to water their flock - the federal government extended the reservation in 1880, primarily to the north and east of the 1868 treaty reservation. To the east, this extension brought the reservation line fifteen miles closer to Chaco Canyon (Brugge 1980: 90).[40]

[39] Many Diné interlocutors have spoken to me about traditional Diné knowledge of minerals, wherein elements were put below the earth and into the sky by the Hero Twins and the Early Twilight Dawn deity with specific purposes, and their removal entails proper protocols and offerings. I do not expand on this here but see Curley 2008; Todacheene 2015; Yazzie-Lewis and Zion 2006; Voyles 2015.

[40] This extension was the second of seventeen executive-order extensions and other formal additions of the Navajo Reservation between 1878 and 1933, including the 1882 creation of the Hopi reservation (Kelly 1970).

Losing 709

In 1907, President Theodore Roosevelt took two actions that would have lasting consequences for Diné people living east of the reservation. In March, Roosevelt issued a Presidential proclamation establishing Chaco Canyon National Monument (Roosevelt 1907), turning 20,629 acres into monument land (McManamon et al 2019).[41] The Monument would be enlarged slightly in 1928 and designated as a National Park in 1980. Diné families had been living in Chaco Canyon since their return from Hwéeldi. The designation of the Canyon as a National Monument meant that no future allotments would be made within the Monument's boundaries and some existing allotments would in fact be cancelled (Brugge 1980).

The second consequential decision for Dinétah was made when Roosevelt heeded to recommendations by allotting agents, Commissioner of Indian Affairs Francis E. Leupp, and calls from Diné people themselves to extend the reservation (Mosk 1944; Kelly 1970). In November of 1907, Roosevelt signed Executive Order 709, withdrawing from the public domain about one million acres in San Juan and McKinley Counties and annexing this acreage to the Navajo Reservation (E.O. 709; Mosk 1944).[42] Shortly after, Executive Order 744 amended a typographical error in 709, which had the extension unintentionally encroach into the boundaries of the Jicarilla Apache Nation (E.O. 744). Allotment of parcels to individual Diné inhabitants within the Executive Order 709/744 addition continued, and allotting agents helped Diné applicants to secure parcels with springs and water holes that would support them in sustaining livestock and crops. Because the Executive Order addition did not affect existing rights in the

[41] Calls for the Canyon to be made into a park for preservation purposes had started in 1901, when the General Land Office sent staff to investigate excavations begun in 1896 under the direction of prominent white rancher in the area, Richard Wetherill (Brugge 1980).
[42] Executive Order 709 also withdrew from the public domain large tracts to the south and west into Arizona, adding these to the reservation as well.

area, white settlers continued to lease sections still owned by the railroad companies (Kelly 1970).

In response to strong opposition to the reservation extension from settlers in the area, Congress passed a law in May of 1908 that allowed for these lands to be restored to the public domain and opened for settlement once allotment had been completed to the satisfaction of the President.[43] By December 1908, Roosevelt had already succumbed to the pressure. He issued another Executive Order, which restored twenty-six townships in the newly extended reservation to the public domain.[44] And by 1911, President Taft's Administration deemed the allotment process to have been sufficiently complete within the entire 709/744 area. With Executive Order 1284, Taft restored all of the land that Roosevelt had initially tacked onto the reservation to the public domain, leaving approximately 2,500 allotments – representing less than 50% of the Diné eligible for allotments and covering less than half of the new extension - in a sea of now federally and privately (railroad) claimed land.[45]

Getting 709/744 Back: *Navajo Tribe v New Mexico*

In 1982, the Navajo Nation brought suit against the state of New Mexico, the United States, and several individuals and private companies with prominent holdings in Dinétah. The suit alleged the lands added to the reservation via Executive Order 709/744 had never been validly revoked, and moreover, that less than half of eligible Navajos living in the extension area had received allotments. Therefore, the suit alleged, the Navajo Nation still held beneficial title

[43] "Public Law No. 156," Chap. 216 § (1908).
[44] "Executive Order 1000: Altering Lands Composing Reservation of Navajo Indians" (Altering Lands Composing Reservation of Navajo Indians).
[45] By 1910, Samuel Stacher, Superintendent of Crownpoint (the Eastern Navajo Jurisdiction) reported that 2,500 allotments had been made: Brugge, *A History of the Chaco Navajos*.

to the land that had been added to the reservation in 1907 and taken back in 1911. The federal district court granted the defendants' motions to dismiss the case principally on the procedural grounds that it should have been filled under the Indian Claims Commission Act (ICCA). In 1987, the Tenth Circuit Court of Appeals unanimously affirmed the district court's decision.

The ICCA of 1946 created the Indian Claims Commission (ICC). Prior to the establishment of the ICC, tribes had no venue to litigate claims against the United States unless they obtained specific permission from Congress. The seed for the ICC was a 1928 report "The Problem of Indian Administration", principally authored by Lewis Meriam for the Secretary of Interior and commissioned by the Brookings Institute (Lewis 1928). Among many other recommendations, this influential report strongly recommended the establishment of a body to adjudicate Indian claims, and for the elimination of the allotment program, of which Meriam was a staunch critic. Once established, the ICC would consider claims from "any Indian tribe, band, or other identifiable group of American Indians" (ICCA 1946) against the United States for monetary damages for tribal lands that were taken, and a broad range of harms done prior to the date of the enactment of the ICCA. Tribes initially had five years to file their claims, but this period was extended several times until 1978, upon which the ICC was abolished, and unsettled claims were transferred to the Court of Claims (Newton 1992).

In dismissing the Navajo Nation's appeal, the Tenth Circuit and the district court before it decided that the claim regarding the Executive Order 709/744 lands should have been filed under the ICC (prior to 1978) and was otherwise barred (*Navajo Tribe v. New Mexico*; Hughes 1988). But the Court held that even if the Navajo Nation had filed a claim under the ICC:

> "The Tribe simply would have had to accept just monetary compensation if the Commission found their claim to title valid. This restriction as to remedy represents a fundamental policy choice made by Congress out of the sheer, pragmatic necessity that, although any and all accrued claims could be heard

> before the Commission, land title in 1946 could not be disturbed because of the sorry injustices suffered by native Americans in the eighteenth, nineteenth, and early twentieth centuries. Those injustices would have to be recompensed through monetary awards" (*Navajo Tribe v. New Mexico* 1987*: 55*).

According to the Tenth Circuit, the Navajo Nation's claim to *title* of 709/744 lands, rather than demand for monetary compensation for the loss of them, could not be adjudicated even had the claim been filed within the ICCA's statute of limitations.[46] This decision, legal scholar Richard Hughes argued at the time, was "utterly without precedent" (1988: 409) because nothing in the ICCA suggested it was meant to handle live title disputes, nor liquidate titles proven to be valid.

Years later, in a 2012 resolution on the topic of land consolidation in Eastern Navajo, the 22nd Navajo Nation Council would write of *Navajo Tribe v. State of New Mexico*: "that decision was not a decision on the merits, such that the Navajo Nation retains its claim to beneficial title to all restored lands but is merely without a judicial forum to press them".[47] To this day, the claim still stands.

Consolidation Efforts

A drama of jurisdiction continued to unfold through the 1920s and early 1930s as the reconfigurations of the landscape brought about through railroad leases, homesteading, and allotment continued. The federal government, whose policies had set in motion the increasing fragmentation of the landscape, found itself unable to contain the process it unleashed.

[46] The Tenth Circuit also affirmed the district court's dismissal of the non-federal parties named in the case (companies and individuals with large land holdings in the 709/744 area).
[47] Navajo Nation Council Resolution CO-47-12, 2012.

By the early 1920s, federal representatives were increasingly concerned with what Diné leaders had been saying for a long time: that the checkerboard put Diné people at significant disadvantage without enough land to subsist. Several pieces of legislation were passed with the goal of consolidating land interests on the checkerboard into contiguous areas. The federal government pursued land exchanges with private property owners, obtaining railroad holdings for the Tribe.[48] The discovery of oil east of the reservation led the federal government to organize a Navajo Tribal Council in 1923 for the sole purpose of approving oil leases on the reservation.[49] The Tribe was then authorized to purchase private lands with its oil royalties, which it did – acquiring by 1932 some 258,000 acres of land for just under half a million dollars.[50]

But the best hope for land consolidation lay in the New Mexico Boundary Bill introduced in 1931 by Senators Carl Hayden and Sam Bratton with the purpose of overcoming "the disadvantages now existing by reason of 'checkerboard' control of lands by Navajo Indians and private landowners" (Hagerman 1932a: III). This is a version of the same bill for which Howard Gorman would advocate in 1938, arguing that it would alleviate the conditions of the 9,000 Diné living on the "no-man's land" of the checkerboard.[51] The bill proposed to redefine the exterior boundaries of the Navajo Reservation and consolidate ownership of lands therein. After nearly a decade of negotiations, the New Mexico Boundary Bill failed to pass, in part because of

[48] By 1935, all of the Santa Fe Pacific Railroad Company holdings in the present-day checkerboard had either been bought by or exchanged with the federal government in trust for the Navajos, and the New Mexico and Arizona Land Company had sold its remaining holdings in the checkerboard to the tribe (Kelly 1970).
[49] I do not elaborate on the history of the Navajo Tribal Council here, but for an excellent account see Chamberlain (2000).
[50] Commissioner of Indian Affairs. "Annual Report of the Commissioner of Indian Affairs to the Secretary of the Interior for Fiscal Year Ended June 30, 1932." United States Department of the Interior, 1932.

[51] Versions of the New Mexico Boundary Bill were introduced in 1931, 1932, 1933, 1934, and 1936 (Kelly 1970; Mosk 1944). All were unsuccessful.

disagreement among Diné politicians on the matter, strong opposition from white stockmen east of the reservation and the politicians who represented them, as well as other New Mexico political interests such as concerns over the loss of taxes in the counties from which land would be withdrawn (Brugge 1980; Kelly 1970; Mosk 1944).

Just as the allotment program on Dinétah was terminated in the early 1930s, the newly appointed Commissioner of Indian Affairs, John Collier, devised a violent livestock reduction program that he hoped would help solve the problem of erosion caused by what he perceived as decades of overgrazing in Navajo country. As Weisiger (2009) notes, while Collier blamed erosion on overgrazing, it was really a result of federal actors' decision to force Diné people onto a reservation that was too small to support their stock.[52] The 1934 passage of the Indian Reorganization Act and the Taylor Grazing Act brought an end to both allotment and homesteading as means for Indigenous people and settlers alike to claim title to land on the public domain.[53] The checkerboard area was now increasingly subject to administration by the Grazing Service and the General Land Office, which would merge in 1946 to become the Bureau of Land Management (Weisiger 2009).

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[52] First soliciting the voluntary sale and then directing the outright slaughter of sheep and other livestock by the tens of thousands, Collier's livestock reduction program had devastating effects on Diné mutton and wool subsistence economies, reducing Diné herds by more than half. Given the central role that sheep play in Diné social and cultural life, the livestock reduction program had reverberating traumatic effects across generations. See also Iverson and Roessel (2002); Powell (2018); Yazzie (2018).

[53] The Taylor Grazing Act of 1934 authorized the Secretary of the Interior to create grazing districts in which the Department would manage permits for grazing and infrastructure projects. While the passage of the Act did not change ownership of surface or subsurface lands in the checkerboard, it did have an effect on land-use. Each grazing district had an advisory board composed of local constituents that made recommendations to higherups on permits. But as most Diné could not read or write in English, they were ineligible to vote on the boards, and white stockmen tended to dominate recommendations for permits. Cognizant that the Diné were being choked off the range, in 1939 John Collier worked with Secretary of the Interior Ickes to create a special grazing district – District 7 – in the checkerboard, essentially encompassing the area that the New Mexico Boundary Bill would have added to the reservation. The advisory board for District 7 had additional members to represent 'Indian interests'– such as the Indian Office, the Soil Conservation Service, and the Forest Service. While effectively turning the administration of the area over to the Grazing Service (now the Bureau of Land Management), the creation of District 7 did ensure that the Diné secured most of the remaining grazing permits in the area, much to the protest of white stockmen. Mosk, *Land Tenure Problems in the Santa Fe Railroad Grant Area;* Weisiger, *Dreaming of Sheep in Navajo Country*.

By mid-century, all hopes of a reservation extension or land consolidation through a boundary bill had been abandoned. It would not be long before Cold War era booms in oil, gas, coal, and uranium would take off in Dinétah (see Introduction). As Diné intellectual John Redhouse (1983) describes, the checkerboard pattern of land ownership that had formed over the previous century saw little change for nearly three decades after the implementation of the Taylor Grazing Act. But beginning in 1964, lands in Dinétah that had been withdrawn for Diné use were opened for mineral leasing (ibid). As the coal and oil and gas potential of these lands was increasingly known, the Bureau of Land Management (BLM) became concerned with Diné occupancy in the area.

Unauthorized Occupants

In 1974, BLM published a report called "Navajo Occupancy on National Resource Lands in Northwest New Mexico", in which it found that nearly 8,000 Diné were living on the public domain without authorization. The report outlined the problem as such: not only were Diné illegally occupying National Resource Lands (as BLM then called federally managed lands), but over 2,000 of these Diné lived on tracts that conflicted with mineral development, particularly coal, oil, and gas.[54] The agency had received letters and comments from oil, gas, and coal companies requesting that "squatters" be removed from their leases, from conservation groups urging for the protection of public lands,[55] and from Diné organizations asking that land be set

[54] Bureau of Land Management, "Navajo Occupancy on National Resource Lands in Northwest New Mexico," Prepared in Conjunction with the San Juan and Chaco Mangement Framework Plans (Albuquerque, New Mexico: United States Department of the Interior Bureau of Land Management Albuquerque District Office, 1974, p.1).
[55] Many of the conservation groups who provided feedback to the BLM on the issue of unauthorized occupancy were not sympathetic to the needs of Diné families living on National Resource Lands. While the conservationists were primarily concerned with halting unchecked resource development, they also felt that the problem of unauthorized occupancy should be handled immediately, primarily by land exchanges. For example, the New Mexico Wildlife Federation wrote: "Steps to evict unauthorized occupants of Federal land should begin at once. Discrimination due to national origin or race in enforcement of trespass laws should be stopped. There will be

aside for Diné use. The report laid out a number of strategies for addressing unauthorized occupancy and ultimately recommended that existing unauthorized occupants be "given the opportunity to acquire the area occupied by exchanging land of equal value" in cases where the occupant did not interfere with mineral development.[56]

Between 1980-1987, the BLM Farmington Field Office legalized approximately 500 homesites belonging to families who had previously lacked federal authority to dwell on the public domain in Eastern Dinétah.[57] The agency's broader approach to the problem of unauthorized occupancy took the form of programs for land exchanges, which have continued since the 1980s and have helped to consolidate some land holdings.[58] In doing so, land consolidation has also authorized some Diné occupancy in the area.[59] But the overall shape of the checkerboard – as a Navajo Nation Council resolution would describe it in 2012, "a crazy quilt of land titles and governmental jurisdiction, and lack of basic services and infrastructure taken for granted in non-Indian areas"[60] – remains.

On the checkerboard, land exchanges – no matter the size – are hard won achievements, and while they may alleviate day to day difficulties of (co)habitation on the range, they do not

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instances where exceptions to the above policy may be necessary. If it is necessary or desirable to authorize this unauthorized occupancy, requirements should be made for an exchange of land rather than an outright gift or sale of the National Resource Land". The Sandia Mountain Wildlife and Conservation Association was even blunter: "We are concerned, even alarmed, at the amount of land being lost to Navajo's by squatters. We would appreciate your thoughts on what we can do in order to halt this land grab" (BLM 1974: Appendix G).

[56] Bureau of Land Management, "Navajo Occupancy on National Resource Lands in Northwest New Mexico." Appendix 1.

[57] Bureau of Land Management, "Farmington Resource Management Plan" (Albuquerque, New Mexico: United States Department of the Interior Bureau of Land Management Albuquerque District Office Farmington Resource Area, 1988: p.2-7).

[58] First, a 1980 Public Land Order (5721) withdrew 67,000 acres of surface federal land in the San Juan Basin for exchange between the BLM and the Navajo Tribe. The exchange was finally authorized by the passage of a 1983 law and, once consummated, the BLM worked with the Tribe and the Bureau of Indian Affairs to identify other areas for potential exchanges (ibid; BLM 2984). The BLM Farmington Field Office Resource Management Plans for 1987 and 2003 both indicated hundreds of thousands of acres available for exchange with the Navajo Nation.

[59] The problem of unauthorized occupancy continued in the 21st century for the BLM. In 2012, the Associated Press reported "Around 45 Navajo families are living on U.S. Bureau of Land Management near Bloomfield without permission" (Associated Press 2012).

[60] CO-47-12

resolve longstanding claims to title and belonging. Moreover, while land exchanges have consolidated some surface holdings, they have not always had the same effect on the subsurface. As with the exchanges consummated in the 1980s under the BLM's Navajo Occupancy Resolution Program, many land exchanges in the area only swap surface rights, further splitting surface and subsurface estates.[61]

In the early twentieth century, white stockmen and homesteaders were anxious about Diné presence east of the reservation, as it threatened their ability to secure land and raise stock. Their opposition, sustained through the first half of the twentieth century, to all forms of Diné land tenure outside of the 1868 treaty reservation informed the contemporary configuration of the checkerboard. Meanwhile, the United States had illegally withheld the subsurface rights to over half of the tracts allotted to Diné individuals, preserving for itself the opportunity to extract coal and other minerals. In the mid 1970s, concern about Diné habitation in Dinétah came to a head when there was great interest from coal companies in strip mining near Chaco Canyon and as oil and gas operators continued to drill throughout Dinétah.[62]

That people who have lived in a place since time immemorial could come to be seen as squatters on their ancestral territory reveals the tremendous capacity of the law to perpetuate a narrative space-time that omits the conditions of its own authority (Cormack 2008; Richland

[61] For example, in November 2018, the Navajo Nation and the New Mexico State Land Office celebrated a land exchange that was three decades in the making. The Navajo Nation gained some scattered 45,000 acres in the checkerboard area, while the State would receive from the Nation two large ranch parcels south of the reservation of approximately the same size and equally valued at $15 million. In the patents and deeds outlining the details of the exchange, both parties unequivocally reserved for themselves the mineral rights underlying the surface acreage they traded. The State Land Office's press release announcing the exchange said the deal would "remedy the inadvertent placement on Navajo dwellings and two Navajo cemeteries on State Trust Lands" (State Land Commissioner 2018) and, by virtue of consolidating some checkerboard lands, make management easier for both parties. "The Navajo people who have placed structures on state trust lands will be able to finally obtain much needed rights-of-ways for basic life-sustaining services, such as water, electricity & gas", the press release said (ibid).

[62] This strip mining ultimately never happened in the Chaco area, though significant surface and underground coal mining was permitted not far from here, in San Juan County and on Navajo Nation in the 1970s.

2013).[63] This form of colonial unknowing (Vimalassery, Pegues, and Goldstein 2016; 2017) shores up the federal government's authority to lease the public domain for oil and gas extraction even in the face of strong Diné opposition (see Chapters Two, Three, and Four).

Navajo Exchange Legislative Initiative

In 1980, the Navajo Nation Council established the Eastern Navajo Land Commission (ENLC). Composed of six Council Delegates representing the checkerboarded Chapters across Eastern Navajo Agency, an at-large member, and support staff, ENLC's purpose is to work towards the consolidation of the checkerboard and to advocate for the rights of Diné people living on BLM and State lands.[64] Keeping alive the goals sought in the 1930s New Mexico Boundary Bill in and in the 1980s *Navajo Tribe v. New Mexico*, the Council devised ENLC's "ultimate objective" of:

> "securing reservation boundary legislation that will include the checkerboard area in New Mexico as part of the formal, recognized Navajo Indian Reservation and formal protection of areas or sites of cultural, religious or historic significance to the Navajo Nation in or near the Eastern Navajo Agency" (ibid).

The Navajo Nation Council reaffirmed the original intent of ENLC in 1988 when it passed the Navajo Land Consolidation Act, formalizing its intent to pursue consolidation. A 1997 resolution requesting that the United States take in to trust status Navajo fee lands[65] across the checkerboard, and subsequent resolutions in 2011 and 2012, put forward specific plans for

[63] See Richland (2013) on "law's perpetuity", a specific type of narrative time-space in which the law intertextually marks itself and "figuring the current legal moment, and its binding of fact to norm as simultaneously immanent and transcending the facts and norms it brings together" (ibid: 219). In a similar vein for my purposes here, Cormack (2007) writes that "the jurisdictional activity that inscribes power as juridical authority is the ongoing process of bringing the law (which is in a lag in relation to itself) inside itself as knowledge and acknowledgement, in consequence of which process the law's past is "lost" by being reordered toward its future" (30).
[64] Navajo Nation Code, Title 2 § 861
[65] Fee land is land owned by the Nation but not subject to trust.

land exchanges and conveyances between BLM, the State, and the Navajo Nation that would consolidate the checkerboard.[66] The proposals culminated in a comprehensive piece of federal legislation called the Navajo Legislative Exchange Initiative (NELI), which received overwhelming support from all 31 Chapters in Eastern Navajo Agency.

Support for consolidation remained strong in Eastern Navajo Agency, though the 23rd Navajo Nation Council (2014-2018) did not prioritize lobbying for federal enactment of the legislation in Washington. In 2019, Daniel Tso, elected in 2018 as Council Delegate of the 24th Navajo Nation Council (2018-2022), led ENLC in renewing efforts towards consolidation. The following year, Council Delegate Mark Freeland introduced ENLC-supported legislation to the Navajo Nation Council. An updated version of NELI, the "Eastern Navajo Agency Land Exchange and Archaeological Protection Act", was circulated for debate in the Nation's Resource Development Committee in February 2020.[67] The legislation was tabled before it could advance, as the Navajo Nation quickly had to respond to the coronavirus pandemic that spread throughout Diné Bikeyah beginning in March of 2020. But throughout Eastern Navajo Agency, restoring the potential for Diné self-governance across an unfragmented homeland has long been a protracted political project, the prospects of which remain in sight.

[66] See Navajo Nation Council resolutions CJY-66-97 (1997), CMY-23-88 (1988) CAP-11-11 (2011), CO-47-12 (2012), and ENLC Resolution ENLCF-01-10 (2010)

[67] "An Action Relating to Resources and Development Committee, Naabik'i'yati' Comittee and the Navajo Nation Council; Rescinding CO-47-12; Re-Affirming CAP-11-11; and Respectfully Requesting the United States Congress Enact Legislation Consistent with the Principles Stated in CAP-11-11 and the Eastern Navajo Agency Land Consolidation Goals of the Navajo Nation." Resolution. Window Rock, AZ: 24th Navajo Nation Council, 2020.

Conclusion

I awoke to an alarming email. A policy researcher with the Tri-Chapter had been pulling data on the New Mexico Oil Conservation Division (NMOCD) website for a mapping project when he happened upon a report describing a substantial oil spill from a well in the Counselor Chapter area. He sees incidents like these in the data regularly – spills, tank fires, and blowouts of which neither he nor the community is made aware. In this case, the sheer volume of substances released in the spill compelled him to alert community leaders and a handful of outside supporters like me. The incident report is not easy to find, located more than halfway down the long NMOCD page for Enduring Resource's well #315H, itself buried in the bowels of the agency's website. Some 46,200 gallons of wastewater and 12,600 gallons of oil were released into a nearby arroyo, travelling over a mile and a half. The spill had occurred about six weeks ago but was news to everyone getting this early morning email, including local community leaders and elected Chapter Officials.

As I began plugging the well's GPS coordinates into Google Maps, I received a panicked call from Daniel Tso. On the road between Window Rock, the Nation's capital in eastern Arizona, and the Chapters he represents in northwestern New Mexico, Daniel was, as usual, calling from his truck. He asked if I could dig into the NMOCD files for him and obtain some information about the culprit well and the wells around it. But most of all, Daniel wanted to know the land status where the spill took place.

I started the search from my desk in Santa Fe, while Daniel remained on the line. It turns out that well #315H is one of the wells we visited together during the "Fracking is Fracking Reality Tour" with the high school students in Santa Fe back in October. The well is part of the North Escavada Unit, established in 2015 and presumably named after the Escavada Wash that

flows through the area until it meets the Chaco Wash at the mouth of Chaco Canyon some 13 miles away. A "unit" can be created by contractually merging an underground pool of hydrocarbons beneath a given continuous surface area. Oil and gas leases tapping into the unit are then bound by a single contract held by one or sometimes multiple operators, rather than by separate agreements for each mineral lease. Royalties from production are distributed to landowners based on the percentage of minerals within the unit that they own, regardless of the production from their particular leases. The North Escavada Unit, originally proposed by WPX Energy and now held by Enduring (to whom WPX sold its assets in 2018), comprises 3,040 acres. Of this acreage, 89.5%, or 2,720 acres, is Indian allotted land, while 320 acres are federally managed.

While these numbers provide a sense of the chunk of land over which Enduring now has partial control, the jurisdiction of the unit is in fact much more specific. Intended only for the horizontal drilling of oil from the Mancos shale across a surface area of 3,040 acres, the North Escavada Unit has a vertical limit that begins at 3,715 feet below the surface of the Earth and ends at 5,575 feet deep, corresponding to the vertical depth of the Mancos formation beneath that particular surface area. A large handful of State and federal agencies manage different parts of the oil and gas production process from this unit – from issuing the lease, to managing the distribution of royalties, to regulating environmental pollutants that may threaten the air, water, and soil.

Daniel audibly cringed – "oh no…." – when I told him that most of the North Escavada Unit was Indian allotted land. He then chuckled along with me when I specified that, according to the oil company's records, 909 locatable allottees co-owned the 2,720 acres. In this moment of shared humor, we laughed not at the environmental devastation but rather at the uncomfortable

reality of fractionation of Diné land holdings in the region, whose complexity sometimes reaches a level of incredulity that it becomes – if only for the briefest of moments – almost funny. The mood quickly darkened as the urgency that had prompted Daniel's call sunk in once again.

Several months after learning about the spill, I joined community leaders from the Tri-Chapter as they accompanied staff from the New Mexico Environment Department and the NMOCD to tour well sites in the area. The tour was held immediately after a public hearing at Counselor Chapter House regarding the State's efforts to develop new methane rules for the oil and gas industry (see Chapter 3). My colleagues from the Tri-Chapter wanted to make sure that the agencies saw and smelled firsthand some of the impacts of oil and gas. Weaving through bumpy dirt roads, our small caravan eventually pulled up next to well #315H. We disembarked from our vehicles and stood there, gazing back and forth from the well pad to the patches of disturbed ground where contaminated soil had been excavated. Not far in the distance, we could make out the contours of the arroyo into which oil and wastewater had rushed.

After listening to community members' concerns about the spill, the agencies informed us that there was finally a remediation plan in place and that NMOCD would be overseeing it. However, they conceded, the process of arriving at this plan had not been easy. The 1.6 miles of the arroyo through which the spill had flowed traversed multiple jurisdictions, and an agreement had to be reached among all of the responsible parties. Indeed, documents later uploaded to the NMOCD website detail correspondences between Enduring, its contractors, and staff from six federal, State, and tribal agencies, all grappling with what was required of them in the situation. In witnessing many interactions like this one between residents and the agencies that regulate oil and gas, I have come to see the checkerboard as a formation that, at times, confounds not only people who live there but also those entities who are meant to introduce order in this fractured

landscape. This is patchwork at work. It produces zones of legal ambiguity that make it difficult to define relationships of accountability. Working with people who navigate this complexity daily reminds me of how the unwitting architects of the checkerboard quickly lost control over the process they let loose. By the time the federal government recognized the checkerboard as a spiraling managerial challenge, land consolidation efforts had long reached an impasse. And yet, the flip side of this managerial challenge is the opportunity to continually pass off management to the next agency in line. This is what happened in the aftermath of the spill from well #315H, and in the wake of other major releases or incidents of routine pollution. Meanwhile, the oil industry finds a favorable climate in which to operate.

In this light, Daniel's rhetorical question – is this a game of chess or checkers? – is not only an incisive critique of the checkerboard's legal geography. Foregrounding jurisdiction, or *land's status*, inverts common place notions of what is infrastructural to resource extraction - such as the pumpjacks, compressors, and pipelines that cover the San Juan Basin. This move forces consideration of the tangled forms of authority that authorize extraction as equally important sites of critical analysis, political action, and reorganization. To call into question the rules of the game is also to challenge the legitimacy of that authority. It is to keep a determined gaze fixed on the *problem* of the checkerboard, but with an eye towards a jurisdictional arrangement that would affirm both Diné presence and sovereignty.

INTERLUDE: DOUBLE DRILLING

In the dreary lobby of the Wendell Chino Building, which houses New Mexico's Energy, Minerals, and Natural Resources Department (EMNRD) in Santa Fe, the room's only bursts of color shot out from framed photographs hung about the walls: a bright blue drilling rig under a spectacular full moon, spot lit by floodlights on the well pad; the red and orange hues of cliffs I recognized from the northwestern corner of the State, foregrounded by a faded green pumpjack.

It was just before 9am on a chilly Monday in November 2018, and the lobby was beginning to fill. As we waited for EMNRD's Oil Conservation Commission (OCC) to open the doors to the room where the hearing would take place, Don Schreiber and I assessed the crowd.[1] We could tell who was on which side by the way they pronounced, in hushed voices, the name of the underground pool of gas whose fate we had all come to learn: The Blanco-Mesaverde. To Don's utter distaste and my amusement, those who aligned with the Texas-based oil and gas company Hilcorp said "mesa-vurd". In contrast, Don and others from the region who were there to oppose Hilcorp's proposal prided themselves on the kind of intuition acquired through

[1] Oil and gas matters overseen by EMNRD are managed by the New Mexico Oil Conservation Commission (OCC) and the New Mexico Oil Conservation Division (OCD). Generally, OCC deals with administrative and policy matters. NMSA 70-2-6 1978 defines the responsibility of each as follows: "The division [OCD] shall have, and is hereby given, jurisdiction and authority over all matters relating to the conservation of oil and gas and the prevention of waste of potash as a result of oil or gas operations in this state. It shall have jurisdiction, authority and control of and over all persons, matters or things necessary or proper to enforce effectively the provisions of this act or any other law of this state relating to the conservation of oil or gas and the prevention of waste of potash as a result of oil or gas operations". "The commission [OCC] shall have concurrent jurisdiction and authority with the division to the extent necessary for the commission to perform its duties as required by law. In addition, any hearing on any matter may be held before the commission if the division director, in his discretion, determines that the commission shall hear the matter.

knowledge of a place and its history: they pronounced the name of the gas pool with a Spanish inflection: “mesa-ver-day”.

By this time, Don and I had been engaged in an impassioned fight with Hilcorp for about six months, and it would absorb us for the better part of yet another year. At this point in the process, we had held long strategy sessions over the phone at every waking hour - he from his ranch in Rio Arriba County, and me from wherever my fieldwork brought me in a given week. We had written letters to elected officials and convinced non-profits to join our cause. We had even taken a whirlwind trip to Washington, D.C., where Don leveraged his political connections to get us thirty minutes before busy New Mexico congressional staffers who listened to us deliver a presentation about how the management of the subsurface affects everything above ground, me in a hand-me-down suit and Don in one of his signature ten-gallon hats. Though there were some thirty years between us, Don always had just as much energy as I, if not more. We made a good team.

It all started back in the Spring of 2018, when I was absentmindedly scanning the OCC online docket. I happened to notice a curious application by Hilcorp, in which the company was proposing an amendment to the State’s “well density requirements” for the Blanco-Mesaverde gas pool across San Juan and Rio Arriba Counties.[2] This was the first in a series of filings by Hilcorp that would bring Don and I back again and again to OCC chambers to protest what Don would, in a stroke of genius, call “Double Drilling”.

[2] The New Mexico Oil and Gas Act defines a “pool” as “an underground reservoir containing a common accumulation of crude petroleum oil or natural gas or both. Each zone of a general structure, which zone is completely separate from any other zone in the structure, is covered by the word pool as used in the Oil and Gas Act. Pool is synonymous with "common source of supply" and with "common reservoir" 70-2-33 NMSA 1978.

When I first read Hilcorp's application, I did not entirely understand it. But I knew enough to glean that the Blanco-Mesaverde sat squarely below Don's ranch just west of Ch'óol'í'í, a sacred mountain to Diné people, where Changing Woman was born. The Blanco-Mesaverde stretches underground for 1.3 million acres throughout northwestern New Mexico.[3]

At this point I had known Don and his wife Jane for several years and had frequently visited them at their beautiful Devil's Springs ranch off Highway 64, about an hour east of Farmington. Driving towards the Jicarilla Apache Reservation, north of Navajo Dam, I would slow and turn right at the blue mailbox standing crookedly on the highway's edge. I would wait for Don to meet me at the first gas well I came upon, just some hundred feet from the highway. When he arrived, I would follow his old Dodge through the winding dirt roads to the house that he and Jane had built with such care many years prior.

Retiring early from their respective careers as an insurance broker and schoolteacher in Farmington, Don and Jane had purchased a small plot and leased surrounding acreage from the federal government to graze cattle in 1999. There were some scattered old gas wells across the property, but not enough to raise their alarm. Having spent a lifetime in San Juan County, this kind of infrastructure was part of their understanding of the landscape. But things changed quickly.

Before long, more and more wells were drilled on the grazing allotment that Don and Jane had leased, and there was nothing they could do about it. As it happened, Burlington Resources – the company that owned and operated most oil and gas infrastructure in the area and that would later sell its assets to ConocoPhillips who, in 2017, would sell to Hilcorp – had just

[3] Hilcorp Energy Corporation, "San Juan Blanco-Mesaverde Pool Rules Change: Well Density Amendment," Presented at the New Mexico Oil Conservation Commission Case #16403, 2018.

successfully applied to OCC to amend the well density requirements for the Blanco-Mesaverde gas pool, effectively paving the way for twice as many wells to be drilled.[4]

Now there are 122 gas wells on Don and Jane's ranch. Compressors, tanks, pipelines, and separators intermix with cliff dwellings and stone and timber structures built by Diné and Pueblo peoples hundreds and thousands of years ago.

Figure 10 – Don Schreiber and I walking through a canyon on Devil's Spring ranch in May 2019. Photo courtesy of Becca Grady.

[4] ConocoPhillips sold its assets to Hilcorp for $3 billion (Witthaus and Spain 2017).

Overlapping Densities

When Hilcorp filed its application to amend the well density rules in August 2018, Don and Jane had all but abandoned their dream of creating a sustainable agriculture model using non-traditional cattle ranching methods. Instead, they spent the decades between Burlington and Hilcorp trying to hold oil and gas companies accountable for pollution and damage to the landscape, fulfilling small contracts and programs for the U.S. Department of Agriculture along the way to keep the land and themselves afloat.

As Don and I read Hilcorp's August 2018 application together over the phone, trying to parse its implications, I could almost feel his anger mounting through the receiver. We had seen Hilcorp attempt a similar move back in May, but when Don managed to wrangle some media coverage of the issue, Hilcorp withdrew its application and the case never went to hearing.[5] This time, however, the company seemed serious. And Don was too.

"Well density" refers to the number of oil and gas wells that are permitted to be drilled within an established "spacing unit". OCC sets a spacing unit for each underground pool over which it presides. When OCC first established jurisdiction over the Blanco-Mesaverde, it created a spacing unit of 320 acres in which it initially allowed one well. At the time of Hilcorp's application, up to 4 wells were allowed, and Hilcorp wanted to double this figure, seeking authorization to drill up to 8 wells per spacing unit. I calculated that the doubling of well density across the Blanco-Mesaverde would equate to a blanket authorization of up to 8,000 potential new wells.[6]

[5] In May of 2018, Hilcorp had presented a substantially similar application. In it, the company also sought to waive the public hearing requirement for this type of change. Instead, it requested that well density changes be made through a non-public administrative process (see Robinson-Avila 2018).
[6] As discussed below, Hilcorp or other operators would still have to obtain drilling permits for each well.

Year	Density[7]
1949	1 well per 320 acres
1974	2 wells per 320 acres or 160-acre spacing
1998	4 wells per 320 acres or 80-acre spacing
2018	Proposal: 8 wells per 320 acres or 40-acre spacing

Table 1 – Doubled Density in the Blanco Mesaverde Gas Pool: A Brief History

Even as I grasped the significance of Hilcorp's proposal, it took a while for this second fact to sink in: the well density for the Blanco-Mesaverde gas pool was independent of all other pools. That is, while the Blanco-Mesaverde had its own density and spacing rules, so too did all the oil and gas-producing pools within other formations above and below it: the Fruitland Coal, Pictured Cliffs, Dakota Sandstone, Mancos Shale, and more. Throughout the same three-dimensional space, multiple density allowances co-exist. A geologist at EMNRD later explained to me that the agency has no comprehensive dataset of all density requirements for the pools OCC manages, but she estimated that there are at least sixty other pools that overlap within the 1.3-million-acre expanse of the Blanco-Mesaverde.

[7] Well density changes in 1974 were prompted by OCC itself, whereas Burlington applied for the 1998 changes. Hilcorp Energy Corporation, "San Juan Blanco-Mesaverde Pool Rules Change: Well Density Amendment," Presented at the New Mexico Oil Conservation Commission Case #16403, 2018.

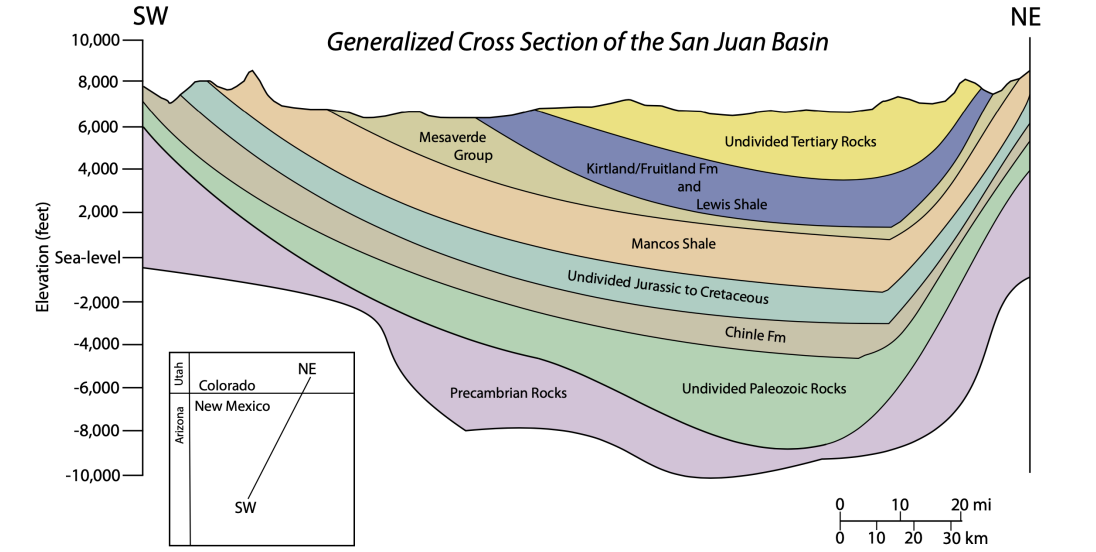

Figure 11 - Generalized cross-section of the San Juan Basin by Nicholas Guiffre (2016) (CC BY-SA 4.0).

The public notice requirements at OCC are such that, unless you are accustomed to scanning the online docket or the fine print in the legal section of the newspaper and have the patience, knowledge of English, and educational background required to decode what these announcements mean, you are unlikely to find out about applications that oil and gas operators or other parties make before the Commission, even if the implications of these applications are as significant as Hilcorp's double drilling proposal.[8] This is part of what so incensed Don and Mike Eisenfeld, our mutual friend and colleague at the environmental non-profit San Juan Citizens Alliance (SJCA), who soon joined Don and I in the fight. We wanted to make this matter public. We worked hard to garner press coverage about Hilcorp's proposal and the upcoming OCC hearings. "Double drilling" gained traction as a catch phrase to describe Hilcorp's plans.

[8] Applicants are required to notify private mineral owners and other operators that may be affected. Notable, in the Hilcorp case, the company failed to notify Diné allotment owners, let alone Navajo Nation Chapters, because of an incorrect assumption that allottees do not have a propertied interest in the mineral estate. See Chapters 1 and 4 for a description of how allottees in Eastern Navajo Agency have asserted, over and over again, their rights to the subsurface.

Recompletions

Under this increasing public scrutiny, Hilcorp framed its application in a new light: it was less interested in drilling new wells than in "recompleting" old ones. A recompletion is a common technique in the oil and gas industry. It essentially refers to the process of going through an existing well bore to access a different formation than the well had initially targeted. For example, in its recompletion scheme, Hilcorp might select an existing well first drilled in the 1990s to extract gas from the Dakota Sandstone, a formation that sits deeper below the surface of the Earth than the Mesaverde. Hilcorp would re-enter the well bore with a completion rig, then perforate and hydraulically fracture a new pool - in this case, the Blanco-Mesaverde. While performing a recompletion does not require the clearing of a new well pad or a new road, it is, Don taught me, otherwise identical to completing a brand new well. Large semi-trucks and dozens of tractor-trailers haul in a rig, water, petrochemicals, and other equipment. This traffic is enough to cause disturbances of all kind. Atop the well pad, the recompletion process disperses air toxins and methane into the atmospheric column. Risks of spills and leaks from the new production remain. Of course, before recompleting a well, an operator like Hilcorp would need to obtain a permit from the appropriate surface manager – in this case, BLM – but at this point in the process there is no avenue for public participation. This is why Don saw the hearing process at OCC as his one chance to avoid a double drilling scenario.

While Hilcorp emphasized recompletions in public appearances, the company's application, if approved, would leave open the possibility for thousands of new wells. In the hearings that followed, it became clear that new wells were indeed part of Hilcorp's long-term plan, but the company failed to specify just how many it hoped to drill, instead focusing on the "wasted" gas that would be left to sit underground if not accessed. This framing was strategic in

many ways. Not only did it portray the proposal as minimally invasive: it also spoke directly to the mission of OCC to prohibit waste, where waste is understood as the loss of, or failure to recover, a hydrocarbon resource.[9] For Don, however, waste takes the form of methane that, instead of captured and sold to market, is vented or flared into the atmosphere.

Hilcorp's Brian Wilbanks, Vice-President Lower 48 West, succinctly explained the company's ideology of waste in an interview with the Farmington Daily Times' *Energy Magazine*:

> "The rational for the proposed amendment is simple. There is immense gas resource that will be *stranded* and *wasted* if the rules are not amended. This gas resource has the potential to create jobs, boost the local economy, and provide significant revenues to both state and local governments. There are hundreds of existing wells throughout the San Juan Basin that have the potential to produce from the Mesaverde reservoir. In our deeper wells, the resource is there and already drilled through. We *simply need to open up* the Mesaverde in those deeper wells and *allow it to flow*" (quoted in Moses 2018, emphasis mine).

Wilbanks describes Hilcorp's proposal as part of a logical progression, an ethical one, even. *Free* the gas. *Let it flow*.

But for others, this was all moving too fast. As a result of Don's furious political organizing in the weeks leading up to the November OCC hearing, a whole cast of characters, including elected representatives from every level of government – federal, State, tribal, local – and civil society groups had written to OCC requesting a continuance in the double drilling matter until further information about the consequences of approving Hilcorp's application could be ascertained.[10]

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[9] 70-2-3 NMSA 1978

[10] These included U.S. Senators Tom Udall and Martin Heinrich of New Mexico, the State's Office of the Attorney General, Governor-elect Michelle Lujan Grisham, U.S. Representative Ben Ray Lujan and U.S. Representative-elect Debra Haaland, Navajo Nation Council Delegate-elect Daniel Tso, mayors of small towns and State representatives, members of the Greater Chaco Coalition, and still others.

OCC chose to proceed with the hearing as scheduled.

A Downhole Matter

OCC Chairperson Heather Riley opened the November 19, 2018 hearing by reading a prepared statement in which she thanked the large crowd that had assembled for their interest in the matter at hand. But she quickly hedged her enthusiasm for the show of public interest uncharacteristic of an OCC hearing. "Having said that, it is important that everyone interested in this proceeding and here today understand the scope and context of the hearing," Riley said. Continuing, she attempted to clarify in no uncertain terms the scope of OCC's decision:

> "The application before the Commission does not implicate or consider surface impacts. It is entirely a downhole, subsurface matter. To the extent that there are surface considerations, those are considered and regulated by the relevant surface owner or manager, BLM, State Land Office and fee owners and managers. If the Commission were to approve the application being considered today, that would not mean that the Applicant had the necessary approvals and permits to drill any well. Rather, an approval would simply mean that the pool in question is able to effectively drain by the well density approved by the Commission. It is not the jurisdictional charge of the Commission to waive potential surface issues against subsurface resource recovery management considerations. Those considerations are for another day and would be before the relevant surface owner or manager." [11]

As the day unfolded, we would hear Hilcorp's attorneys echo Chairperson Riley's assertion that the issue before the OCC was merely a "downhole matter". This was, at best, unconvincing to all those in the audience who, like Don, live with oil and gas. But it didn't much matter to the Commission what Don or others thought, for their perspectives were deemed only relevant to the "surface", a plane that would be addressed at some point later by another regulatory body.

[11] Application of Hilcorp Energy Company Case No. 16403 to Amend the Well Density and Location Requirements and Administrative Exceptions of the Special Rules for the Blanco-Mesaverde Gas Pool, Rio Arriba and San Juan Counties, New Mexico: Reporter's Transcript of Proceedings, 2018, p.9-10.

Don, Mike, and I learned this lesson quickly. As soon as we caught wind of Hilcorp's proposal, we scrambled to submit an application to OCC for SJCA to formally intervene as a party in the proceedings that would first take place in September. Between the time that Hilcorp filed its application in late August, and the time that OCC required materials from hopeful intervenors, we had only a week to do so. We somehow managed, but only thanks to the generous support of the University of New Mexico Natural Resources and Environmental Law Clinic, and later the Western Environmental Law Center, who agreed to represent SJCA on very short notice.[12]

It turned out that getting our materials together and securing legal representation was only the first hurdle. Next, we had to convince OCC that SJCA had standing to intervene in the case. In this instance, we were not so lucky. In September and again in November, Hilcorp vigorously opposed SJCA's application for standing. OCC concurred, finding that because the matter at hand concerned only the downhole, SJCA had neither standing nor the potential to provide information that could contribute substantially to the decision. Apart from Hilcorp, the only parties that were granted standing to intervene in the case were other oil and gas operators who held leases within the Blanco-Mesaverde gas pool. Those who had attachments to the surface, propertied or not, were only permitted to express their views during the "public comment period" held at the end of each hearing. While these comments became part of the hearing record, and while the Commissioners were obliged to sit and listen to them, they were not required to respond to or consider them in the same way that they considered evidence presented by formally recognized intervenors in a case.

[12] After the matter in case 16403 was continued due to a technicality in September to November 2018, WELC joined the UNM Clinic as co-counsel for SJCA and later took over. Specifically, OCC found that there was a typo in a notice Hilcorp had provided to other operators in the region that resulted in some confusion about the hearing date.

After OCC denied SJCA's application for intervention in November, the hearing went on. Hilcorp's counsel guided a petroleum reservoir engineer through a series of questions to further explain the importance of the application. The point they sought to drive across was that even after 70 years of Blanco-Mesaverde gas extraction "we've [operators in the San Juan Basin] only produced 28 percent of the original gas in place".[13] Through a method specific to the field of reservoir engineering, the petroleum engineer recounted how she calculated that the Blanco-Mesaverde gas pool originally held 55.2 trillion cubic feet of natural gas. Changes to the well density requirements were needed in order to attain 80 percent recovery efficiency of this volume, the standard efficiency for this type of pool. Eventually, the engineer predicted, 20-acre spacing would be needed to drain the resource, or 16 wells per 320-acres. But for now, Hilcorp was only pursuing 40-acre spacing, or 8 wells per 320-acre spacing unit.

The discussion went on like this for quite some time. Commissioners asked a few questions about the San Juan Basin's geology and the engineer's calculations. Then they opened the floor to public comment. Over 20 people had signed up to speak. Daniel Tso, recently elected as Navajo Nation Council Delegate representing eight Chapters in Eastern Navajo Agency, was first.

L-A-W-S

Daniel began by reminding the Commissioners that they were on their way out. Just weeks ago, New Mexicans had elected a new Democratic administration, ending eight years of Republican governance. Governor-elect Michelle Lujan-Grisham, who had taken an interest in the Hilcorp case and requested it be continued until more information was available, would

[13] Application of Hilcorp Energy Company Case No. 16403 to Amend the Well Density and Location Requirements and Administrative Exceptions of the Special Rules for the Blanco-Mesaverde Gas Pool, Rio Arriba and San Juan Counties, New Mexico: Reporter's Transcript of Proceedings, 2018, p.59

appoint a new EMNRD Secretary who, with the New Mexico State Land Office, would appoint a new Commission. Priorities would likely change under this new administration that had made expressed commitments towards tackling climate change. Pushing Hilcorp's application through at this stage seemed disingenuous.

Moving on, Daniel said: "Navajo people, traditional people, have their own L-A-W-S".[14] I had heard Daniel make this point in public before, spelling out the word "laws". I had always assumed that he did so to remind federal and State agencies of Diné legal traditions that predate them. But it was on this day at the OCC hearing that I belatedly noticed Daniel's poetics. On the spot, allowed only three minutes to speak, he structured his comments regarding Hilcorp's proposal in terms of how it would affect the Land, Air, Water, and the Sacred: L-A-W-S. "The land that's being discussed is our Indigenous homelands for the Navajo people. Some of the earliest home structures exist in the area, and yet there is no mention about the Navajo people [in the application]", he said.[15] With regards to Air, he spoke of how Hilcorp's proposal would bring "something from underground that is emitted, that is purposely leaked, purposely vented, purposely flared. And for me, that's a waste".[16] While OCC considered gas left in the ground wasted, for Daniel "it's a resource for the future" (ibid). Water, Daniel pointed out, was not mentioned at all during the hearing. But it is used to drill or recomplete a well. If that life-sustaining substance is contaminated, it becomes valueless – "zero" (ibid). Speaking of "the sacredness of the land", also overlooked in the day's proceedings, Daniel said: "The ancestors

[14] [14] Application of Hilcorp Energy Company Case No. 16403 to Amend the Well Density and Location Requirements and Administrative Exxceptions of the Special Rules for the Blacno-Mesaverde Gas Pool, Rio Arriba and San Juan Counties, New Mexico: Reporter's Transcript of Proceedings, 2018, p.196
[15] Ibid.
[16] Ibid 198

are still there, and they're the ones that are telling us, 'Hey, you better say something.'"[17]Knowing that his statements were likely falling on deaf ears, Daniel said:

> "I realize some of this stuff is outside the purview of the Commission, and what I'm trying to say is those L-A-W-S are interconnected. You can't silo those issues as the law and the rules and the regulations you've put together."[18]

The comments continued for about another hour. Most echoed points raised by Daniel and Don, while others representing different parts of the business community accused the "environmentally elite" of "once again engaging in mass misrepresentation"[19] and urged the Commission to approve Hilcorp's proposal that could be a "win for everyone"[20] insofar as it would generate revenue and jobs for the State over time.

When the comment period concluded, the Commissioners deliberated in a closed executive session for about 40 minutes. They returned to inform the audience that they had decided to approve Hilcorp's application. The well density would be doubled. The meeting was adjourned.

A Deal

Just days into 2019 and Governor Michelle Lujan-Grisham's inaugural term, a reconstituted OCC held a special meeting concerning Hilcorp's application. The Commission moved quickly to suspend the November decision and rehear the case at a later date after the information provided at previous hearings could be carefully reviewed. The hearing was

[17] Ibid p.197
[18] ibid
[19] ibid
[20] ibid

eventually scheduled for months later in August, and Hilcorp was required to provide due notice to land management agencies and tribal governments.[21]

The tides had shifted abruptly. While Hilcorp still had the advantage of a high-powered legal team and a set of regulations that would continue to silo L-A-W-S, the new State administration seemed intent to give proposals like Hilcorp's more scrutiny and with an eye towards encouraging public involvement. Hilcorp understood it would not get everything it initially sought, and SJCA knew it was unlikely to succeed in stopping Hilcorp altogether. In talks between OCC, the State Land Office, SJCA, and Hilcorp, a compromise was reached. In August 2019, OCC swiftly approved a revised application by Hilcorp that was unopposed by other parties. The resulting hearing order approved well density requirements that would allow operators like Hilcorp to *recomplete* up to four new wells per spacing unit within the Blanco-Mesaverde gas pool, but they would be prohibited from drilling new wells or to drill horizontally within the pool.[22]

Had we won? Don and Mike, and even Daniel, thought so. Unlike me, this wasn't their first rodeo at OCC. They knew how rare a victory was, even if it was only partial. Stopping the buildout of new infrastructure on the landscape was major to them, even if there was still so much work to be done. In its broadest sense, what had been fought over was a question about whether an agency that regulates a subsurface hydrocarbon reservoir ought to consider how the management of that reservoir affects anything outside of, or connected to, it – like land, air, water. It was a fight about the advantage of separating such domains to begin with. But it was

[21] Upon SJCA's request, OCC directed Hilcorp to notify all Navajo Nation Chapters within the vicinity of the Blanco-Mesaverde gas pool.

[22] If an applicant sought to drill an additional well beyond these density requirements, they would need to seek an administrative exception from OCC. While it is unlikely that an operator would seek to drill a horizontal Blanco-Mesaverde well, approximately 10 have been completed thus far. It was important to SJCA and allies within Eastern Navajo Agency to prohibit the development, even if exploratory, of further horizontal wells.

also, and crucially, a fight about livability and continuity in very specific places. In the face of Hilcorp's proposal, advocates had to make a choice about how to fight, with what long and short-term goals, and in which register. The unopposed application, approved in August 2019, represented the kind of compromise that would not prevent a similar proposal from cropping up in the future, but that would, for now, offer some degree of protection across 1.3 million acres of Dinétah.

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In May 2019, my wife, Becca, and I visited Don and Jane at Devil's Spring for the weekend. Though OCC had yet to issue its final ruling in the Hilcorp case, it was clear by now that an agreement would be reached. Over a homecooked dinner, we opened a bottle of wine and toasted all our hard work over the past year. Don and I joked about the unlikely fight we had waged and where it had ended up. Then, the conversation turned towards the future. Don and Jane's grandkids, our plans, the ranch.

We spent the next day assisting Don and Jane in installing "escape ramps" in the cattle troughs scattered throughout the large property. Made of grated steel cut and bent just so, the escape ramps helped small critters like birds or lizards, who sometimes stopped for a drink and fell into the water, crawl out before they drowned. The ramps also kept the water cleaner for the cattle.

After a picnic lunch, we took a long walk through a canyon that cuts through the ranch. The grasses and sage were lush shades of green this year thanks to a snowy winter. While the day had started to warm, the peaks of the La Plata Mountains in the distance were a beautiful

white. As we walked, Don pointed out canyon walls where petroglyphs had been carved centuries and centuries ago. I observed a pipeline, narrow in diameter, that ran precariously from atop the canyon where it connected to a gas well, down into the canyon bed, and up the other side.

We installed more escape ramps until dusk, even tackling the neighbors' troughs. Then, as the sun began to set, we drove slowly back to the ranch house. A herd of cattle followed closely. They stopped with us when Don got out to check a water tank. Here, Jane decided to test the hypothesis that if a human lies down, cows will get curious and come to inspect. The rest of us hopped into the bed of the pickup and watched as Jane got comfortable in the grass. She lay there for a while. The cows looked perplexed. Eventually they walked away, taking a wide berth from Jane. Laughing, we returned to the house and enjoyed another meal together.

Figure 12 – Cattle and a gas well at dusk on Devil's Spring. May 2019. Photo courtesy of Becca Grady.

CHAPTER TWO

Gridlock: Roads, Jurisdiction, and Getting Things Done

Deadly Jurisdiction

In the sunlit gymnasium of Lybrook Elementary School, Mario Atencio addressed a modest crowd. He spoke slowly and forcefully as he explained to the audience that people out here are dying because of jurisdiction.

Mario Atencio, a Diné man in his late thirties, sat at a table in front of the school stage next to two respected community elders. A banner reading "Frack Off Greater Chaco" hung from the table, complimenting similar banners taped to walls across the large open space. The air conditioning that wafted through the school was a welcome reprieve from the dry heat of summer in the high desert. Still, some sat in the plastic chairs that faced the stage fanning paper brochures to create a gentle breeze. The soft clatter of lunch dishes being scrubbed and rinsed was audible from the cafeteria, tucked in the gym's back corner.

The occasion of Mario's speech was a panel called "History of Allotment: Present Jurisdictional Challenges in Eastern Agency", one of many panels held that weekend at the Eastern People's Convention, organized by Diné Citizens Against Ruining our Environment (Diné CARE). The convention was the second in a series. The first had been hosted a few weeks prior on June 1, 2018, in Dilkon, Arizona on the Western side of the Navajo Nation. It had coincided with the 150th anniversary of the 1868 treaty between Navajo Nation and the United States and the 30th anniversary of Diné CARE's environmental justice work across Diné Bikéyah. Both gatherings attracted residents in the communities where they were held as well as

Indigenous and non-Indigenous activists from across the Southwest. Attendees had come to learn about Diné resistance to resource extraction and to strategize for future organizing efforts.

Through a microphone, Mario addressed the crowd. "Jurisdiction is imaginary lines" that someone draws to designate the area that they are in charge of.[1] Out here, Mario said, there are many jurisdictions – at least 11 different land statuses. "To go through and tell you about each one would take a *long* time. *But the main ones that we can always see are State, BLM [Bureau of Land Management], BIA* [Bureau of Indian Affairs] - which is the allotment lands; and Tribal – tribal trust land and tribal fee land". Mario then reminded the crowd that a family may live on tribal surface land on top of a mineral estate that is owned and administered by the federal government. "So, at every single point, you really have no way to figure out who is in charge, or what is going on underneath you or around you", Mario emphasized. In its overwhelming multiplicity, jurisdiction - which is supposed to make clear who is "in charge" of what - leads more often to confusion than clarity about the distribution of authority on the checkerboard.

Mario illustrated his point through the example of roads. He had just spent several frustrating months working as the Roads Coordinator for the Tri-Chapter Council, a temporary position established with the Council's limited funding to help make headway on the deep-seated problem of road disrepair. Mario had run around in circles trying to get the BLM, BIA, the Navajo Nation Department of Transportation, the three counties that straddle the three Chapters, and the Chapters themselves in the same room together. This was a feat in and of itself, let alone getting the parties to agree on a path forward to begin fixing up the roads. "Everything takes

[1] In referring to jurisdiction as a set of "imaginary lines", Mario does not refute its existence. Instead, directing attention to the 'someone' who draws those lines, he highlights the contingent and performative nature of authority on the checkerboard. The lines drawn around places and people enact the juridical reality that they come to represent (Cormack 2008; Kahn 2019; Richland 2013).

years to get done. So, within that, that's the pain", Mario said. "A lot of the times the things that we want for our communities are slowed down by that. People are dying because of that."

Mario put bluntly at the Eastern People's Convention what I came to recognize as a common analytic among Diné residents of the Tri-Chapter, who frequently conveyed in community meetings and one-on-one conversations that jurisdiction leads to premature death.[2] That is, people recognize that the jurisdictional complexity that Mario described, a product of over 150 years of dispossession and reorganization of land relations (see Chapter 1), often results in the deferral or outright stoppage of investments in life-sustaining infrastructure. Mario and other residents have experienced how the effects of this jurisdictional arrangement, which I call patchwork, tend towards Indigenous death.

Why Mario was talking about roads, bureaucracy, and land status during a conference about environmental justice needed no explanation for those in the room who habitually navigate the unpaved and under-paved roads whose conditions have been rapidly deteriorating since fracking hit the region. Roads are one of the most discernable vectors of the changes brought on by fracking, so much so that people in the area often talk about the impacts of oil and gas *through* roads. The Mancos shale boom brought hundreds of large trucks onto Tri-Chapter roads on weekly and sometimes daily basis, carrying water, sand, chemicals, and hydrocarbons in and out of well sites. People point to the increased truck traffic, accidents, dust, and degradation. Not lost on them is the bitter irony that the roads are getting worse for local residents, while non-tribal governments and oil companies profit from extraction, in some cases walking away with millions.[3]

[2] Gilmore (2007) describes racism as "the state-sanctioned or extralegal production and exploitation of group-differentiated vulnerability to premature death (28).".

[3] Oil and gas extracted on the checkerboard produces royalties primarily for the federal and state government, for extraction of federal or state minerals. Oil and gas extracted on allotment lands produces royalties that BIA and the

It was at this moment in my fieldwork that I began paying attention to roads as a site where jurisdiction, or more precisely patchwork, is palpably felt. It is felt when roads fail to deliver what they promise - connection, speed, and movement – and when efforts to correct this failure lead to an impasse.[4] As people move about, are slowed down, get stuck, or are prevented from moving at all; as they try to get the roads fixed up, or as their cars accrue wear and tear from rough conditions, settler jurisdiction makes itself known as a structuring element of ordinary life.

While the previous chapter showed how federal and State institutions have asserted jurisdiction to break up Dinétah through the institutionalization of a patchwork way of apprehending land, this chapter sheds light on another dimension of patchwork's violence: gridlock. Taking a cue from Mario, I unpack what it means to say that people die because of jurisdiction. I propose "gridlock" as an analogy to describe the space of frustration that people like Mario inhabit in trying to get something done on the checkerboard, within patchwork.[5] Gridlock undermines the reproduction and maintenance of infrastructures necessary for social life, and life itself. Resulting from the fabrication of jurisdictional ambiguity across Indigenous life, gridlock points to the complex negotiations in which Indigenous peoples often have to engage with other jurisdictions in order to both exercise tribal sovereignty and demand fulfilment of the federal trust relationship (Cattelino 2010; Dennison 2017)

Federal Indian Mineral Office disperse to co-owners of the allotment(s) from which it was extracted. Unless oil and gas is extracted from a piece tribal trust land where Navajo Nation owns the minerals, no royalties are produced for the tribe. Despite the fact that all of this extraction occurs within Navajo Nation Chapters, Chapter governments see no revenue (and nor is it dispersed to them by the state, unlike with county governments). See Velivis (2019).

[4] Dalakoglou and Harvey (2012) argue that roads can bring disconnection as much as connection, conditioning differential speeds.

[5] I am using the term gridlock in a different way than Elizabeth Povinelli (2002), whose important essay "Notes on Gridlock" describes global circulations normative forms or "grids" of intimacy and sexuality.

Conditions of gridlock are particularly noticeable in, but not limited to, checkerboard scenarios, where responsibility is not only complexly divided across multiple authorities, but also heavily fragmented across space.[6] I expand on what I mean by gridlock below. Briefly, it is a space of jurisdictional friction in which things slow down to the point that, as Mario explained, it can take ages to address even urgent problems. Delays can be deadly. In the spacetime of gridlock, anticipation and stasis intermix to produce anxiety, frustration, and sometimes a sense of resignation to how things are. At the same time, in gridlock's uncertain temporal horizon, people develop creative workarounds to go on living, and sometimes live a bit better.[7]

In what follows I explore three scenes in which rough roads are at the nexus of major challenges to Diné wellbeing in the Tri-Chapter. First, I look to local efforts to repair N474, a road in Ojo Encino Chapter whose chronic disrepair is exacerbated by oil and gas traffic. I describe how Tri-Chapter officials have responded to gridlock by fixing the road themselves. Through an account of my attempts to gather information about the road's history and ownership, I highlight obstacles in the process of road maintenance on the checkerboard. Next, I turn to public education and school transportation. Diné students in the Tri-Chapter not only suffer from inadequate educational services – they also have difficulty getting to school on buses that cannot always travel on Tri-Chapter roads. Finally, I examine how jurisdictional complexity and undermaintained roads produce major predicaments for emergency responders. Through the account of a local fire chief, I describe how emergency crews navigate around infrastructural and jurisdictional hurdles. Across these sections, I attend to the inventive adaptations that Tri-

[6] For example, Louise Erdrich's novel *The Roundhouse* (2013) illustrates a fictional, yet probable, instance of what I am calling gridlock, where the prosecution of a rape on a checkerboarded Ojibwe reservation in North Dakota is suspended as the novel's characters try to determine on what exact spot of ground, and under what jurisdiction, the assault occurred.

[7] See Berlant (2011) on lateral agency.

Chapter residents perform to increase the pace and safety of their movements amid gridlock. In each case, the specter of oil and gas looms large, both as an agent of road degradation and as force that moves through the region with comparative ease.

Gridlock: Infrastructure and Jurisdiction

Roads

Infrastructures condition uneven distributions of connection, mobility, and speed (Rodgers and O'Neill 2012). As quintessentially modern infrastructures, roads spur fantasies and attachments rooted in the idea that the social and economic ought to be characterized by seamless circulation (Larkin 2013: 332-333). Like most infrastructures, roads contain temporal promises of progress and prosperity to come (Appel 2018; Hetherington 2016). The very idea of roads as a form of public infrastructure is scaffolded by imaginative and affective contexts – infrastructures in their own right – that propel expectations of a good life in which state resources help citizens move forward, even as such expectations are increasingly unfulfilled (Masco 2014; Berlant 2011). Throughout the 20th century, governments in many parts of the world assumed the responsibility of building and maintaining public infrastructures (Anand 2019, Collier, Mizes, & von Schnitzler 2016; Schwenkel 2018). While this model began to wane in the 1960s and 1970s with the rise private financing and public-private partnerships, infrastructures still bring political subjects into proximity with the state, along with its promises and failures. As Anand (2019) argues, infrastructural troubles enable publics to form around a problem and make demands of the state, while state responses to infrastructural demands help consolidate the state form (Anand 2018).

Infrastructures are not continuous across space and time (Berlant 2016). They are processual forms whose reproduction demands upkeep. As Carse (2014) puts it, infrastructures require human communities to maintain them even as they shape those communities and surrounding ecologies (219; see also Mattern 2018). Without maintenance responsive to changing conditions, decay is inevitable. In this way, "every infrastructure installs its own future crisis" (Masco 2014: 146). As I will show through the case of a road in Ojo Encino Chapter that has been infrequently maintained, a crisis of disrepair exacerbated by the Mancos shale boom has led to crisis of responsibility for reconstruction.

In their study of roads, Harvey and Knox (2012) find that the promise of infrastructural forms is particularly captivating in contexts where people regularly come face to face with infrastructural stasis, blockage, or rupture. This is not merely to repeat the adage that infrastructures become visible upon breakdown (Star 1999). Rather, Harvey and Knox (2012) argue that infrastructural instabilities expose the promise of even connection and circulation as woefully precarious. In doing so, these instabilities give way to desires for and expectations of a state that would guarantee and equally distribute public goods and services.

In Dinétah, the question of who is responsible for providing and maintaining public infrastructures like roads is particularly fraught. Not only do the checkerboard's various jurisdictions often disagree about their responsibilities: it also matters what kind of authority the Chapters have to hail to demand infrastructural support and maintenance.[8] As Simpson (2014:12) puts it, multiple sovereignties cannot proliferate equally under conditions of settler colonialism. Chapters thus make strategic decisions about when to make demands upon settler governments, and when to try and take care of matters themselves. In the Tri-Chapter, infrastructure does not

[8] For case studies of how political subjects make themselves proximate to the state through infrastructure, see Kruglova (2019) and Anand (2018).

necessarily direct imagination towards a particular centralized power. Instead, infrastructure is often a reminder of an uneven dispersion of authority, responsibility, resources, and territory.

To call on the Navajo Nation to fix the roads is to affirm Diné territorial jurisdiction in Eastern Navajo Agency. But the Navajo Nation has repeatedly indicated that it does not have the resources to maintain all roads – let alone paved roads – in the region. Roads are not only a problem on the checkerboard, though coordinating their maintenance is much more complicated here for reasons I will explain below. The Navajo Nation Division of Transportation (NDOT) estimates that at its current level of funding, it would require $8 billion and 116 years to repair all roads on the reservation that are in need of fixes. There are over 14,000 distinct roads across Diné Bikeyah, weaving through and connecting small communities, linking homes to Chapter Houses and schools. The BIA owns about 42% of these roads, while the Navajo Nation owns 34%. States and counties are each responsible for another 12% of the remaining roads.[9] Only about 14% of roads throughout the Nation are paved, while 1% are graveled and 85% are dirt (Office of the Speaker 2019).

When Chapters call on federal agencies, the State of New Mexico, or the counties for infrastructural matters, they knowingly and partially undermine the claims to territorial jurisdiction that they assert at other times and in other venues. For instance, the project of land consolidation long pursued by the Navajo Nation and the Eastern Navajo Land Commission, which would see the checkerboard consolidated into tribal trust land through a series of exchanges and conveyances between the tribe, the State, and BLM, relies on the factual premise that lands in Eastern Navajo Agency were unlawfully taken from the Diné (See Chapter 1).[10]

[9] As I describe below, to own a road in Indian Country is to own the right-of-way for it.
[10] See Chapter 1 for an overview of land consolidation efforts on the checkerboard and the Navajo Legislative Exchange Initiative.

One of the Navajo Nation's stated goals for land consolidation is to address "the inability of any government to administer and oversee productive development in the area under existing conditions", in turn described as "a crazy-quilt of land titles and governmental jurisdiction, and lack of basic services and infrastructure taken for granted in non-Indian areas".[11] But in the meantime, people still need to get around, and get around safely. The provision of essential services is a core aspect of the federal government's trust responsibility to tribes – a duty it is obliged to fulfill in exchange for access to Indigenous lands across the country. But Chapter officials are keenly aware that making demands on the feds can undercut their long-term project of increased self-determination, insofar as demands directed at the federal government can reinforce a notion of need-based sovereignty rather than political relation based on treaty rights or sovereign recognition (Cattelino 2010).

Caught between unsafe roads and the jurisdictional ambiguities of the checkerboard, the Chapters navigate this dilemma as best they can, sometimes asserting and sometimes yielding jurisdiction to achieve the most favorable outcomes. They make strategic determinations about what is needed now and what they want for the future. For example, twice every quarter, the Tri-Chapters follow BLM's process for public commenting on oil and gas lease sales. The Chapters submit extensive technical comments and protests to the agency to oppose the leasing of parcels for oil and gas development within or in proximity to Chapter boundaries. This is not a form of government-to-government consultation, for BLM consults with Navajo Nation at the level of the Office of the President and Vice-President, in the nation's capital of Window Rock, Arizona. Rather, the Tri-Chapters' persistent protests constitute, on the one hand, an acknowledgement that in order to voice their concerns, they must, for now, do so as all other members of the

[11] Navajo Nation Council Resolution CO-47-12, 2012.

public; and on the other, an insistence of their authority in the region, even if that authority is currently unrecognized by State and federal governments.

As Dennison (2017) shows, these kinds of ongoing, negotiated compromises are constitutive of sovereignty for Native nations and colonial governments alike. Sovereignty, Dennison argues, is not a "pure state of exclusive authority" (686) but a "practice that further imbricates you with other polities" (687). It is an insistence of authority "without the illusion of full control" (685) (cf. also Cattelino 2008 and 2010; Simpson 2014). This is key to understanding the Tri-Chapter's tactics to fix roads on the checkerboard. In this space of overlapping jurisdiction, getting something done involves a series of hard-won compromises and negotiations between different authorities, including the Chapters themselves.

On the checkerboard, action is often strained as parties negotiate the spacetime of their authority. While federal agencies wield more resources than those of other governments, in practice there is no functioning chain of command that delineates responsibility across jurisdictions. This kind of scalar imaginary is an aspirational order of settler governance (Pasternak 2017: 17; Valverde 2009) that is not always operative in practice, and certainly not when it comes to taking responsibility for public infrastructures like roads. As Valverde (2009) puts it, where legal powers appear to us "always already distinguished by scale" (141), the work of jurisdiction is to sort authorities by scale and subject.

But the Tri-Chapters work against such a scalar logic (Carr and Lempert 2016), insisting that their claim to lands in Dinétah are distinct in degree and temporal scope from the claims of other parties. The incommensurability of Diné claims to Dinétah on the one hand, and the claims of settler governments to northwest New Mexico on the other, render jurisdiction, in effect, nonscalable (Tsing 2012). Rather than a clear hierarchy of governance, legal authority on the

checkerboard is best understood as an uneven and discordant meshwork of "interlegalities" through which different actors move with more or less ease (de Sousa Santos 1987; Valverde 2009).[12] Living in this space, one is both caught up in jurisdiction and on the edge of it, for there is always a sense of being just outside the scope of one authority and abutting another. Sometimes things fall through the cracks. Sometimes they stall.

Gridlock

I offer "gridlock" to describe the experience of impasse within the jurisdictional tangle of patchwork. Gridlock, here, is not a traffic jam. Nor does it indicate a complete lack of movement. Rather, gridlock is the sticky space of deferred promise that my interlocutors navigate when trying to get something done, like reproduce and maintain infrastructure, on the checkerboard. Gridlock happens when the gears of bureaucracies are misaligned, rubbing up against each other but only inching forward. The resulting friction can cause a standstill or a crisis of responsibility. Things stall because no one knows or can agree about who is responsible. Gridlock occurs in the moment when the expectation of jurisdiction – to locate oneself in space and time vis-à-vis the law and invoke a relation of property or accountability – gets so jammed up with claims that it disintegrates.

This blockage is an effect of settler colonialism. Gridlock grows more abrasive over time as settler jurisdictions overlay Indigenous legal orders, extending the project of dispossession. Diné people and the agents of dispossession alike get caught up in this tangle, unable to direct sovereign action without negotiation – even if that negotiation is uneven from the get-go.

[12] After de Sousa Santos (1987), Valverde (2009) describes interlegality as a process in which different legal orders "each of which has its own scope, its own logic, and its own criteria for what is to be governed, as well as its own rules for how to govern" coexist and interact (141).

Gridlock can thus sometimes look like bureaucratic inefficiency – like an absence or confusion of the jurisdictional order that Weber (2013 [1921]) identified as the primary characteristic of modern bureaucracies – but it is not merely that, for it is a form of inefficiency that is produced and reproduced through patchwork's colonial entanglements (Dennison 2012 & 2017).

Gridlock emerges in spaces of entangled sovereignties, at the conjuncture of infrastructure and jurisdiction. It amounts to the weaponization of legal geography to threaten or slow the reproduction of infrastructures key to Indigenous survival – whether these are, for example, roads, healthcare and education systems, or social and ecological relations (see LaDuke and Cowen 2020; Spice 2018).[13] Gridlock produces a form of social death akin to what Weizman (2014) calls a "field casualty", a slow and continuous form of violence "defined by the permanent clash of multiple forces" across a "thick fabric of lateral relations, associations, and chains of actions between material things, large environments, individuals, and collective action" (27) (see also Jusionyte 2018). In this chaotic forcefield, in which, as Mario described, "nothing gets done", gridlock effectively disguises its violence as an unfortunate and unintended consequence of governing complexity – but it would be a mistake to see it as such.

While the bureaucratic exigencies of the federal trust relationship produce a documentary need that slows things down, what makes the grid "lock" at particular moments are the oft incompatible stakes of infrastructure for Diné governments on the one hand, and settler governments on the other. This is not to say that there are not some common concerns across jurisdictions, or that federal-tribal relationships are purely antagonistic (Lambert 2017). The contradiction that tribes inhabit, as sovereign yet domestic dependent nations (Barker 2006

[13] Spice (2018) describes the threat that invasive pipeline infrastructure in Wet'suwet'en territory poses to critical Wet'suwet'en infrastructure – networks of human and more-than-human relations that are crucial to Indigenous survival. See also Karuka (2019) on how U.S. imperialism and territorialization – enacted in part through railroad infrastructure - aims to compromise Indigenous modes of relationship.

Cattelino 2010; Dennison 2017; Krakoff 2004; Royster 1995) produces a fundamental tension for Diné people that has to do with the difficulty of reconciling long-term projects – like land restitution and consolidation – with urgent needs in the present – like safe roads.

There is movement within gridlock, though it may often feel like repetition, like moving in place or in circles instead of moving towards something different. It can leave things feeling unresolved. Berlant (2011) describes an impasse as a "holding station that doesn't hold securely but opens out into anxiety…it marks a delay that demands activity" (199). In the impasse of gridlock, there is all kinds of activity. People invent stopgap measures, they improvise, they come up with creative (legal or extra-legal) workarounds to go on living in gridlock.[14]

Gridlock does not affect every body evenly. While residents and local governments often struggle to get things done, the oil and gas industry tends to move through jurisdictional chokepoints much easier. Sometimes this is because accommodations are made. Sometimes it's because the cracks in the grid are just the right shape for industry to slide through. For instance, Chapter 3 describes how thresholds for permissible pollution enable tens of thousands of oil and gas facilities to effectively operate without a permit. In this chapter, I demonstrate how the lack of accountability for road damage perpetuated by the oil and gas industry extenuates an existing crisis of responsibility and movement for local Diné governments.

[14] See Carse, Cons & Middleton (2018) and Melly (2013) for ethnographic accounts of this form of lateral agency (Berlant 2011) and how people maneuver through chokepoints, bottlenecks, and sticky situations.

Repair

Potholes

As I turned onto N474, I took a deep breath and gripped the steering wheel tightly, bracing myself for a bumpy ride. Indian Service Route 474 (N474) is known locally as the "DWI road" – not because of actual incidents of drunk driving, but because it is so full of potholes and ruts that it compels drivers to swerve back and forth to avoid bottoming out.[15] That day I straddled the faded center line for most of the 12 miles from the junction at Highway 197 all the way to Ojo Encino Chapter House. Occasionally oncoming traffic forced me back into my lane. I stopped and pulled over twice when approaching vehicles came too fast towards me on the wrong side of the road: presumably, they were trying to avoid the holes too. Over the course of fieldwork, I drove this road countless times and began to think of myself as quite skilled at dodging its obstacles. But I would invariably succumb to at least one on each trip, accelerating with a burst of confidence and then cringing as the bottom of my small car scrapped violently against the pavement, sending a shock rippling through my body.

I spotted George Werito as I crested "Verizon Hill", the elevated point with the best cellphone service within Ojo Encino Chapter. He was parked on the side of the road just a few hundred feet from the Chapter House, with a long trailer hooked to his truck. When I pulled over behind him, he greeted me warmly and handed me a pair of work gloves.

Wasting no time, George began demonstrating his technique for filling potholes. First, he prepared the hole, using a shovel to clear loose gravel. Then, with the sharp edge of the shovel he made a series of small incisions in the bottom of one of the hundreds of bags of asphalt sitting in his trailer. Heaving the bag over to the hole, he emptied its contents. He grabbed a rake to spread

[15] DWI stands for Driving While under the Influence. Some states use DUI instead: "Driving Under the Influence".

the mixture evenly. With a heavy tamper, he compressed and flattened the wet asphalt before the final step: skillfully backing the trailer and truck wheels over the newly filled hole to secure the asphalt in place. It was backbreaking work (See Figures 13 and 14).

Figure 13 - George patching a medium-sized hole: the raking step.

We proceeded slowly up the road, filling holes as we went. Some holes were so big that they required 10 bags of the asphalt mixture. As we worked, drivers-by would slow or stop to see what we were doing. If we had just filled a hole, George would signal to oncoming cars to drive over the wet mixture, pointing animatedly at the exact spot on the road that needed the drivers' attention. Few understood. Instead, they swerved to miss the holes entirely, and George would have to run his wheels over the asphalt once again. Frustrated by the misunderstanding that required him to repeat the tedious maneuver, George said: "They're just so used to avoiding them!"

Figure 14 – George and his trailer loaded with bags of asphalt of N474

Roads had been a topic of conversation at the Tri-Chapter Council meeting a few days prior, just like at every monthly Tri-Chapter Council meeting I attended over a period of two years. After a lengthy discussion about the chronic disrepair of local roads, George had exclaimed: “We can sit here and talk about it until we turn blue! That’s how it has been for years.” George was sick of talking. He was ready to take matters into his own hands. Ojo Encino Chapter had recently approved funds to buy asphalt and tools, which George had purchased at

the nearest hardware store about two hours away. When I learned that George would spend the following Monday repairing the road, I jumped at the opportunity to join him.

As the President of Ojo Encino Chapter and of the Tri-Chapter Council, George had for years been in conversations with county, tribal, and federal agencies about the need to fix up local roads. The sharp increase of oil and gas truck traffic travelling in and out of the region on roads not built for heavy loads had exacerbated unsafe conditions. But somehow, despite the Tri-Chapter Council's efforts, and despite promises of funding from multiple government coffers, nothing was getting done. The road was getting worse.

Before the Council had set aside money to buy asphalt and tools, community members were in the habit of filling particularly hazardous holes with sand and dirt, stomping it down with their feet. This mending never lasted long. But in the interval before weather and traffic dislodged the dirt and sent it flying across the road, these DIY techniques did reduce wear and tear on tires, rims, and shocks. So, while I couldn't help but think of the work that George and I had done together as wishful, I had to remind myself that the purchase of materials and the dedication of hours towards the project represented a significant investment of energy and resources on behalf of the Tri-Chapter. It was a necessary, albeit temporary, hack to keep moving on the road.

Four Phases and Five Decades of N474

N474 winds northwesterly from its starting point at Johnson's Junction, the site of the old Johnson Trading Post off Highway 197, to the Ojo Encino Chapter House and Day School. Along the way, it crosses a county line and passes through tribal allotment, tribal trust, federal, and State land. The road bends up and down rolling hills, through expanses of sage that shelter

scattered homesites, and past undulating badlands whose distinctive mounds of orange, pink, and grey mark a gentle contrast with the greens and browns of surrounding fields. At night, the road can be pitch dark, with no streetlights or reflective ribbons to light the way – unless, of course, the moon is full. Like on many local roads, sudden changes of weather, like New Mexico's summer "monsoons" or springtime hailstorms, can make travelling on N474 even more perilous than usual.

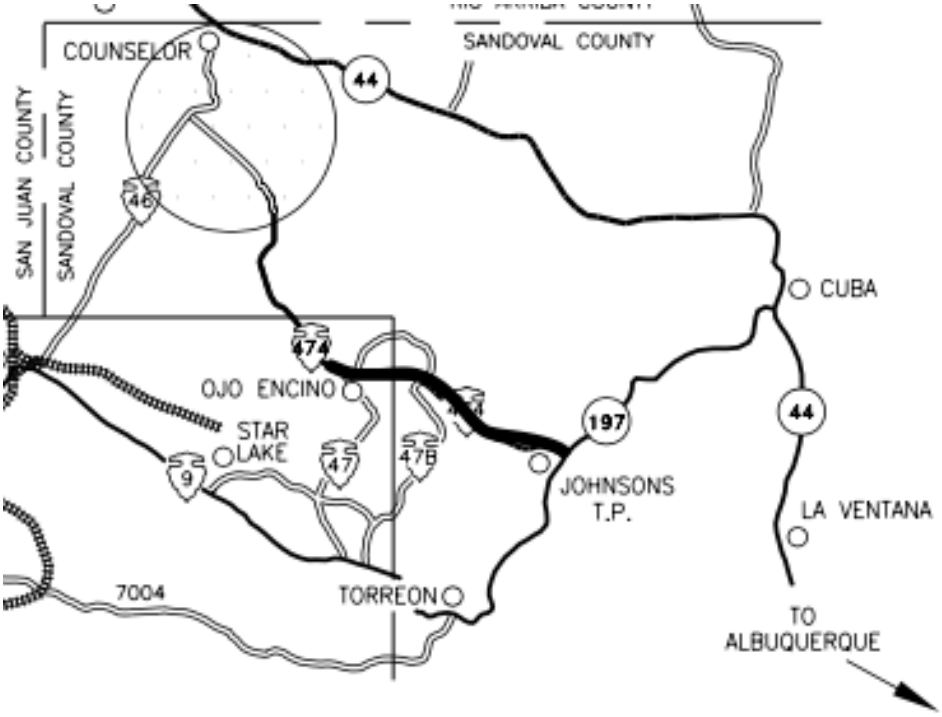

Figure 15 – Map of local roads from engineering plans for N474(4) and N46. N474 from 197 (Johnsons T.P.) to the Chapter House is bolded. Phase 4 of the project, discussed below, will involve construction within the circled are on N474 and N46. Eastern Navajo Agency Bureau of Indian Affairs, Branch of Roads, "Proposed Improvements to Navajo Route 474: Sandoval and McKinley Counties, New Mexico," 1982.

From Johnson's Junction to the Chapter House, 12 miles of N474 are paved with a thin layer of asphalt pockmarked by potholes and cracks. Past the turnoff to the Chapter House, the road heads north by Apache Corner to N46, which connects to Counselor and, eventually, to U.S.

Highway 550.[16] This section of road, past the Chapter House, is unpaved and unpassable when muddy. I ventured on it once, hoping to take the shortcut from Ojo Encino to Counselor, but I swore never to do it again in my small front-wheel drive hatchback. I nearly got stuck on a slope in a wet rut. My wheels spun as wave of panic swept over me when I realized I had no cellphone reception. In theory, taking the backroads along N474 to Counselor is a 35-minute drive from the Ojo Encino Chapter House, but after this incident it felt safer to double back to Cuba and follow the highway to Counselor, even though this route takes twice as long. Experiences like these – close calls brought on by my expectations of what a road is and how I should be able to move on it – forced me to gradually reorient myself to spatial-temporal dimensions of life in the region. It takes time, a reliable vehicle, and quite a lot of gas money to get around. Moving about comes at personal, collective, and infrastructural investment – the latter seldomly made on the checkerboard.

After witnessing several conversations, and hearing Chapter officials recount many more, in which representatives from federal, tribal, State, and county agencies skirted responsibility for N474, officials at Ojo Encino asked me to help dig up information about the road. I made calls to every government agency with jurisdiction in the area to try and find the answers to what I naively thought were simple questions: When was the road built? Who owns it? Who is responsible for it?

Because there was scant documentation of the road's history, it took many conversations to piece together a partial story of N474 in its multiple phases, from initial construction as a "ghost road", through Phases 1-3, and its planned but deferred Phase 4. The story opens onto a complicated web of regulations regarding tribal roads administration, federal trust obligations,

[16] Apache Corner is the local name for the spot where the southwesterly corner of the Jicarilla Apache Reservation abuts Diné land.

and the environment. In sketching this story, my aim is not to provide a comprehensive account of the legal and regulatory requirements for the construction and maintenance of N474, but rather to illustrate how gridlock – thick colonial entanglements – condenses along the way. Gridlock here resembles forms of frustration and violence experienced by citizens who bureaucracies are meant to serve when infrastructure necessary for public life is delayed, deferred, or unevenly provisioned (Anand 2017; Appel 2018; Gupta 2012). As a condensation within patchwork, what makes gridlock distinct as an American settler colonial formation is that it develops through the accretion of requirements and procedures that guide the relationship between Indigenous nations and other governments, even when not all parties of that relationship share the same operative terms or goals.

Construction: N474(ghost)-N474(3):

The story I've heard many times about the original construction of the road goes like this: a particularly feisty Sandoval County Commissioner wanted a school bus route through Ojo Encino to help meet the needs of his constituents attending school in the Chapter and in the nearby town of Cuba. He stood at Johnson's Junction, and with the straight shot of an arm he eyeballed a road, got his crew together, and made it happen. I would later glean from an Environmental Assessment document that this first construction took place in 1981. Sandoval County supplied crews and, with a mix of county and State funding, built 6.7 miles of road from Johnson's Junction to the county line.[17]

[17] In 1970, during U.S. Senate hearings on the Federal-Aid Highway Act, the Four Corners Regional Commission presented its list of priority road projects for the coming years.[17] An 18-mile road through Ojo Encino was listed 49th out of the commission's 75 priorities for road construction in New Mexico for fiscal years 1976-1980. The Commission estimated its construction would cost $1,290,000.

When people tell this story, they often repeat the Commissioner's gesture: shooting out their right arm, sometimes closing one eye as if to focus their gaze. This simplified telling conjures a space and time in which it was easier to get things done on the checkerboard, when regulations were fewer and less stringently enforced. Whether the story adheres to or exaggerates the conditions of possibility for the first stretch of N474, its retelling is significant for at least two reasons. First, it suggests that the complex requirements to build infrastructure on the checkerboard should not pose an insurmountable obstacle to a project when what is at stake is nothing less than the mobility and wellbeing of the public. Some retellings make this point while qualifying it with a second: although expediency is important, so is good design and careful construction with durable materials. The thin layer of asphalt applied to N474 back in the 1980s has been slowly wearing down for years.

The first part of N474 built by the County would, decades later, become what some locals and transportation officials call a "ghost road" – a road that has no clear owner because a right-of-way was never established. By today's standards, it is as if the road simply appeared out of thin air. With no responsible owner, the maintenance and repair of this section of road has become particularly challenging.

I obtained an Environmental Assessment (EA) written in 1982, along with a few construction plans and other documents, on a thumb drive from an engineer at the BIA Division of Transportation office in Gallup. The EA made a strong case to grade, drain, and pave the remaining 6.3 miles of N474 to the Chapter House. The EA contains several statements that resonate uncannily with descriptions of transportation challenges in the area today, for instance:

> "Ojo Encino has been the most isolated of Eastern Navajo Communities for many years. All roads leading out of the community are dirt roads with high clay

> content. Access to and from the community, Chapter House, and school is cut off by mud conditions brought about by only minor precipitation".[18]

Today, the nearest gas station or basic food store is about 40 minutes away in the border town of Cuba. Though many roads have been at least partially paved since the 1980s, they are plagued by potholes, sharp curves, and blind spots over steep hills that require careful navigation. The vast majority of families (90%) choose to stock up on essentials at larger stores in Rio Rancho, Albuquerque, or Farmington, where they are likely to be able to run other errands at the same time and buy food in larger quantities at more affordable prices (Ojo Encino Chapter 2016). These larger cities are between 1.5-2 hours away, each way.

Despite the urgency conveyed in the 1982 EA about Ojo Encino's isolation, the next phase of construction did not occur until 1989, when BIA completed what it would call Phase 1 of the N474 project, or "N474(1)". In the interim, Congress enacted the Surface Transportation Assistance Act of 1982, which established the Indian Reservation Roads (IRR) program. The IRR gave BIA a dedicated funding stream from the federal Highway Trust Fund to administer construction and maintenance of roads in Indian Country. With these funds, BIA completed about 2.5 miles of road work and replaced two bridges across the Torreon and Ojo Encino washes, near the Chapter House.

Years went by until, nearly a decade later, N474 saw another flurry of activity. There is no available record of the lag itself. The BIA engineer told me that delays like these usually have to do with funding constraints and a shift in priorities for projects given limited funding allocations. Between 1996-1997, BIA executed the second and third phases of construction-

[18] Eastern Navajo Agency Bureau of Indian Affairs, Branch of Roads, "Proposed Improvements to Navajo Route 474: Sandoval and McKinley Counties, New Mexico," 1982.

N474(2) and N474(3). The agency graded and drained 10.7 miles of road on both sides of the Sandoval-McKinley County line, past the Chapter House where the pavement ends, and all the way to Apache Corner.

It is this version of the road – inclusive of N474(ghost) to N474(3) – that would later be exposed to heavy oil field traffic for which it was not designed. A BIA realty specialist for the region told me that N474 "was in pretty good condition before the BLM started issuing all those oil and gas leases". Beginning around 2014, interest in the Mancos shale brought hundreds of tanker trucks into the Tri-Chapter region on a daily basis. The Chapters of Counselor, Ojo Encino, and Torreon began passing resolutions that expressed concerns about deteriorating road conditions and increased vehicular traffic (Norrell 2015).

Ownership:

To own a road through Indian Country effectively means to own the right-of-way (ROW) along the surface of the road's path.[19] On the checkerboard, a road ROW is a time-limited (usually 50 years) bundle of agreements with different landowners that allows the road to pass through or across federal, tribal, State, and private jurisdictions.[20] Take, for example, the ROW for N474(3), the phase of N474 in which 6.5 miles of grading and drainage work was conducted in 1997 from the county line to Ojo Encino Chapter House. A plat map provided to me by BIA details the length and width of the ROW across federal, state and Navajo Nation lands, as well as

[19] Title 18 USC § 1151 defines Indian Country as: "(a) all land within the limits of any Indian reservation under the jurisdiction of the United States government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States, whether within the original or subsequently acquired territory..., and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through […]". ROWs for roads only include access to surface lands.

[20] A ROW is a non-possessory interest in land that does not diminish the property interest or jurisdiction of the owner, meaning that title to the land remains with the owner (CFR 25 §169.1).

across eight distinct allotments. A dizzying inset on the map zooms into a small section where N474(3) passes through the intersection of three allotments and a parcel of Navajo Nation trust land (see Figure 16).

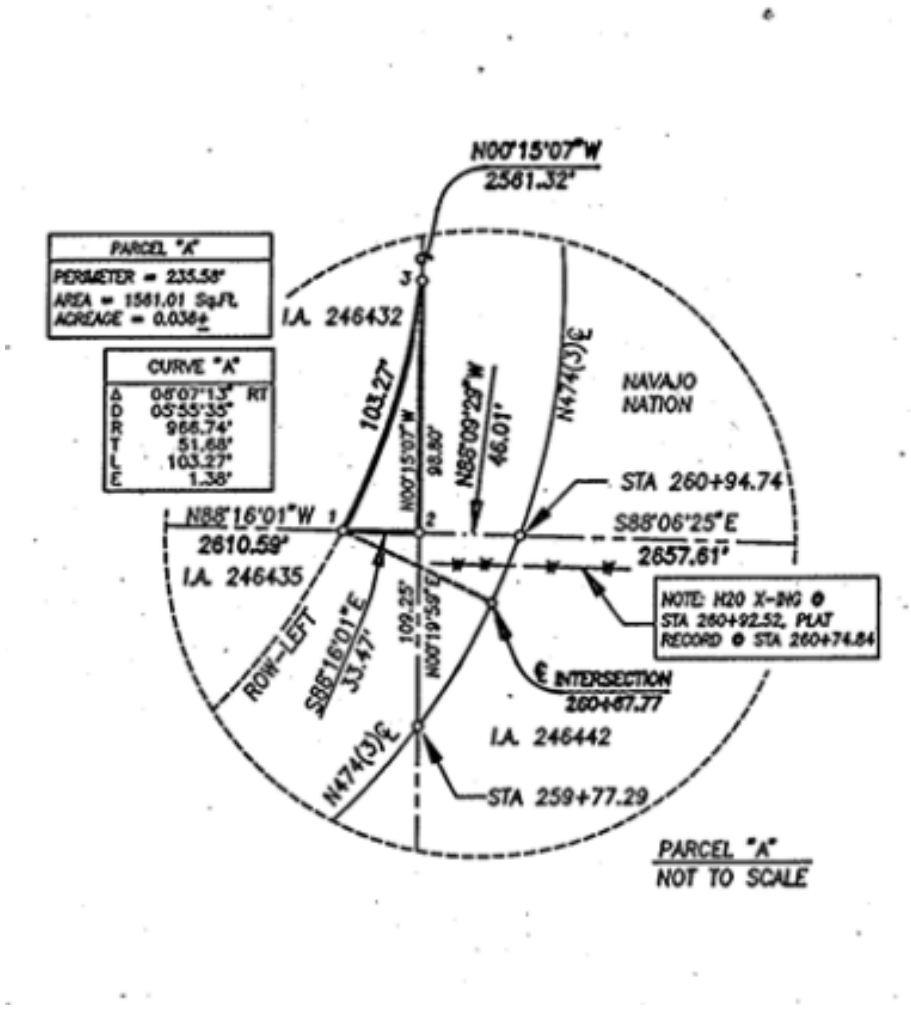

Figure 16 – Inset on ROW plat for N474(3) showing N474 crossing four land statuses.

ROWs in Indian Country are administered by the BIA. An applicant for a ROW is charged with surveying the proposed route, identifying land ownership, appraising the land value, coordinating compliance with federal environmental laws, obtaining consent from landowners, and negotiating compensation to landowners. The process of obtaining consent is complex at the best of times, and on the checkerboard, it can significantly lengthen the timeline

of any project. In the case of N474, whose ROW is owned by BIA, a different process of consent is required for each jurisdiction through which the road passes. For ROWs on tribal trust land, consent must be obtained from both the Navajo Nation and the BIA; on State land, from the New Mexico State Land Office; on federal land, from BLM; and on allotment land, from co-owners that together hold at least a 51% interest in the allotment. Obtaining consent from 51% of shareholders in an allotment involves contacting and collecting signatures from dozens and even hundreds of co-owners, many of whom do not reside in the region.[21]

While information about rights-of-way and land titles is retained by BIA, I was told by staff at both BIA and the Navajo Division of Transportation (NDOT) that many of the components that make up a right-of-way, such as environmental assessments, site surveys, and archaeological reports, are buried underground in Lenexa, Kansas. Lack of access to these documents can mean that assessments have to be redone before new construction can begin on an existing right-of-way.

An old limestone cavern in a Kansas City suburb is where, in 2004, the Department of Interior (DOI) began storing inactive BIA records and other materials related to DOI's trust responsibilities. There is a good chance that records from the 1950s onwards are stored there (Greenwald and Smith 2015). The cave is called the American Indian Records Repository (AIRR). It replaced BIA's old system of record management, in which the bureau destroyed some inactive records and transferred others to the National Archives.[22] Though more BIA

[21] In some circumstances, BIA may grant a ROW without consent from all landowners if the landowners are too numerous or their whereabouts are unknown, and if the agency determines that allottees will not be harmed by the ROW and that adequate notice and compensation are provided (25 CFR Part 169.08) See Benally Fontanelle (2014) for an analysis of challenges in the ROW consent process for Navajo allottees in Eastern Navajo Agency.

[22] The 1996 *Cobell* lawsuit (see Chapter 1) shed light on DOI's systemic mismanagement of Indian trust records. In 1997, the Office of the Special Trustee, which was established by the the 1994 American Indian Trust Fund Management Reform Act, devised a series of reforms to better fulfil DOI's trust responsibility to tribes, one of which was to an overhaul of DOI's records management.[22] These reforms ultimately led to the creation of the AIRR in 2004.

records are now securely stored at AIRR than were typically accessioned by the National Archives, these records are not accessible to the public. Federal government contractors and tribal members may request permission to view AIRR records, but access is not guaranteed. Scholars and other members of the public must file a Freedom of Information Act request to access specific documents, though this approach is not assured to yield the results sought (Greenwald and Smith 2015). The BIA engineer who provided me with what little documentation he had on N474 noted that many times his staff had requested the retrieval of records from AIRR, only to have archivists in Kansas deliver the wrong records or fail to turn up anything at all.

Road ownership on the checkerboard is a temporary non-possessory interest in land, contingent on consent from multiple landowners and compliance with a variety of federal environmental and archaeological laws. Compliance requires the production of a documentary record that is both labor intensive to assemble and, as years pass, can become inaccessible. As with oil and gas proposals, Tri-Chapter leaders insist on the importance of careful environmental and archaeological review prior to road construction, and a road design that mitigates potential damage to ecological, community, or cultural resources. And yet, as the years go by and N474 gets worse, the old County Commissioner's decisive action, which seemingly skirted all regulations, gains appeal. *Why not just go out there and build it?* Except that now, the ghost road that the Commissioner built is one of the largest obstacles standing in the way of repair on N474. While road ownership does not bear a direct correlation to responsibility for road maintenance, nor can maintenance proceed in the absence of ownership.

Responsibility:

N474 began deteriorating at a moment when the Navajo Nation had just recently assumed new responsibilities for roads across Diné Bikéyah. A series of changes to federal highway legislation beginning in the late 1990s authorized tribes to administer federal road funding through compacts with BIA or the Federal Highway Administration (FHWA).[23] By 2011, at least 110 tribes had entered into agreements with FHWA (Congressional Research Service 2016).[24] The Navajo Nation followed suit in 2012. The Navajo Division of Transportation (NDOT) assumed duties of administering the Indian Reservation Roads program – now called the Tribal Transportation Program (TTP).[25]

Over the next several years, BIA slowly transferred its TTP projects to NDOT. With the transfer complete, BIA would continue maintain BIA roads but would no longer be responsible for planning and constructing tribal roads. Instead, BIA now oversees NDOT's activities. As the federal trustee, BIA's review and approval is still needed on all NDOT plans and assessments, and BIA still administers ROWs.

NDOT receives approximately $54 million per year from FHWA to administer the TTP and another $6 million from the Nation's fuel excise tax and general fund. The BIA, formerly the recipient of all FHWA funding, now receives about $6 million annually for maintenance on roads for which it owns the ROW. By the time the costs of road maintenance, operations and

[23] The precedent for tribes to assume control over transportation programs lies in the 1975 Indian Self-Determination and Educational Assistance Act (ISDEAA), which authorized tribes to provide their own services formally provided by the federal government.
[24] The first legislation to allow tribes to administer road funding was the 1998 Transportation Equity Act for the 21st Century, which authorized compacts between tribes and BIA. The 2005 Safe, Accountable, Flexible, Efficient, Transportation Equity Act authorized compacts between tribes and BIA or FHWA. The 2015 Fixing America's Surface Transportation (FAST) act authorized compacts between tribes and FHWA (Name Redacted 2016).
[25] The Indian Reservation Roads program was renamed Tribal Transportation Program (TTP) in 2012, with the passage of the Moving Ahead for Progress in the 21st Century Act (MAP-21). MAP-21 also introduced a new funding formula for tribal shares – the amount of federal funding each tribe receives under the TTP.

planning, and engineering are subtracted from the sum NDOT receives, the Division is left with just under $37 million for construction. By NDOT's estimates, it costs approximately $2 million to pave one mile of road on the Navajo Nation. This means that the Division can only pave about 17.5 miles of road annually, and this mileage decreases when bridge repairs are thrown into the equation. With 11.5 miles of heavy construction work needed on N474 and connecting roads, the project will constitute the bulk of NDOT's annual work in the year in which it gets done.

The transfer of responsibility for the TTP to NDOT took years. By mid-2018, BIA had ceased work on all TTP projects and had transferred files to NDOT.[26] One of the projects transferred was N474, which had come back alive in a fourth phase. The road's disrepair was such that the work needed no longer qualified, in BIA's terms, as "maintenance". Instead, since N474 required new construction, the road was now NDOT's responsibility.

In late 2014 BIA began working on engineering and construction plans for N474(4), which would rehabilitate parts of the road and pave the dirt section that continues north from the Chapter House (see figure 15).[27] It is unclear when construction will begin. With funding constraints, outstanding environmental and archaeological assessments yet to be done, ROW consents to obtain on several allotments, and a process of federal oversight whereby BIA will review all of NDOT's work, there are many obstacles to surmount before N474 can be repaired. Moreover, planners are stuck on the ghost portion of the road built in 1981 for which there is no documented ROW. Until an agency assumes the ROW, no construction or rehabilitation can occur on that part of the road.

[26] Stevens, Bartholomew, 2018, "Bureau of Indian Affairs Navajo Region Report to the 23rd Navajo Nation Council." Bureau of Indian Affairs.
[27] The plans for N474(4) are combined with the fourth phase of work on N46. The plans indicate that N46 will be graded and parts will be paved, all the way to Counselor and U.S. Highway 550.

Importantly, officials at BIA and NDOT do not share a common understanding of each other's authority and responsibility when it comes to N474. In interviews, engineers and planners at both BIA and NDOT pointed the finger to the other agency when I asked about incomplete requirements that were holding up construction. This confusion could partially stem from wrinkles in the transfer process of the TTP between BIA and NDOT, which may be smoothed over in time.

But the confusion also indexes a common experience on the checkerboard, where the Chapters often find themselves waiting for authorities other than themselves to claim - or admit - jurisdiction over a local problem. This becomes particularly untenable when rapid changes occur. Under conditions of gridlock, it is not possible for governments to coordinate action quickly enough to respond to the massive infrastructural changes brought on by a fracking boom. Unsafe roads grow even less safe, if not for the imaginative interventions of people like George.

1. Education

"Even though the oil trucks go through there, I have kids on my bus when I drive through. […] I can't go through certain roads because of the potholes", announced a bus driver at a Tri-Chapter Council meeting in late August 2019. While the well-maintained oil trucks are equipped with high clearance and 4-wheel drive, her school bus does not boast the same features. She reported that she is currently redesigning her morning and afternoon routes to minimize delays and hazards for students. The issue of school transportation was discussed at length that day as a follow-up to a conversation held during the previous month's meeting.

Back in July, the Executive Director of the Navajo Nation Human Rights Commission (NNHRC) had attended a Tri-Chapter Council meeting to report on the NNHRC's work

regarding the mistreatment of Navajo students. Prompted by multiple reports of abuse at schools in border towns abutting the reservation, the Navajo Nation Council had directed the NNHRC to hold a series of public hearings to assess the education of Diné children and youth. The galvanizing incident had occurred in October 2018, when a high school teacher in Albuquerque cut the braid of a Diné student during a Halloween lesson and called another a "bloody Indian" (NABID-87-18).[28] News of this abuse reverberated in local news venues and even made it into *Teen Vogue, The Washington Post,* and other national publications (Wang 2018; West 2018). Stories drew attention to the widespread verbal and physical abuse of Indigenous students across the region.

The incident in Albuquerque came on the heels of a precedent-setting legal decision in New Mexico regarding the education of Indigenous students, in which school transportation figured as a central issue. In 2014, a group of families and six school districts across New Mexico sued the State for neglecting to provide a "uniform statewide system of free public schools" (*Yazzie/Martinez v. State of New Mexico*) sufficient for the education of all New Mexican children. In a consolidated lawsuit, *Yazzie/Martinez v. State of New Mexico*, plaintiffs alleged that the State was especially failing to administer programs and services for low-income, Native American, English language learner (ELL), and students with disabilities. In 2018, Judge Sarah Singleton of the First District Court of New Mexico ruled in favor of the plaintiffs, finding that New Mexican children have a right to an education that prepares them for college and careers. Lack of funding, the judge ruled, is not an excuse for providing equal access to basic

[28] NABID-87-18, "Resolution of the Naabik'iyati' Standing Committee of the 23rd Navajo Nation Council 4th Year, 2018, An Action Relating to Health, Education and Human Services, Naabik'iyati' Committees; Requesting the Navajo Nation Human Rights Commission Undertake an Investigation of the Occurrence of Discriminatory Behavior Including Verbal and Physical Abuse of Navajo and Native American Students by Representatives of the School Systems on the Navajo Nation and the Surrounding Contiguous States," 2018.

services. The judge found that the State's failure to provide "at-risk" students with adequate educational services could lead to irreparable harm. She thus ordered the State to take immediate steps to remedy the situation. Inadequate education services and supports affect students not only in the immediate term, but over their entire lifetimes, the judge found, echoing concerns I heard repeated by parents and officials in the Tri-Chapter.

One of the school districts to join the *Yazzie/Martinez* suit was Cuba Independent School District (CISD), which runs an elementary, middle, and high school in the village of Cuba, New Mexico. Students from across the Tri-Chapter region attend CISD schools, where approximately 600 students are enrolled. Nearly 70% of students at CISD schools are Native American, primarily Diné. The schools, like the village itself, have long been known for discriminatory attitudes and practices towards Diné people, and for failing to equip students with the tools to meet national proficiency standards in reading, science, and math.[29]

Cuba is a small village along U.S. Highway 550 with a population of less than 800 people. At nearly 7,000 feet, it sits on the Continental Divide and is a popular stop for hikers. Cuba's main strip has more gas stations than any other kind of establishment, though there are a handful of New Mexican and fast food restaurants, a small hardware shop, a minimal grocery store, a Wells Fargo, an auto-repair shop, and a rundown motel. The Rio Puerco, tributary of the Rio Grande, flows ephemerally through town, carving a shallow canyon along its path. All three CISD schools are clustered in a circle east of the Rio Puerco about a half mile off the main drag, overlooked by the Nacimiento Mountains. Many students at the school are avid athletes, participating in basketball, volleyball, and track for schools' team, the blue and yellow Cuba

[29] On border town violence in Cuba and other border towns abutting the Navajo Nation, see Denetdale (2016). A review of school district report cards between 2009-2018 reveals that students at CISD schools consistently fail to achieve standard educational objectives compared to state and national averages.

Rams. Behind the school complex are miles of cross-country running trails that weave through stunning sandstone cliffs and pinon-juniper woodlands.

Among the many challenges that CISD schools face, lack of funding for adequate student transportation features prominently in *Yazzie/Martinez* court fillings and in discussions at the Tri-Chapter Council. Deficient funding for bilingual and culturally appropriate education, instructional materials, and staffing are also major concerns. In recent years, CISD has had to substantially subsidize transportation costs with operational funds, leaving less money for other crucial services. The school district's existing funding is not adequate to provide Native American students who live outside of Cuba with transportation to access extended learning opportunities, like after-school tutoring, extra-curriculars, or summer school.

Just getting Tri-Chapter students to school can be a major hurdle on the region's roads, especially in inclement weather. Parents report that students miss too many school days per year because buses cannot pass through the roads. With the *Yazzie/Martinez* ruling, Cuba schools began introducing "e-days" in 2019 to help mitigate the problem of lost educational time that impacts Diné students most. Students now download their weekly assignments at the beginning of the week on a laptop provided by the school, using the school's internet connection.[30] If road conditions prevent school buses from driving their full routes, students can now complete their assignments from home.

Transportation problems are just one set of challenges that CISD is working to address in the wake of the *Yazzie/Martinez* ruling, which ordered the state to take immediate action to ensure that all students receive the services and programs they need. Since then, a newly hired Indian Education Coordinator and staff persons charged with coordinating special education,

[30] Many students in the region do not have internet access at home.

English as a second language, and needs for at-risk youth have made regular appearances at Tri-Chapter Council meetings to report on CISD's progress and hear concerns from parents and Chapter officials. The school is making significant strides in improving access to bilingual and culturally relevant education.[31] In the Fall of 2019, CISD collaborated with local Chapters and the Black Mesa Water Coalition to build a hogan, a traditional Diné dwelling often used for ceremonies. If adequately funded, CISD can hire more bus drivers, purchase more buses, and allocate more monies towards vehicle maintenance. But the district can't fix the roads.

"Our hands are tied when it comes to roads", said the newly appointed Assistant Superintendent of CISD at that same August Tri-Chapter meeting, shortly after the bus driver complained of road safety. The Assistant Superintendent was responding to complaints from Chapter officials, who had recently discovered that CISD receives approximately $50,000 per month from ad-valorem taxes on oil and gas production in the Tri-Chapter. This tax is collected by the County and a portion is diverted to CISD (Velivis 2019). Chapter governments, however, receive no money from oil and gas taxes and revenue derived from extraction within Chapter boundaries. Circulating a handout documenting the annual distribution of oil and gas revenues to the county and school district, the Assistant Superintendent explained that CISD can only repair roads on district properties. Oil and gas monies from the county are appropriated for specific funding channels at CISD, like salaries. CISD does not have the authority to help maintain the roads on which students must travel.

Chapter officials were outraged yet not surprised at the irony of the situation. Roads made worse by heavy oil and gas traffic hamper the safe and timely transportation of students to

[31] In Fall of 2019, the State awarded Cuba Schools a large grant to continue improving Indigenous Education. The grant was part of a new granting program in response to Yazzie/Martinez (Colton 2019).

and from school. But monies derived from oil and gas production, which help fund the school district and not local Diné governments, cannot be used to fix the roads.

Gridlock, here, manifests as a barrier to addressing at least two connected forms of attrition – the wearing out of roads and the reduction of life chances for Diné students. At CISD, Diné children and youth have been consistently denied access to adequate and culturally appropriate educational services.[32] And when the roads are especially bad, students are denied transportation to school. Timely, safe, and successful movement through the school system is affected on multiple levels, but there is no straightforward process for clearing obstacles in students' paths – though the Chapters and school staff alike continue to work towards gradual improvements. The entrenchment of the oil and gas industry as the primary funder of public education in New Mexico (see the Introduction) makes matters stickier, as districts like CISD rely on state disbursements of public education funds to make the changes mandated by *Yazzie/Martinez*, even as roads continue to disintegrate. Meanwhile, Diné students are caught up in gridlock.

Emergency

On a rainy summer evening a few years back, a man in the Tri-Chapter was having chest pains. 9-11 operators dispatched AJ Trujillo, volunteer fire chief for the Torreon district of the Sandoval County Fire and Rescue Department. AJ and his colleague arrived on the scene in one of the 4-wheel drive trucks that the Department had purchased to help firefighters get around on the region's rough roads. In the man's home, they assessed the situation and determined that he was in need of immediate medical attention. AJ called an ambulance. The ambulance set out but

[32] I want to emphasize that since the *Yazzie/Martinez* decision in 2018, CISD is making a considerable effort to improve the delivery of educational services to Diné students, but there is a long way to go.

could not reach the home. Rain had seeped into the dirt roads, softening them. Water pooled in the ruts and holes.

When the paramedics alerted AJ that they had been forced to stop miles away, AJ and his colleague decided they had no other choice but to transport the man to the ambulance in their truck. Such an action is inconsistent with protocol, because it means the patient won't have access to paramedics and equipment in the ambulance. But at times, veering from protocol is the only option, AJ explained to me. These swerves can save lives.

Sometimes the road conditions require AJ and his team to take long detours to avoid conditions that even their high-clearance trucks can't handle safely. Depending on which ambulance is dispatched, the patient will either be transported to a hospital in Albuquerque, Crownpoint, or Farmington – each destination about 90 minutes away from any given spot in the Tri-Chapter. In comparison, residents in States across the Mountain West live, on average, within a 13.7-minute drive to a hospital (Lam, Broderik & Toor 2018).

The difficult road conditions, which require the Sandoval County Fire and Rescue Department to spend a lot of money on repairs and tire replacements, are just one set of challenges facing AJ and his crew. Delivering emergency services in a timely matter is a difficult proposition on the checkerboard, and not only because it's hard to get around. A truism I often heard repeated in the Tri-Chapter is that if you call the police for an emergency, they might show up in a day or so. Such laments, sometimes uttered with the utmost seriousness and sometimes in joking, contain both a critique of bureaucratic inefficacy and the common sense feeling that people are forgotten in Eastern Navajo Agency. To convey how jurisdictional complexity gets in the way of protecting the community, AJ told me a story.

Several years back, AJ was on his way home from his job as a school bus driver when he got an emergency call. An elderly woman had stopped breathing and emergency responders were needed on the scene fast. AJ quickly dropped off the school bus and jumped in his truck. The woman was only 5 miles away and he was there in under 10 minutes. When he arrived, the woman's husband said in despair "what took you so long?". AJ said he had rushed there as soon as he got the call. He would later learn that the husband's initial call had been routed to the border town of Gallup, where operators determined that the medical emergency was on tribal lands and thus forwarded the complaint to Crownpoint, on the reservation. "Crownpoint must have sat on it for over 45 minutes," AJ said. By the time he got there, it was too late to revive the woman.

I asked AJ why the call had been routed to Gallup, and he explained that at the dispatch center, location accuracy varies depending on whether a 9-1-1 call comes from a landline or cellphone. The dispatch center can determine the precise location of a landline, but it is trickier to do so with a cellphone call. Both the Federal Communications Commission and the Navajo Nation Telecommunications Regulatory Commission are working with phone companies to improve the quick transfer of information about a caller's location from the company to the dispatch center, but there remains work to be done. Location inaccuracies can have a big impact in the Tri-Chapter, where a discrepancy of a few hundred feet can mean the difference between one responsible party and another. The time it takes to pinpoint not only a location but also a jurisdiction can be a matter of life or death.

"If I called 9-11 right now from my cellphone, would the dispatch operator ask me what kind of land I was on?", I asked AJ. He said they would not, but "they would ask for a very specific location". "For example, if you said you were at the Day School, they would know it

was on private property and the County could respond. Same if you're along Highway 550," AJ said. However, he cautioned, on Highway 197 things might be different. At mile marker 15, the county would have jurisdiction, whereas by mile marker 17 or 18, authority lies with the tribe. "So, it is really hard - sometimes no one does anything because of jurisdiction," AJ explained.

"None of the other jurisdictions will respond to an incident on tribal trust or allotted land unless Navajo Nation asks them to", AJ continued, noting that often the County just doesn't find out about incidents on tribal lands as they are happening. "And sometimes the tribe won't respond because they don't have capacity, or for whatever reason." If AJ and his colleagues do find out about an emergency outside of their jurisdiction they will respond nonetheless, but these small transgressions can come at a cost: the Fire Department is under-funded and AJ's crew faces constant pressure from supervisors when they use extra fuel to get to places that are outside of their normal routes.

With emergency response on the checkerboard, gridlock manifests as the inability to respond in a timely manner. It develops at the conjuncture of infrastructure and jurisdiction. Space becomes a function of the time it takes to move through it, marked by a legal geography whose margins are, at varying moments, more or less porous.[33] Rough roads make some emergency trips impossible in an ambulance. Jurisdictional complexity on the ground causes delays, confusion, and hiccups in the dispatching process. These delays, as AJ knows, can be matters of life or death. His crew's modest hacks – taking a detour, modifying protocol, or responding when it is not their responsibility – are life-saving maneuvers.

[33] In a study of emergency responders along the US-Mexico border, Jusionyte (2019) details how rural space is experienced as time.

Coda: George's Superhighway

It was the turn of a new decade. In the first week of January 2020, Council Delegate Daniel Tso held a district meeting at Ojo Encino Chapter House for the eight Chapters in Eastern Navajo Agency that he represents. The room was blissfully warm, heated by a wood fire burning in a large cast iron stove, and people were glad to see one another after the Christmas holiday. From the small stage in front of the room, officials representing each Chapter reported on their successes and challenges, their visions for the decade ahead, and listed projects for which they needed help from Window Rock: power and waterline extensions, expanded behavioral health services, road repair.

Navajo Nation President Jonathan Nez, along with several members of his cabinet, attended to hear reports and concerns from communities in Eastern Navajo Agency. Nez' attendance made the day a momentous occasion. Throughout the meeting, Chapter officials reminded the Executive branch of its responsibility towards them: "even though we are referred to as 'checkerboard Navajos' we are still part of the Navajo Nation," said the Vice-President of Ojo Encino in his introduction to the crowd.

Daniel Tso's introductory comments underscored this point. "We *are* part of the Navajo Nation," he said, turning to President Nez: "I'm glad you took the shortcut [the most direct route from Window Rock], but I wish you had come through this way," Daniel said, gesturing vaguely towards the weaving roads that lead from U.S. Highway 550 to N474 and finally to the Chapter House, "so you could have seen President Werito's 'superhighway'!" Over muffled laughter from locals in the crowd, Daniel explained that N474 was built so cheaply that in some places the asphalt is less than an inch thick. The Tri-Chapter has been trying to get it fixed for years, but nothing has happened. "So back in the Spring, George and some laborers filled their own

potholes!", Daniel exclaimed. Repairing the road is just one example from "a whole laundry list" of critical tasks for public safety and wellbeing that Chapters in Eastern Navajo Agency take on themselves, without support from Window Rock or the other jurisdictions that surround them.

Several hours later, George was invited to give concluding remarks as the hosting official. His tone was less celebratory than might be expected for a man who had been heavily praised for improvising so creatively in the face of gridlock. He told the audience that the Tri-Chapter Council had spent over $12,000 of its own budget fixing the roads. The decision to do so didn't come easily, but George had been at this fight for over four years, had heard promise after promise, and no longer believed the road would get fixed any other way. "I've sat here with State officials, congressional people, division directors, BLM, *everyone*. *So many times*. But nothing gets resolved. I hate to be this way but that's how I feel about this. That's how my people feel about this." Despite the attendance of the President and the optimism with which many were approaching the new year, George had little confidence that anything would get done under existing conditions.

Soon, the meeting began to peter out. I said my goodbyes and, outside, brushed a dusting of snowflakes off my windshield. As I drove back home on N474, I admired George's handiwork. I tried to remember which holes along the 12-mile stretch I had helped fill, and which had been tackled by George and a crew of local men on another day later that Spring. I noticed places where the newly applied asphalt was starting to chip, and I dodged holes that hadn't yet been addressed. On that crisp January afternoon, snow and melting ice had accumulated in some holes, making them indistinguishable from the road's surface. My front tire hit one and sent water splashing in every direction. I gripped the steering wheel tighter to regain control of my car.

The road felt safer, but precariously so. George and I had discussed earlier that morning that new cracks would appear in the asphalt with the coming freeze and thaw. It would have to be patched again.

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When I first heard Mario articulate that people in the Tri-Chapter were dying because of jurisdiction, it took me a while to grasp what he meant. What kind of causal relation was he drawing between the configuration of land ownership and authority, on the one hand, and the life chances of Diné people, on the other? Mario was primarily addressing a crowd of fellow residents who have intimate and embodied knowledge of getting or feeling stuck on the checkerboard, whether in their vehicles or along the life paths they hope to carve out for themselves, in part through accessing public services like education and healthcare. With Mario's prompting, I started paying attention to roads in the manner that he and other residents have but no choice to. As I did, I began to discern how gridlock accretes through patchwork's colonial entanglements (Dennison 2012; 2017).

Patchwork simultaneously produces a proliferation of government authority *and* the conditions of possibility for government neglect as avenues for action get jammed up with competing claims of jurisdiction, responsibility, or lack thereof. Focusing on the figure of the road to demonstrate how gridlock poses tangible threats to Diné existence, in this chapter I followed Tri-Chapter residents as they moved through a region engineered for their immobility. Along the road's many bumps and curvatures, residents develop temporary workarounds and

strategic adaptations to keep getting things done amid conditions of gridlock, all the while watching the oil and gas semi-trucks run through the region with comparative ease.

INTERLUDE: METHANE MATTERS

The Wall

One of the first things I do every time I arrive to spend a week at the National Oceanic and Atmospheric Administration (NOAA) research center in Boulder, Colorado, is go visit the wall across from the vending machines on the third floor. I get up from the temporary desk I have been assigned in an office of the Carbon Cycle Greenhouse Gases (CCGG) group and wander through the long corridors, peering into laboratories housing cylindrical tanks of air and large boxy machines along the way. I stop just before I reach the National Weather Service and Space Weather Prediction Center in the building's southern wing.

I stand back, spending a few minutes there to take in the wall. My eyes follow the yellow line that charts atmospheric concentrations of carbon dioxide (CO_2) over the last 800,000 years. The line zigs and zags through ice ages, tracking concentrations of CO_2 that hover variably between ~175-275 parts per million (ppm) over millennia. It was during the current interglacial period, the chart indicates, that human civilizations arose, some 12,000 years ago. From here, the yellow line continues its pattern of ups and downs until the year 1760. A bubble on the chart signals this as the beginning of the industrial revolution. Suddenly, the pattern changes. The yellow line begins to shoot straight up as it surpasses 300 ppm of CO_2 for the first time and never turns back. Soon the line is no longer yellow: it is red.

In a few short centuries, atmospheric concentrations of CO_2 have grown exponentially, by over 100 ppm. In the five years during which I conducted research on this project, between 2015-2020, levels rose by another 10ppm, reaching 413ppm by May 2020. This knowledge weighs heavily on the scientists in the CCGG group. It's why they do the work that they do. When some of the more senior members of the team started their careers, they thought they might be able to

contribute in some small way in taming the curve documented on the wall. But that prospect, they know, is no longer realistic in their lifetimes.

Their lab is the worldwide central calibration hub for the measurement of CO_2, methane, and several other gases. For some of these scientists, their daily labor involves tending to the calibration tanks, checking the measurements, and caring for shipments of air samples that come in from all over the world. They know this data, and these gases, intimately.

Accounting

I had first come to NOAA in 2015 to better understand the Four Corners methane hotspot. Soon after the journal *Geophysical Research Letters* published "Four Corners: The largest US methane anomaly viewed from space", the research article announcing the discovery of the cloud (Kort et al 2014), scientists at NOAA received grant funding to help pinpoint exactly where all that methane was coming from. Along with researchers from other institutions, they would eventually confirm the original article's hypothesis that the oil and gas sector is the hotspot's primary source by performing additional aircraft and van-based measurements (Smith et al. 2017, Frankenberg et al. 2016, Pétron et al. 2020). But the scientists I worked with at NOAA's CCGG group quickly helped me reframe the questions that had prompted my initial visit. While I – like many people living in the Four Corners region – was still shocked to know that an invisible cloud loomed overhead, the scientists were not so surprised that large quantities of methane were detected in the atmosphere above one of the country's largest natural gas producing basin. What most interested them about the cloud were the techniques used to detect it. They wondered how useful these techniques would be in solving a puzzle of planetary proportions.

The CCGG group at NOAA is part of an international network that has spent decades trying to account for the total quantity of methane in the atmosphere. This figure is called the "global methane budget", and it represents the total sources and sinks of methane. Understanding it is critical to formulating scientifically sound emissions reduction strategies in the work of climate change mitigation. After CO_2, methane contributes second most to planetary warming. Whiles its lifetime in the atmosphere is much shorter than CO_2, it has a higher global warming potential or capacity to trap heat: over twenty years, methane traps up to 86 times more heat than CO_2, and 28 more times over one hundred years (IPCC 2019).

In recent years, scientists at the CCGG group have been concerned with pinpointing the reasons for the sharp and sudden increase in global atmospheric methane concentrations that began in 2007. Like CO_2, global atmospheric concentrations of methane have risen significantly over the last several hundred years, more than doubling since preindustrial times due to a mix of anthropogenic activities (Dlugokencky et al. 2011). But a strange thing happened between 2000-2006: methane concentrations nearly stabilized, forming a flat line on an otherwise sharp curve (see Figure 17). Then, starting in 2007, emissions began growing persistently again by approximately 5 parts per billion annually and by even more after 2014 (Nisbet et al. 2019). Scientists are trying to ascertain what accounts for the period of relative stability and the continued growth in the methane budget that followed. To do so, they mobilize a vast global knowledge infrastructure (Edwards 2010) to reconcile what are called both "top-down" and "bottom-up" assessments.

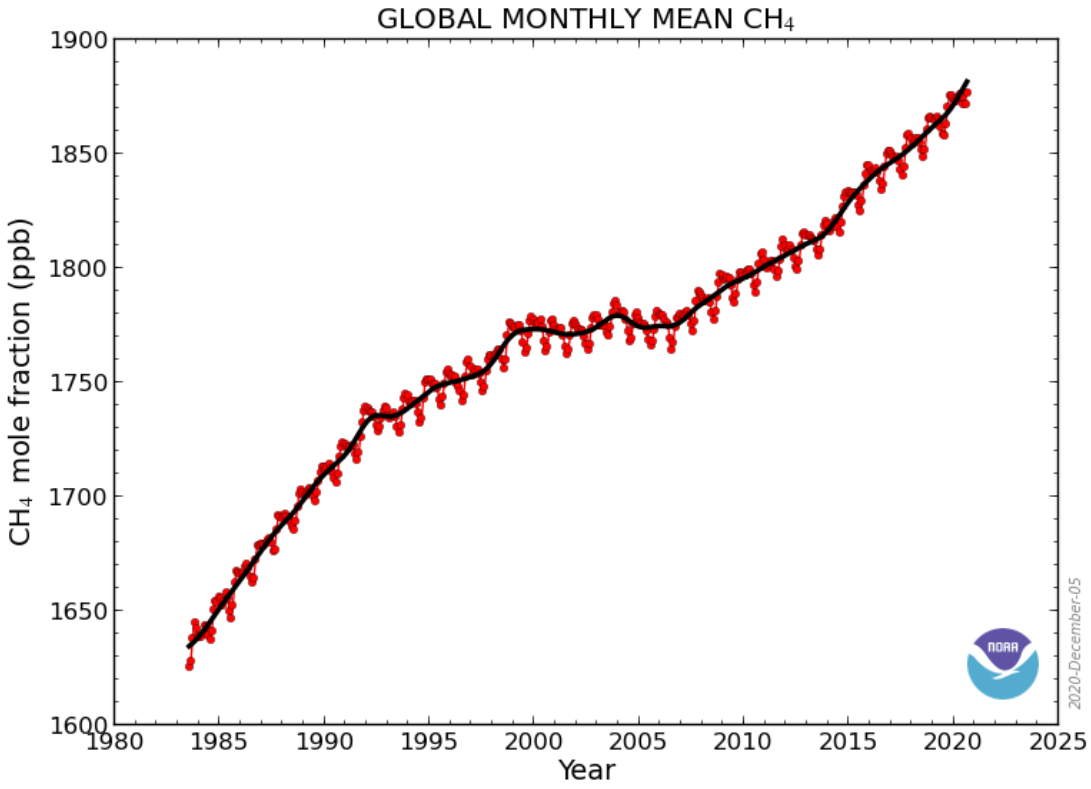

Figure 17 – Global monthly trends in atmospheric methane from 1980-2020, including a period of relative stability between 2000-2007. National Atmospheric and Oceanic Administration Global Monitoring Laboratory. Ed Dlugokencky.

To complete a bottom-up assessment, scientists tally in-situ measurements or estimates of emissions from individual sources. For example, a bottom-up assessment of methane emissions from oil and gas production in the San Juan Basin would aggregate emissions (either direct measurements, or the emissions reported from industry) from a representative number of facilities. Bottom-up assessments of particular processes, like enteric fermentation in agriculture or natural gas transportation, can be extrapolated to produce estimates for an entire sector. These kinds of assessments inform greenhouse gas inventories like the one maintained by the U.S. Environmental Protection Agency (EPA). In contrast, top-down assessments gauge ambient atmospheric conditions for broad geographic regions. Top-down methods take spatially and

temporally distributed measurements - like satellite observations, aircraft monitoring above a region, or air samples regularly collected through NOAA's international sampling network - and run them through a variety of atmospheric transport models to derive emissions estimates (National Academies of Sciences 2018).

Top-down and bottom-up approaches are considered complimentary. Researchers recognize that both are needed to understand methane concentrations and sources (Allen 2014; National Academies of Sciences 2018). But neither method, nor the combination of the two, has yet to fully explain the increase in global methane concentrations since 2007. Discrepancies between both approaches and challenges in attributing emissions to specific sources mean that no one knows exactly why there is so much methane in the atmosphere. Either there are sources of methane that are unknown or improperly counted; or sinks of methane - such as soils or chemical reactions in the atmosphere – that are not absorbing as much as they used to.[1] Scientists around the world are actively working on the puzzle. Each year, they develop and test new hypotheses, and fine tune increasingly accurate methods for reconciling top-down and bottom-up measurements to stitch together a picture of the global methane budget (Jackson et al. 2020; Saunois et al. 2020; Schwietzke et al. 2016). The identification of the Four Corners methane hotspot was made possible because of these international collaborations and the infrastructures they sustain. The first study of its kind to use space-borne measurements to quantify greenhouse gas emissions in a particular region, it represented a promising achievement in the quest to solve the global methane mystery.

[1] One of the largest "sinks" of methane is hydroxyl radicals (OH). When methane interacts with OH, it turns into water and CO_2. Researchers suspect that changes to the global methane budget may be due to changes in OH (see Saunois et al. 2020).

An Anomaly

In 2002, the European Space Agency (ESA) launched the satellite Envisat, the largest civilian Earth observation mission to date. The ESA lost contact with Envisat in 2012 and declared its mission complete, but the satellite still orbits the Earth, becoming part of a growing mass of anthropogenic junk floating in outer space (Malik 2012). Of the instruments Envisat housed to observe Earthly conditions, one was SCIAMACHY (SCanning Imaging Absorption spectroMeter for Atmospheric CHartographY), an infrared imaging spectrometer designed to detect trace gases in the Earth's troposphere and stratosphere.

As beams of sunlight refract off the Earth's surface and bounce back into space, SCIAMACHY records the intensity of solar radiation in a spectrum of over 8,000 channels. With this data, scientists can identify concentrations of gases like CO_2 and methane, which absorb solar radiation in the near-infrared, by their spectroscopic signatures. In this way, the spaceborne spectrometer enables the quantification of greenhouse gases in the atmospheric column above specific terrestrial regions.

Christian Frankenberg, a professor of environmental science and engineering at CalTech and a research scientist at NASA's Jet Propulsion Lab, has been working with SCIAMACHY data since his years as a graduate student. Shortly after Envisat launched, Frankenberg developed algorithms with which to derive concentrations of methane from the massive data sets that SCHIAMACHY produced (Frankenberg 2005).

Over the phone from Pasadena in 2015, Frankenberg told me that earlier in his work, he had always called methane "the 'stepchild' of the greenhouse gasses, because it was kind of

neglected a little bit". "But I think it's getting more attention nowadays," he added. By then, the Obama Administration had released a Climate Action Plan in which addressing methane emissions from the oil and gas sector was a key policy goal.

Frankenberg had first seen the methane anomaly over the Four Corners when he was analyzing years' worth of SCIAMACHY data back in 2009, but he and his colleagues weren't sure what to make of it initially. At the time, with so much data to parse, they didn't prioritize investigating the situation in northwestern New Mexico "especially because if you don't really have any ground-based validation, sometimes people will have a hard time believing that what the satellite sees is actually fully robust".

What Frankenberg needed was a measure against which to compare the satellite data. A few years later, he found it. Frankenberg and his colleague Eric Kort, an associate professor of climate and space science and engineering at the University of Michigan, attended an academic conference where they listened to a presentation by Manvendra Dubey, an atmospheric chemist at the Los Alamos National Laboratory (LANL) in New Mexico. At the time, Dubey's team at LANL had been working on advancing methodologies to remotely measure greenhouse gases. The U.S. Department of Energy's national laboratories were interested in this work in the context of international climate treaties. The U.S. had a national security interest in the development of reliable remote sensing technologies that could verify the greenhouse gas emissions of other countries to ensure compliance with international agreements. "Verifiability is a key to ratification in the U.S," Dubey explained to me over lunch at a café on the perimeter of LANL's facilities. Echoing a Reaganite Cold War adage, "'Trust, but verify' is kind of the mantra," he explained.

Dubey's team placed a ground-based spectrometer in the northwest corner of the state, abutting the Navajo Reservation on the outskirts of Farmington, between the San Juan Generating Station and the Four Corners Power Plant. This spectrometer partook temporarily in the Total Carbon Colum Observing Network (TCCON), a global network of ground-based Fourier Transform Spectrometers that remotely measure the atmospheric abundances of several gases. One of the network's chief purposes is to provide ground-based data comparable to measurements taken from space-based instruments (Wunch 2011). The spectrometer Dubey's team used functioned much like SCIAMACHY: it recorded solar radiation, and the team was able to derive greenhouse gas emissions from the spectra and distinguish which emissions were coming from each plant. Then, they compared their results to the emissions that each coal plant was required to report in order to verify that their spectroscopic data was accurate. It was. This result was a major achievement. While Dubey's study had focused on verifying CO_2, nitrogen oxide, and carbon monoxide emissions, the spectrometer also captured data on methane. Dubey's team noticed that these emissions were much higher than expected.

When Frankenberg and Kort heard Dubey present his results, they realized that Dubey's spectrometer was located in the same region as the methane anomaly in their SCIAMACHY data. At that point, Frankenberg told me, it seemed very likely that the space-based (top-down) and ground-based (bottom-up) data were "telling the same story".

Frankenberg, Kort, and Dubey assembled a team to look more carefully at the methane anomaly. They brought in Keeley Costigan, another LANL employee, to run an atmospheric weather research and forecasting model with the purpose of checking whether the ground-based data, collected in one spot over months, was consistent with the temporally averaged and

spatially broad SCIAMACHY data collected in momentary flyovers over 6 years.[2] Simulating weather across time and space while accounting for the region's topography, Costigan found that both data sets correlated with one another. The model's simulations helped verify that the SCIAMACHY data captured, in an aggregate way, the regional dynamics that the ground-based spectrometer was so sensitive to, like diurnal cycles, winds, and emission sources. Moreover, both the ground-based and spaceborne datasets showed the same elevated concentrations of methane in the area.

The researchers then wanted to know what rate of methane emissions would be consistent with their atmospheric observations, which showed a total of 0.59 tera-grams of methane emitted from the region annually through at least 2012. To do so, they ran another simulation with the model, inputting emissions from an international greenhouse gas inventory called EDGAR (Emission Database for Global Atmospheric Research). They found a significant discrepancy between the simulations that modeled the concentrations of methane they had observed, and those that modeled the region's atmosphere using inventory numbers. Based on their measurements, the actual rate of emissions in the region was 3.5 times greater than EDGAR's global inventory, and 1.8 times greater than EPA's inventory for the region.

Within the first year of publishing their findings, the research team received so many media inquiries about the paper's significance that Eric Kort made a Frequently Asked Questions page on his academic website regarding the study. On it, he wrote: "Total global methane emissions are ~550 TgCH4/yr, so 0.59 is only ~0.1% of global total emissions".[3] However, he

[2] The researchers also calculated for the time difference of when the measurements were taken (2003-2009 for SCIAMACHY, and 2011-2012 for the ground-based Fourier spectrometer).
[3] At the time of writing, most recent estimates place total global methane emissions closer to 576Tg (Saunois et al. 2020).

adds, “for such a small region, it is a large number—it is very close to the estimated methane emissions from the entire UK oil, gas, and coal industries combined” (Kort 2015).

On this same FAQ page, Kort was careful to clarify, as did all the scientists involved in the study with whom I met or spoke on the phone, that the Four Corners methane hotspot – the red dot on the map that still circulates years later as the icon of air conditions in the region – represents an anomalous state relative to background conditions, not methane emissions per se. That is, the methane hotspot does not represent the place where the most methane emissions in the country are escaping. Instead, the hotspot is a measure of the *difference from the average atmospheric abundance of methane across the country, when corrected for the impact of topography*. By smoothing out their spaceborne observations in this way, Kort’s team was able to identify the Four Corners region, and specifically the northwestern corner of New Mexico, as the most atypical for methane emissions relative to its surroundings.

Pétron et al. (2020) later found that if the Envisat satellite had done its flyovers above the Four Corners region later in the day when the atmospheric column is well mixed, instead of in mid-morning when gases tend to pool in the San Juan Basin’s valleys, SCIAMACHY might not have detected an enhancement in the methane column at all. This cannot be determined for sure, because “it remains a fundamental weakness of remote sensing that GHG [greenhouse gas] atmospheric column retrievals cannot be calibrated” (ibid: 22). These types of measurements can only be “compared to relatively sparse and never entirely coincident calibrated in situ measurements”, like follow-up measurements NOAA scientists performed on the ground, “or evaluated against ground-based remote sensing data products” (ibid: 22), like Dubey’s Fourier spectrometer. In other words, there is always a geographic and temporal gap between measurements that are taken remotely, and their verification.

This does not mean that there is not a lot of methane coming from the San Juan Basin. Nor does it necessarily mean that Kort's team miscalculated the emissions rate. It means that making this volume appear *anomalous* on a map of the country requires the production of a certain kind of spatial and temporal vantage on the region's atmosphere. Knowledge of the air, this planetarily distributed medium, is always partial, situated (Choy 2011). The view from space will miss important dynamics on the ground.

These nuances, however, are usually eclipsed by the glow of the bright red dot. While the researchers' representational practices helped attract attention to their findings, their visualization of the hotspot also produced misunderstandings among audiences not well versed in atmospheric science, audiences who live under the cloud. Years after the hotspot's discovery, news articles and environmentalist publications continue to portray it as a concentration of methane unmatched anywhere in the country. But perhaps this matters less than I am often tempted to think it does. On the one hand, my colleagues at NOAA took the Four Corners study as an opportunity to hone techniques for attributing methane and air toxics emissions to specific sources, tracking them as they disperse throughout the basin over a diurnal cycle (Pétron et al. 2020). On the other, my colleagues living in the hotspot took the bright red dot at face value, a rarity they could work with - evidence of the impact they already knew was there.

A Bridge

In the world of oil and gas policy, the timing of the study's publication in 2014 was important. It came at a moment when President Obama's administration was actively touting natural gas as a "bridge fuel" in the transition away from coal-fired power towards cleaner energy sources.[4] In the eight years of President Obama's tenure, the U.S. made significant strides in reducing greenhouse gas emissions from coal power, but emissions from the natural gas sector soared. Thanks to fracking, the Obama years saw the country's largest oil boom in its history (Isidore 2015), prompting the President to lift a decades-long export ban on crude oil (Smith 2015). Meanwhile, natural gas production from shale doubled.[5]

But the scientific community warned that unless leakage rates from the oil and gas sector were kept closely in check, methane emissions from oil and gas production and transportation could prove just as devastating to the climate as the CO_2 that would have been emitted from now shuttered coal plants. A scientific review in which Kort and several members of NOAA's CCGG group were contributors put it succinctly: "If natural gas is to be a "bridge" to a more sustainable energy future, it is a bridge that must be traversed carefully: Diligence will be required to ensure that leakage rates are low enough to achieve sustainability goals." (Brandt et al 2014: 735)

At NOAA, members of the CCGG group candidly expressed their concerns that the reliance on natural gas as a bridge fuel, and in turn on methane regulations for the oil and gas sector to make that bridge a sustainable one, would backfire. This approach, they worried, would produce such an investment in oil and gas infrastructures that it would effectively "lock" the

[4] Executive Office of the President, *The President's Climate Action Plan*, Washington, D.C.: The White House, 2003.
[5] United States Energy Information Administration. "Natural Gas Explained Where Our Natural Gas Comes From." U.S. Energy Information Administration, 2020. https://www.eia.gov/energyexplained/natural-gas/where-our-natural-gas-comes-from.php.

country into this form of energy for decades to come. Moreover, they were quick to note, even if technical and regulatory mechanisms were effective at keeping methane leakage rates low, the consumption of oil and gas would continue to produce CO_2 emissions in large quantities. And this was the biggest threat to the climate, they insisted, quickly pulling up on their desktop a copy of the same curve illustrated on the wall near the vending machines.

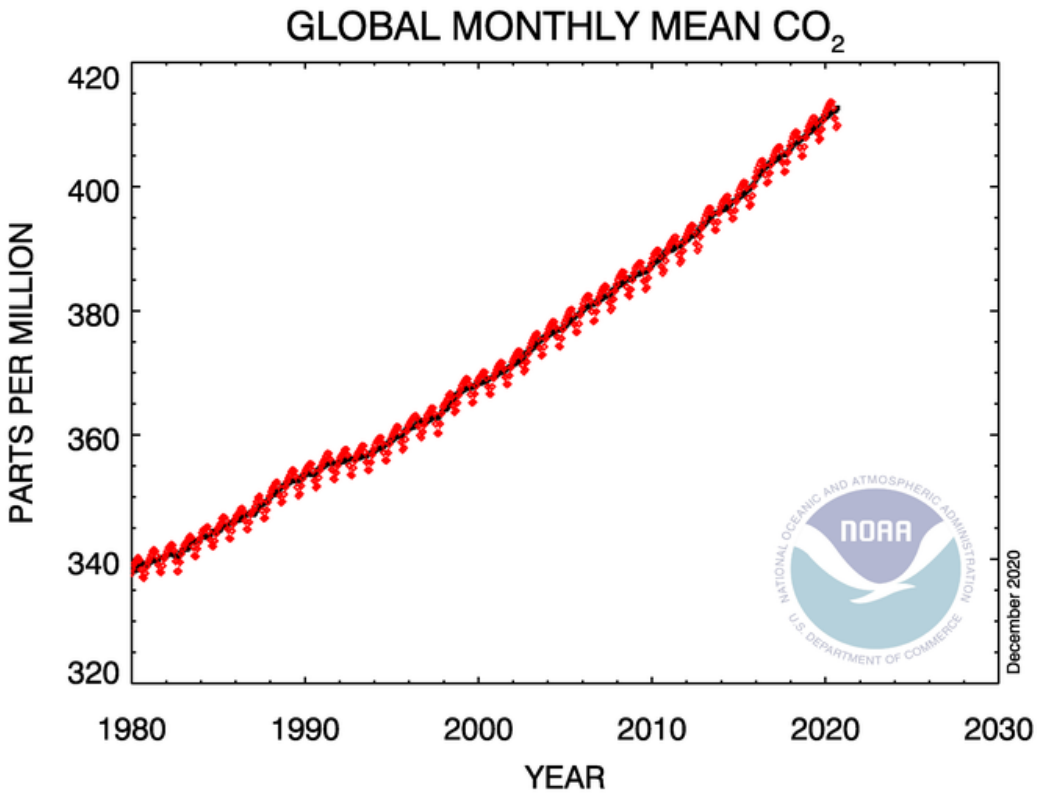

Figure 18 – Global monthly mean CO_2 atmospheric concentrations from 1989-2020. National Oceanic and Atmospheric Administration, Global Monitoring Division.

The nexus of federal and State regulations for the oil and gas sector in New Mexico became a case in point for the kind of approach scientists at NOAA feared. In late 2018, as extraction expanded across the Permian Basin, and to a lesser extent across the Greater Chaco region, the State began developing methane rules for the oil and gas industry (still in process at

the time of writing). This was part of the newly elected Governor Michelle Lujan-Grisham's plan to address climate change and prevent energy waste.[6] While the environmental community supported the enactment of methane rules as an important step, some groups also maintained a critical view of this approach as a strategy for tackling climate change. Using federal and State data from 2018, the environmental non-profit WildEarth Guardians calculated the total CO_2 emissions associated with oil and gas production in the State and found that it equals 189 *million* metric tons, equivalent to the amount of CO_2 released by 48.5 coal-fired power plants in a single year. By comparison, in the same period, the State's oil and gas industry released the equivalent of approximately 629,334 metric tons of CO_2 in methane, a fraction of the industry's real carbon emissions.[7] Methane emissions from the oil and gas sector are often characterized by environmentalists and scientists alike as "low-hanging fruits", a kind of emission that experts know how to reign in without fundamentally changing energy systems. But doing so will not be sufficient in significantly reducing the New Mexican or American climate footprint.

Still, when the newly elected Trump Administration began in 2016 to overturn federal methane regulations that President Obama had just signed into law, conservation and environmental justice coalitions across the country fought tooth and nail in the courts to have the rules reinstated. Rules that had been developed for the EPA were officially rolled back in August 2020, though at the time of writing court challenges are still pending.[8] Meanwhile, in October 2020, a U.S. District Court in California struck down BLM's attempt to rollback most of an

[6] Executive Order on Addressing Climate Change and Preventing Energy Waste, Executive Order 2019-003, The State of New Mexico, 2019.
[7] Depending on the global warming potential of methane that is assumed, emissions from oil and production in NM are calculated at 639,334 (assuming a GWP of 86) or at 189,946 (assuming a GWP of 25).
[8] *State of California et al. v. Wheeler et al*. 3:20-cv-03005

Obama-era rule intended to limit venting and flaring of natural gas from wells producing on federally managed lands.[9]

Trends

As I observed CCGG group members caring for their data at the lab – checking the calibration tanks, running models over and over again, conscientiously unpacking small flasks of air from padded suitcases, or hooking these flasks up to an inlet where techniques of laser spectrometry and gas chromatography are used to measure their contents against known quantities – I was struck by just how much they knew about the atmosphere, and yet still could not say exactly why it is so full of methane. I think they were struck by this too. At some moments, in their unending curiosity, their gaps in knowledge seemed to matter more to them than at others. When their frustration at the puzzle took hold, they grounded themselves in their intimate and detailed knowledge of a trend in both methane and CO_2, a trend that was decidedly moving perilously upwards.

Over the years of visiting the lab, I read more and more publications in the geophysical sciences by researchers in the CCGG group and those from other institutions with whom they were in dialogue. I too began noticing a trend. Researchers increasingly wrote what they spoke about all the time in conversation: that there is an urgent need to address climate change. They often contextualized the importance of their research in terms of how it might inform mitigation strategies and ended their articles with a plea or statement to the same effect. For example, in a long-anticipated NOAA study on detailed source attribution and air quality implications of the Four Corners "methane enhancement", as the authors called it, Pétron et al. (2020) concluded:

[9] *State of California et al. v. Bernardt et al*. 3:18-cv-05712

“At this critical time in the planet and human history, reliable, comprehensive, and up-to-date GHG [greenhouse gas] emission estimates by source type and at scales relevant for policy-making are still lacking. However, as much as accurate GHG emission estimates are valuable, even more time critical is the need for “rapid and deep” mitigation, in other words much bolder emission cuts necessitating substantial societal and industry transformations, to meet the Paris Climate Agreement goals (Nisbet et al., 2019, 2020; Anderson et al., 2020).” (24)

Sometimes a measurement is only as good as what it is used for.

CHAPTER THREE

Aggregate Airs: Atmospheres of Oil and Gas[1]

Atmospheres

At the highest point on the mesa where we stood, Mario Atencio pointed out peaks and landforms faintly visible on the horizon. It was truly special to be able to see so many sacred places from one spot, he said. With the landscape as guide, he relayed a story of Diné emergence into this world. He spoke of how long ago but not far from here, Changing Woman gave birth to the Hero Twins who would save the Diné by slaying the monsters that were killing the people. "That's the head of the biggest one, over there," said Mario, gesturing to a prominent shape bulging out from the ground in the distance. When the Hero Twins slayed Yé'iitsoh, the biggest and tallest of the monsters, his head fell to lay forever northwest of the Jemez mountains, becoming the rounded peak that the Spanish would later call "Cabezon."

"But you can't *really* see them now," Mario said of the many formations. Their profiles were clouded by a film of grayish-brown haze, lending them an almost spectral look. Despite the bright autumn sun in the cloudless sky, it still didn't quite feel like a clear day. The air had an opacity to it that gave me the sense that there was something between the world and my perception of it.

I had accompanied Mario that day as he showed the facilitator of New Mexico's Methane Advisory Panel (MAP) some of the hundreds of oil and gas wells that had recently been fracked in Counselor Chapter. Convened to advise state agencies on the development of a rule to reduce

[1] A version of this chapter appeared in the journal *Engaging Science, Technology, and Society* in November 2020. See Sonia Grant (2020) (CC BY-NC-ND 4.0).

methane and other air pollutants from the oil and gas sector, the MAP was composed of representatives from industry and environmental groups, as well as a few members from impacted ranching and Indigenous communities, like Mario. The MAP facilitator had previously been on tours with petroleum engineers, during which she had learned how industry was already doing its best to capture methane. In contrast, Mario, who represented several communities in Eastern Navajo Agency on the MAP, wanted to convey to the facilitator that even the smallest of emissions could have a large impact for those who breathe this air everyday – especially when the emissions from a single well are understood in relation to those from the 40,000 wells in the densely drilled region.

Mario's gesture – of pointing to the land to explain the impacts of air pollution – prompts a question about how the cumulative effects of extraction are understood in relation to their sources. Following Mario, this article probes at how settler governance carves out regulatory approaches for managing atmospheric phenomena. I argue that while extraction's atmospheres are experienced incommensurately in the Greater Chaco, a fractured regulatory system treats them as commensurate, parsing aggregate airs in ways that stretch the scope of settler rule. Inhabiting the checkerboard's late industrial atmospheres (Fortun 2012) involves taking in – and sometimes challenging – these contested conditions of jurisdiction.

The inducement to do something about methane in northwestern New Mexico began in earnest in 2014, upon the discovery that the largest cloud of methane over the United States was hovering above the Greater Chaco region (Kort et al. 2014). The billowing plume was detected by an infrared spectrometer aboard a spaceborne satellite. From this vantage, scientists discerned that methane emissions from the region were in fact much greater than previously estimated in national and international greenhouse gas inventories. Follow-up studies soon confirmed that the

surprising rate of emissions could be largely attributed to the oil and gas sector (Frankenberg et al. 2016; Smith et al. 2017).

Methane is the primary component of natural gas and a powerful greenhouse gas. Over a twenty-year period, it traps 86 times more heat than carbon dioxide (CO_2), and at least 28 times more heat over 100 years (IPCC 2019). The reduction of methane emissions is thus widely recognized as critical for achieving international climate goals (Nisbet et al. 2019). In the United States, the oil and gas sector is the largest single source of methane, accounting for approximately 31% of the country's annual emissions (EPA 2019).[2] Methane seeps out of oil and gas infrastructure at multiple points in the production and transportation process – a loose valve, a leaky storage tank, a poorly maintained pipe. Sometimes the gas is intentionally vented directly into the atmosphere when a facility doesn't have infrastructure onsite to capture it. At other times, it is flared off from a stack, turning into a fiery blaze of CO_2, volatile organic compounds (VOC), and hydrogen sulfide.

For the residents with whom I conducted research, methane is as much a harbinger of these other airborne substances as it is a serious concern in itself. Methane is odorless and invisible to the naked eye. But when it is released from oil and gas production, it is usually co-emitted with VOCs, nitrogen oxides, and other air toxics that can quickly overwhelm the senses. These pollutants, which can be directly harmful to human health and contribute to the formation of ground-level ozone, often have recognizable fumes. But on the checkerboard, there is no infrastructure to measure and understand daily exposures to these toxics, either as they spike and

[2] Peer-reviewed studies have found that the EPA underestimates the contribution of the oil and gas sector to the country's methane budget. A prominent study by Alvarez et al. (2018) found that EPA underestimates methane leakage from the oil and gas sector by 60%.

the wind conspires to blow them inside through a window, or as they average out over years, becoming part of a body's burden.

The announcement of the methane hotspot drew heightened attention to the air at the same moment that a new wave of extraction hit the Greater Chaco region.[3] By 2014, new fracking technologies had rapidly taken hold, with oil and gas operators injecting high volumes of water, chemicals, and proppants through a wellbore that could now travel horizontally for hundreds of feet below ground. Fracking heralded the opening of a new resource frontier: the Mancos shale. This pocket of hydrocarbon potential is concentrated in Eastern Navajo communities on the checkerboard, like Counselor Chapter, and in previously undrilled areas near Chaco Culture National Historical Park. Quickly, small rural Diné communities were inundated with semi-trucks that tore up local dirt roads. The air began to smell different and the darkness of the night sky was diluted by lights and flaring gas.

While these new aerial disturbances concerned residents, the cloud itself also directed attention right back to the land. It pointed to the contested territorial conditions that have enabled extraction to flourish in the region, often at the expense of Diné life (Yazzie 2018), with fracking but the latest phase. The data used to identify the hotspot was collected between 2003-2009, years before the Mancos shale boom. This meant that the emissions responsible for the cloud, as it had been glimpsed from space, derived not from the recent fracking boom in particular but rather from the region's tens of thousands of conventional wells that had been drilled, in surges, since the 1920s. In other words, the space-borne spectrometer elucidated an atmospheric condition nearly a century in the making, now punctuated anew.

[3] On the region's long history of extraction, see Curley 2018; Masco 2006; Powell 2018; Redhouse 1984; Voyles 2015.

I take inspiration from recent interdisciplinary scholarship in treating "atmosphere" as both a planetary envelope of gases that provides material continuity across space, albeit in uneven concentrations and circulations, and as a live background that is lived through, composing ordinary life (Choy 2014; Choy and Zee 2015; Simmons 2017; Sharpe 2016; Stewart 2011). The atmosphere is that gaseous medium in which substances like methane trap heat and warm the planet. But so too do distinct scenes of habitation spawn their own atmospheres, shared scenes of experience in which, as Berlant puts it, "structural conditions are suffused through a variety of mediations, such as predictable repetitions and other spatial practices that might well go under the radar, or in any case, not take up the form of an event" (2011: 101). For instance, Fanon (2004) diagnosed an "atmosphere of violence" (1-52) that reigned during wartime in Algeria as the primary cause of the ailments his patients suffered. Meanwhile, Simmons (2017) describes the "normative and necessary violences found in settlement" in the United States as part of a "settler atmospheric" that is felt palpably through Indigenous lands and bodies and experienced by Indigenous people as an expected daily rhythm.

In what follows, I consider what scholars have called affective atmospheres (Anderson 2009), on the one hand, and a planetary atmosphere with its localized meteorological conditions, on the other, as always already entangled. The atmospheric, as I approach it here, is akin to what de la Cadena (2018) calls "uncommons" – a space of partially connected and heterogenous worlds that are neither nested within nor separate from one another, but in constitutive relation (Blaser and de la Cadena 2018; Strathern 2004). As an ethnographic concept, uncommons helps me attend to ways in which ambient phenomena can have incommensurate effects. While the atmospheric may be a shared medium, approaching it as uncommons interrupts a liberal

tendency to suppose that all that circulates atmospherically is shared, and that even what is held in common is the same (see also Berlant 2016).

As Choy (2018) writes, the apprehension of atmospheric things is relative to "norms of assessment, registration, and existence" (55) through which people sense and know something about their world. What may not be discernible to some can exert itself as a concrete pressure for others. In discussing atmospheric politics of oil and gas in the Greater Chaco, my aim is not to elucidate the content of atmospheric difference between Diné and other worlds. Instead, I trace managerial practices through which settler governments attempt to render Diné atmospheric claims commensurate with state techniques of assessment, and when these attempts fail.

This chapter unfolds extraction's atmospheres across three sites. In each, I examine how scale mediates the problem of in/commensurability. I begin by showing how the regulation of air pollution from the oil and gas sector is grounded in an administrative fragmentation of air and land that makes it difficult to account for the cumulative atmospheric burdens of extraction. Next, I look to a recent court case in which Indigenous and environmental advocates argued under federal historic preservation law that fracking in the Greater Chaco is detrimentally altering the region's atmospheric qualities. I show how assessment techniques employed by the Bureau of Land Management (BLM) fragment the landscape in ways that preempt these claims but still satisfy the procedural requirements of the law, thus foreclosing the consideration of incommensurable values. Finally, I turn to a study led by Diné residents who mobilized to understand, in their own terms, how fracking was affecting their wellbeing. With air monitors they installed, residents detected pollution that no one else was tracking. They also found that extraction reproduces colonial relations that disrupt collective knowledge practices, and they began to leverage this disturbance to build a better future that affirms Diné epistemology.

Across each case, there is an unspecified excess – what I hope to conjure with "aggregate airs" – that spills over my descriptions. With this gesture, I do not mean to imply an ontological position from which an aggregate grasp of extraction's atmospheres is possible. Rather, I signal that the conflicts I describe play out in terms of how the cumulative experiences of extraction are broken up into intelligible categories of jurisdiction and action. These distinctions – and who gets to make and enforce them through law – matter. Because air and land are not only resource categories that state institutions subject to management: they are also relational ontological categories that differ for and between Diné people and federal agencies like BLM (see Tuck and Yang 2012). In the management of oil and gas, these categories are fragmented in a patchwork manner that enable settler governance to expand its zones of settlement.[4]

Double Bind of In/Commensuration

During my fieldwork in New Mexico between 2018-2020, as I tracked a mounting controversy around fracking in the Greater Chaco, I participated in dozens of tours organized by local residents like Mario. Residents arrange these tours primarily for people from outside the region, such as environmentalists from New Mexico's cities, representatives of allied Indigenous and environmental movements visiting from other parts of the country, grade school and university students, or elected officials and policy makers. The tours are meant to teach participants about the lived realities of fracking in the Greater Chaco. By sharing parts of their story with those willing to listen, residents hope to garner support for their efforts to slow the expansion of fracking.

[4] I thank Cameron Hu and Hannah Burnett for helping me refine the points in this paragraph.

As I worked alongside Diné residents in their advocacy, I frequently witnessed them struggle to convey to state and federal agencies the expansiveness of their claims about the harm that fracking was causing in their communities. At nearly every step of the way, they came up against a double bind: they either had to modify their claims such that they could be adjudicated by the agencies or insist on the incommensurability of their claims and risk that they might not be heard.[5] This double bind is not unique to their situation. Settler liberalism tends to shift the burden of social commensuration onto its others (Byrd and Rothberg 2011; Povinelli 2001 & 2011). As "the transformation of different qualities into a common metric" (Espeland & Stevens 1998: 314), commensuration can be a way of subsuming difference rather than reckoning with it, forcing self-correction to a norm as a condition of meaningful participation in public discourse (Povinelli 2001).

For instance, every few months a staff person with the regional BLM office would attend a council meeting of three adjacent Chapters – Counselor, Ojo Encino, and Torreon – to discuss leasing parcels of federally-managed minerals for oil and gas extraction. While residents and Chapter officials sometimes brought up site-specific concerns regarding the parcels at issue – a ceremonial site, a particular plant or animal species known to inhabit the site, or the parcel's proximity to a home – most often they articulated worries about the overall impacts of additional development. They repeatedly expressed concerns about air quality, public health, and concerns that had to do with the integrity of the entire landscape, undivided. These conversations always ended at an impasse, with the agency unable to address the Chapters' most pressing concerns.

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[5] As Povinelli (2001) puts it, liberalism's message to radical worlds "be other so that we will not ossify, but be in such a way that we are not undone, that is make yourself doable for us" (329).

This impasse, I would discern, had to do with a kind zoning at work in the management of oil and gas: any given decision was made at a circumscribed scale (for instance, the scale of a 300-acre parcel up for lease), and input into that decision had to be articulated within that restricted space. This was patchwork at work. At each scale of analysis, only commensurately scaled impacts that corresponded to the jurisdictional purview of the responsible agency could be considered. These scalar limitations impose ontological ones for Diné people who relate to land as Mother Earth, a living totality.

As I will explore, the ensuing ontological disagreement (de la Cadena 2015) is amplified on the checkerboard, where a chaotic spatial distribution of authority forces residents and regulators alike to tack back and forth between scales of rule when managing an industrial presence whose effects are indifferent to such boundaries. Indeed, the management of oil and gas on the checkerboard makes visible an administrative logic in which regulatory frameworks pretend to encompass the objects they are meant to manage – like air – even while uncontained consequences of industrial activity – like climate changing pollution – make themselves known. In the process, the cumulative fallout (Masco 2015) of late industrialism becomes harder and harder to grasp. Over the course of my research, I became increasingly interested in the patchwork jurisdictional arrangements that both obscure accumulating environmental degradation, and that force my Diné colleagues time and time again into a double bind of in/commensuration.

STS scholars have intricately traced how knowledge gaps and regulatory fragmentation in environmental management can enable industrial pollution to go unaccounted for. Regulatory exemptions for industry (Wylie 2018), the separation of oversight activities across multiple government agencies (Allen 2003), the spatial fragmentation of environmental monitoring

(Frickel and Vincent 2011; Kinchy et al. 2016), and other forms of "undone science" (Frickel et al. 2010; Hess 2020; Murphy 2006) are all processes that can get in the way of holding polluters responsible and protecting communities from harmful impacts of industry. Building on this critical scholarship, I show that the fragmentation of environmental data, along with its purposeful nonproduction, not only makes it difficult to substantiate claims to environmental harm. As I argue, it also facilitates processes of commensuration that conceal how environmental exposures are differentially experienced across social worlds.

In her study of a proposed dam project on Yavapai lands in Arizona, Espeland (1998) argues that commensuration is an important component of rational decision making for the federal bureaucrats with whom she researches because the development of a common metric allows them to compare otherwise disparate things. But, Espeland notes, just as commensuration can enable social actors to draw some information into new relationships, it can also be a way of discarding other kinds of information: "everyday experience, practical reasoning, and empathetic identification become an increasingly irrelevant basis for judgement as context is stripped away and relationships become more abstractly represented by numbers" (1998: 25). Decision-making processes that rely on commensuration foreclose the inclusion of incommensurable values, values that are socially unique and cannot be conveyed in terms of another category (ibid: 28-29).

Incommensurable realities do not disintegrate just because they exceed state taxonomies. In her ethnography of partial connections across Indigenous and non-Indigenous worlds in Peru, de la Cadena (2015) shows how runakuna people "engage in political practices that the state recognizes as legitimate while also enacting those that the state cannot recognize" (14). That is, the radical worlds that bear the burden of commensuration do not always accept to carry it (see

Lyons 2020; Povinelli 2001; Simpson 2014). In the Greater Chaco, Diné residents participate in policy processes around the management of oil and gas by following the terms outlined by those processes, while simultaneously insisting on their own. Although many of their claims go unrecognized by state authorities, they still hang in the air.

Permissible Pollution

Large-scale atmospheric consequences of extraction, like the region's infamous methane cloud, often fly under the radar of the agencies responsible for air quality because air pollution from the oil and gas sector is regulated on a facility-by-facility basis. While pollution from each facility mixes in the atmosphere, its sources largely indistinguishable, regulation happens at the scale of a single source: well by well, compressor by compressor, pipeline by pipeline. This approach can have immense consequences for local, regional, and planetary airs.

After years of witnessing air quality in the Greater Chaco worsen, Mario has become an expert on the Clean Air Act, the 1963 federal statute designed to control air pollution. The US Environmental Protection Agency (EPA) typically delegates the authority to implement the Clean Air Act to states, except on tribal lands where the EPA retains jurisdiction or authorizes tribes to do so. On the checkerboard, jurisdiction over air quality is split between the state and the Navajo Nation. The state regulates air pollution from sources on federal, private, and tribal allotment lands, while the Navajo Nation has authority over air on patches of tribal trust land scattered amid other jurisdictions on the checkerboard. To determine who has jurisdiction over the air in a particular spot, one has to look to the land.

With a keen eye for what falls through regulatory cracks on the checkerboard, Mario was the first person to draw my attention to the piecemeal way that air pollution from the oil and gas

sector is permitted. Each of the tens of thousands of wells in northwestern New Mexico is authorized to emit a range of air pollutants, but many of these facilities do not require a permit at all if they emit under an established threshold. Smaller emitters only require a registration with the state or may be eligible to operate without a registration at all if they emit less than 10 tons of a regulated pollutant annually (NMAC 20.2.73).

And yet, with tens of thousands of wells densely spread throughout the region, and hundreds in the small community of Counselor alone, it is paradoxical to residents that these sources of pollution aren't considered together. This is why, in meetings with regulators, Mario consistently brings up the question of "source aggregation". Source aggregation is a concept from the Clean Air Act in which two or more facilities that the Act treats as "minor sources" of pollution can be aggregated and treated together as a single "major source" if they emit above a threshold of pollutants and meet benchmark criteria of spatial proximity, shared industrial grouping, and ownership. This is significant, because the permitting process and obligations of permittees for major sources are more arduous than for minor sources. Major sources require the use of additional pollution controls, reporting, and a process of public notification and involvement that is absent in the minor source permitting process. For Mario and other residents who are surrounded by polluting facilities, source aggregation would be a better approach for getting a handle on air pollution in the area than treating facilities individually. But in practice, no oil and gas wells in the state of New Mexico are aggregated in this way because no grouping of wells meet the oil and gas sector-specific criteria for source aggregation, which require not only that oil and gas infrastructures be owned and operated by the same entity but also that they be located within ¼ mile of one another.[6] Here, the regulations absorb spatial and proprietary

[6] See the United States Environmental Protection Agency's "Source Determination for Certain Emission Units in the Oil and Natural Gas Sector" 2016 Final Rule (EPA-HQ-OAR-2013-0685). The issue of source aggregation under the

norms of the industry in a way that forestalls the consideration of a large cluster of wells as a major source of pollution.

All of this means that air permitting is not the place where the cumulative air impacts of oil and gas are meant to be considered. Rather, this is meant to occur during land-use planning and leasing, processes that are conducted by land management agencies. In the world of oil and gas, the issuance of a lease is an irrevocable commitment to allow extraction. After issuing a lease, a federal or state agency may impose conditions to mitigate or limit emissions; but with the lease in hand the leaseholder has a legal right to drill.[7] An oil and gas operator cannot apply for a permit to emit before first securing the land from which it purchases a right to extract.

On the checkerboard, a complex set of federal and state agencies regulate different components of the leasing, drilling, and production process across the region's multiple jurisdictions. Consider the work of BLM, the federal agency that oversees most extraction in the Greater Chaco on both federal and tribal lands.[8] BLM is required by the National Environmental Policy Act (NEPA) to evaluate the direct, indirect, and cumulative effects of any form of land-use it authorizes, including the decision to make lands available for mineral leasing.[9] During this planning process, BLM is required to forecast the air quality impacts of potential development.

Clean Air Act has a complicated regulatory history dating to the 1980s. The specific question of how and whether to aggregate sources from the oil and gas sector was animated in the mid-2000s during George W. Bush's Administration and again during the Obama Administration in 2009 (Bumpers and Williams, 2013; Lord Jr. 2012; McCarthy 2009). Information about major and minor source permitting in New Mexico was obtained through interviews with New Mexico Environment Department (NMED) Air Quality Bureau (AQB) staff and the online NMED AQB Air Permit Map, available at: https://air.net.env.nm.gov/rsmt/.

[7] This principle was recently tested in *WildEarth Guardians v. Ryan Zinke* 1:16-cv-01724-RC (2019). In its memorandum of opinion regarding leases the BLM issued in Wyoming, the DC Federal Court ruled that BLM had to consider greenhouse gas emissions at the leasing stage, rather than defer climate change analysis to the drilling stage, because leasing represents "an irrevocable commitment to oil and gas drilling" (24).

[8] While the Bureau of Indian Affairs acts as the trustee for the Navajo Nation in negotiating leases on tribal trust and tribal allotment lands, BLM approves drilling permits.

[9] At the time of writing, the Trump Administration has recently made significant changes to NEPA that eliminate the requirement of federal agencies to consider "cumulative effects." Any reference to "indirect effects" has been removed from the statute (85 FR 43304). The significance of these changes cannot be understated. The changes will likely be litigated for years to come.

The seemingly precautionary process prescribed by NEPA is thwarted in the Greater Chaco, where BLM has leased over 91% of available federally managed lands for extraction and has for years authorized new fracking development based on planning processes that were undertaken prior to the advent of fracking in the region. Drillers' interest in the Mancos shale has resulted in hundreds of additional wells and emissions that were not accounted for in BLM's last comprehensive plans for the region, finalized in 1986 and 2003 respectively (BLM 1986 and BLM 2003). Since 2014, the BLM has authorized this development while deferring analysis and regulation of actual emissions to the agencies that issue air permits for each facility. For residents who live with the outcomes of this process, administrative distinctions between air and land quickly lose meaning, but these distinctions still help underwrite the expansion of oil and gas.

Two months before Mario's tour with the MAP facilitator, on an afternoon in mid-August 2019, Counselor Chapter hosted state agencies and community members for a public meeting so the state could solicit feedback on the development of its methane rule. During the public comment period, Samuel Sage, the Chapter's Community Services Coordinator, was one of the first to speak. Samuel was resolutely in favor of strong and enforceable rules to regulate air pollution. Something needed to be done to rein in oil and gas operators because "slowly," he said, "they are killing our kids." Letting the "slowly" lag as if to emphasize a gradually aggregating impact, he continued:

> Last year, our Chapter President who was a bus driver for that school [pointing to Lybrook Elementary up the road], he was pretty shocked the first day of school because the students, the majority of those little kids, are actually using inhalers. He had never seen that before. He was pretty disturbed by it. And from then on, he kept saying *we have to do something, we have to do something*. Unfortunately, he is now battling cancer.

In relaying observations of the Chapter President – whose school bus is often delayed by poor conditions on local roads torn up by oilfield traffic – Samuel provided an example of how conditions have shifted in the community as fracking has spread. People notice that things are different than before. While they may not be able to draw causal relations, they know enough to put two and two together. Their stories overlap and resonate with one another, intensifying. Resonating stories and observations, layered on top of one another as if stacked, exert a felt pressure on residents who worry about embodied and ecological changes since fracking began.[10]

Several commentators later, a Diné woman from Counselor approached the microphone. Currently living in an adjacent community, she travels through Counselor daily to go to work. "Sometimes when I'm travelling, coming back by the mesa […] I can actually *smell* in my vehicle, smell the methane and then some kind of real bad odor like a rotten egg. I would slow down and get a headache," she said.[11] Impressing upon the regulators that there is no escaping the fumes, she continued: "And at night when I'm driving back through sometimes, *way* late at night you know when everything is calm? You think that you won't smell these things. I roll down my window so that I don't have to use the air conditioner, but guess what? I smell it again!"

In just a few years since fracking began, a noxious odor has become an ambient fixture of ordinary life for rural Diné residents in Counselor. It can be anticipated. Habitual practices like smelling rotten eggs, getting stuck in a pothole, or running out of breath compose the atmospheres of oil and gas in the area. This scene contains enough structured repetition that most

[10] I learned to think about resonance between stories as generative of atmospheres from Lepselter (2016).
[11] Methane itself is an odorless gas, but many co-emitted pollutants and other emissions from oil and gas production have a strong odor. Hydrogen sulfide, in particular, smells like rotten eggs.

of what happens is no longer surprising: rather, the iteration of gestures and sensory experiences gives way to an atmosphere in which it has become reliably oppressive to breathe.

The presentation of these facts to regulators, too, is a form of repetition that sutures everyday life. Each re-presentation of lived cumulative exposure – for which there is little monitoring data and no clear regulatory solution on offer – is unlikely to alter the jurisdictional arrangements that give way to bad air. But still, residents persist in reciting their stories for the record.

"Setting, Feeling, and Association"

In May of 2019, the United States Court of Appeals for the 10th Circuit issued a decision long awaited by Indigenous groups and environmentalists in their multi-year legal battle against BLM. The plaintiffs, Diné Citizens Against Ruining our Environment (CARE) and several non-native environmental organizations, alleged that BLM's continued approval of drilling permits for fracked wells in the Greater Chaco was in violation of the National Historic Preservation Act (NHPA), a law intended to preserve historical and archeological sites across the country.[12] The court found that BLM had met the procedural requirements of NHPA and dismissed the plaintiffs' allegations. This decision reveals the limits – and also the sedimented purpose (Whyte 2018) – of settler jurisprudence when called upon to adjudicate incommensurable claims to space in the settler colony. As Povinelli (2011) puts it, the law of recognition always seems to demand that the justice of an indigenous claim "speak its difference within a legislated norm" (27).

[12] Plaintiffs also claimed that BLM had violated the National Environmental Policy Act. The 10th Circuit found in their favor, agreeing that BLM failed to evaluate the potential cumulative water use of Mancos shale development. The 10th Circuit remanded this issue to the district court, which required supplemental information and analysis from BLM. Plaintiffs continue to challenge the legality of the drilling permits under NEPA in this venue. As this matter is unresolved, I do not analyze the NEPA claims here.

The case, *Diné Citizens v. Bernhardt*, was argued before the 10th Circuit on a crisp March morning in Salt Lake City.[13] Law students filled a dim auditorium at the University of Utah where they had come to observe oral arguments. On stage, a panel of three judges presided. The question of whether BLM was in compliance with NHPA pivoted around interpretations of the appropriate scale at which to assess potential impacts to cultural properties from fracking.[14] In NHPA parlance, an Area of Potential Effect (APE) is "the geographic area or areas within which an undertaking [a project under the jurisdiction of the federal government] may directly or indirectly cause changes in the character or use of historic properties" (36 CFR 800.16d). The standard APE for an oil or gas well is the footprint of the well pad and access road, with an additional buffer of 100 feet on each side (see Figure 18).

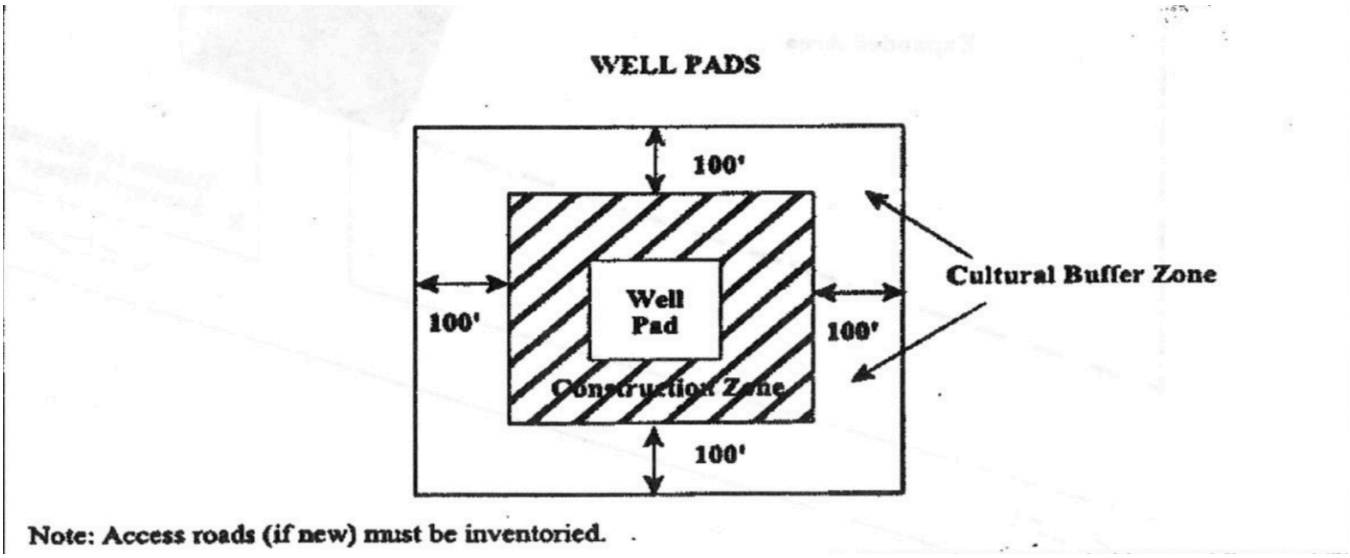

Figure 19 –Diagram of a Standard Area of Potential Effect (APE) for a well pad and a "cultural buffer zone" of 100 feet on each side, as defined by the Bureau of Land Management. See Pappas, Jeff, and Jesse Juen. 2014. "State Protocol Between the New Mexico Bureau of Land Management and the New Mexico State Historic Preservation Officer Regarding the Manner in Which BLM Will Meet Its Responsibilities under the National Historic Preservation Act in New Mexico." Santa Fe, N.M. Appendix B.

[13] 10th Circuit court cases are usually heard in the Byron White Court House in Denver. The court occasionally travels to hear cases at universities as part of an educational initiative.

[14] I use terms like "cultural properties" and "cultural resources" because this is the language used in NHPA. See Dongoske et al. (2015) and Tsosie (2006) for discussions of how Indigenous communities are forced to take up these terms to defend important sites, even though the terms themselves fail to capture what is at stake.

Representing the plaintiffs, attorney Samantha Ruscavage-Barz of WildEarth Guardians explained that BLM's survey for cultural properties within the standard APE for each drilling permit was an inadequate approach for understanding the cumulative impacts of extraction in the Greater Chaco:

> When you're talking about air, noise, and visual impacts, you are not talking about surface impacts. You're not talking about a bulldozer going through one of those Chacoan outlier sites. What you're talking about is that the cumulative air pollution coming off this development could compromise the historic setting of these larger properties.

By contrast, attorney Avi Kupfer with the US Department of Justice began his opening remarks on behalf of the federal defendants with a challenge to the scalar basis of the plaintiffs' argument.

> Although it is understandable that plaintiffs value the entire landscape of the San Juan Basin as a whole, that is not a basis for bringing an APA [Administrative Procedures Act] challenge to particular, site-specific drill permits.

As Kupfer referenced, NHPA is a procedural statute. The job of the court is not to determine whether BLM made the best land management decisions, but rather whether the agency followed procedures outlined in the Act. The federal government argued that none of the cumulative impacts of extraction cited by the plaintiffs – such as an upswing in heavy truck traffic or increased air, noise, and light pollution – could be attributed to a BLM decision to approve a single well.

The plaintiffs argued the opposite. They sought to establish not only a geographic nexus between individual well pads in the Greater Chaco region: they also argued that there is a connection between individual land-use decisions and cumulative atmospheric effects. Once BLM designates an APE for a project, the agency must determine whether the proposed action –

in this case, a drilling permit – has the potential to adversely affect historic properties within the APE. A historic property is a structure, building, object, site, or district eligible for listing under the National Register of Historic Places because it is deemed "significant." It may be so if it is associated with an important historical event or person, has a distinctive construction style characteristic of a type, or is likely to yield important information about American history.[15]

The "significance" of a property may be diminished by physical destruction, damage, or removal from its historic site. But NHPA also mandates that federal agencies consider whether the "introduction of visual, atmospheric or audible elements" could "diminish the integrity of the property's significant historic features" (C.F.R. 36 Part 800.5). Under NHPA, "integrity" is the "ability of a property to convey its significance." There are several aspects of integrity through which a cultural property is thought to impart significance: location, design, setting, materials, feeling, and association (DOI 1995).

In *Diné Citizens v. Bernhardt*, plaintiffs highlighted "setting," "feeling," and "association" as constitutive of the cultural significance of the Greater Chaco for Diné people, arguing that these elements of integrity are particularly susceptible to adverse effects brought on by "visual, atmospheric or audible" changes.[16] BLM's failure to consider these potential disruptions, plaintiffs argued, resulted in an arbitrary decision to rely on a standard APE. Once BLM defined this APE, it assessed only the potential for adverse effects to cultural properties within that small space, in which it missed the ambient and large-scale impacts of extraction that concern Diné plaintiffs and environmentalists alike. Within the standard APE, BLM found only

[15] This is a brief summary of criteria of significance A, B, C, and D under NHPA.
[16] Setting, here, means "physical environment of a historic property that illustrates the character of the place." Feeling is the "quality that a historic property has in evoking the aesthetic or historic sense of a past period of time." And association is "the direct link between a property and the event or person for which the property is significant" (CFR 36 Part 800).

archaeological sites and artifacts that the agency argued could "yield important historic information regardless of whether [they are] in a pristine location or surrounded by development" (Diné Citizens v. Bernhardt). The BLM reasoned that "so long as the site itself remains undisturbed; setting is not an important aspect of its integrity" (ibid).

It is worth pausing to ask how BLM could assess whether setting, feeling, or association were negatively affected by oil and gas development. A 2014 Protocol that outlines how the BLM is to meet its responsibilities under NHPA in New Mexico provides a clue:

> If setting, feeling and/or association are contributing aspects of integrity for any historic property, and a proposed undertaking will be visible from the historic property, but the project elements will not dominate the setting or attract the attention of the casual observer, the BLM will document the decision and a finding of "No Adverse Effect" is appropriate (Pappas & Juen 2014: 28).

The figure of the casual observer belies an important assumption about the conditions of possibility for knowing, seeing, or sensing something culturally or historically important about place.[17] Following BLM's protocol, significance can be discerned by the naked eye of the cultural resource specialist during a pedestrian survey of the APE. But both Diné and Pueblo groups have consistently affirmed that federal agencies do not have the knowledge or capacities – what Choy (2018) might call an apparatus of atmospheric attention – to know what is significant for Diné and Pueblo people. Indeed, plaintiffs and Amici put forth this argument in *Diné Citizens v. Bernhardt.*

[17] The "casual observer" is a figure that appears across national BLM policies regarding the management of visual resources. It is not unique to New Mexico.

In an Amicus Brief in support of the plaintiffs, the All Pueblo Council of Governors (APCG) and the National Trust for Historic Preservation (NTHP) argued that BLM could not know what is culturally and historically significant about the Greater Chaco because the agency failed to consult with Pueblos about the drilling permits at issue. While BLM focused on assessing adverse effects within a standard APE for properties that were significant because of their "informational potential," the Amici argued that if BLM had meaningfully consulted with them, Pueblo governments would have been able to identify many traditional cultural properties across the Greater Chaco that are potentially eligible for protection because of their setting, feeling, or association. The identification of these properties may have required BLM to consider a larger APE in its evaluation of drilling permits. The Amici expand on the importance of tribal consultation for identifying the appropriate scale of analysis:

> The significance of these sacred sites is often safeguarded through traditional, unwritten practices within Pueblo communities, and formal written recordation is often culturally inappropriate. The religious and cultural importance of the Greater Chaco Landscape can only be understood through meaningful dialogue and consultation between the Pueblos and the federal agencies who risk unintentionally disrespecting these areas through uninformed actions.

Amici note that the only attempt made by the federal government to consult with Pueblos on oil and gas development in the Greater Chaco was through a letter sent to the Pueblos of Acoma, Jemez, Zia, and Zuni (four of 20 Pueblo nations) regarding an oil and gas lease sale in 2014. Local Navajo governments echo this point. Chapters like Counselor consistently state in protest comments that BLM has not adequately communicated with them, and they note that many sacred Diné sites are unknown to BLM and are often unrecognizable by non-Diné specialists.

Diné Citizens v. Bernhardt highlights challenges that Indigenous groups and sovereign nations face in rendering their claims about the protection of sacred sites intelligible to federal agencies and court, especially without disclosing too much about their location or importance (see Dongoske et al. 2014; Tsosie 2012). The 10th Circuit ultimately declined to consider the Amici argument that BLM did not meet the standard of tribal consultation outlined in NHPA, because neither the plaintiffs nor the Amici had made this argument in district court. The court also found that BLM had the authority but was not legally obliged to consider a larger APE.

The argument made by plaintiffs and Amici about setting, feeling, and association points to an important characteristic of extraction's atmospheres: they are not all the same. Techniques like the use of a standard APE manipulate scale in an attempt to commensurate atmospheric effects of oil and gas, but they miss the mark, denying the existence of what exceeds them. Not only is airborne pollution unevenly distributed: differently positioned subjects and groups can access different atmospheric qualities in the same place. These divergent atmospherics circulate within an atmospheric uncommons, "a space that is not only the same space" (de la Cadena 2018). From within distinct worldings, atmospheres take form and differentially materialize extraction's disturbances.

Counselor Health Impact Assessment Committee

Not long after the Mancos shale boom took off, Diné residents of the Tri-Chapter became worried about changes in their community. By 2015, shared concerns about public health, constant truck traffic, poor road conditions, the degradation of sacred sites, and community tensions were being discussed at Chapter meetings. Across human and non-human kinship relations, there was a noticeable difference in the air.

A group of particularly concerned residents from across the Tri-Chapter mobilized to document what was happening. Calling themselves the Counselor Health Impact Assessment Committee, the group launched a community health study. Upon the discovery that there were no air monitors anywhere in the vicinity that would register what residents were exposed to on a daily basis, the Committee fundraised to set up their own temporary air monitors.[18] They built on a tradition of civic science in which frontline communities seek to fill consequential knowledge gaps by studying their own environmental exposures (Jalbert 2016; Ottinger 2013; Wylie 2018). The Committee also convened a series of conversations across the Tri-Chapter and began a course of study that incorporated Diné traditional teachings to understand the specific cultural and spiritual impacts of fracking for Diné people. I had the privilege of working with the Committee for two years, mostly providing administrative support in the form of grant writing and helping with other documentary needs, and I learned a great deal from this collaboration.

The Committee's air monitoring revealed levels of airborne formaldehyde that far exceeded nationally established safe standards and showed elevated levels of VOCs and particulate matter, the latter surpassing national air quality standards and reaching concentrations that can be harmful to human respiratory health.[19] While these "episodic intense peak exposures may only last for a few minutes to an hour in Counselor," the Committee found that "such exposures can cause acute health symptoms, even though the total exposure averaged over a 24-hour period appears acceptable and falls within a limit below a current threshold to consider action to prevent immediate health impacts" (Tsosie et al. 23). When considered at the scale of ordinary life in Counselor, these exposures were worrisome.

[18] There are a handful of continuously operating air monitors in the region, but nowhere near the Tri-Chapter or other parts of Eastern Navajo Agency affected by Mancos shale extraction.
[19] See Shapiro (2015) on airborne formaldehyde exposure. Formaldehyde can form from a chemical reaction of methane and sunlight.

In addition to an air monitoring campaign, the Committee collected health surveys from 80 residents in Counselor (representing 11.4% of the Chapter's population of 700). Among them, 90% reported a sore throat and sinus problems; 80% reported coughs, headaches, itchy eyes, joint pain, and fatigue; 70% reported nosebleeds and wheezing; and others reported experiencing one or more symptoms associated with chemical exposures, like nausea and shortness of breath.

The Committee also found that residents shared significant concerns that traditional Diné knowledge may be threatened by the social and environmental changes introduced with fracking. They felt that agencies responsible for oil and gas regulation ignored traditional knowledge in their decision making. "This implies that non-western, non-modern world views no longer count as contributors to how health and wellbeing are perceived and acted upon," wrote Dr. Herbert Benally and Dr. Larry Emerson in one of the Committee's first preliminary reports (2017: 13). They surmised that "human and ecological trauma" occurs when Diné epistemology is sidelined. Threats to the environment, upon which many Diné rely "for a sense of wholeness and with a beloved kinship with the earth and sky," also pose significant threats to "Diné ways of knowing" (ibid: 14).

In its ongoing research the Committee has identified a range of felt impacts across the Tri-Chapter. Some of these impacts are measurable as data points—such as how many people experience a sore throat or share a concern about the destruction of ceremonial sites—but their aggregation does not provide a straightforward answer to the question of how fracking affects wellbeing. What emerges instead is a clear sense that fracking causes a disturbance in collective Diné relations with the environment.

As Dr. David Tsosie writes in the introduction to a 2020 Committee report, echoing phrases directly from Diné Fundamental Law:

> It is important to note that Mother Earth and Father Sky are part of us as Diné and we are part of Mother Earth and Father Sky; thus, we must treat this sacred bond with love and respect without exerting dominance. The love, respect and honor that is shown to our natural environment is displayed by following the proper protocols of making offerings at sacred sites requesting permission to only take what is needed and to place them back with prayers and songs (Tsosie et al. 2020).

In bringing Diné epistemology to bear on the question of fracking, the Committee examines how shared metaphors and values may be shifting under the pressure of extraction.[20] The Committee's research has registered a shift in the Tri-Chapter, perceptible yet hard to define, evinced in changes to bodies, lands, and the relations between them. Accounting for this shift at this scale, as the Committee asserts, is part of what it means to understand the cumulative impacts of extraction. Ambient conditions that sustain forms of Diné knowledge and life, rooted in local ecologies, are changing. In this way, through air pollution and other impacts, extraction reproduces and further sediments colonial relations (see Gilio-Whitaker 2019; Pasternak and King 2019).

Recognizing this, the Committee is able to leverage its findings to advocate for the practice, teaching, and further development of Diné research methodologies, which they see as a partial corrective to the forms of relationality perpetuated by extraction. Members of the Committee partner with medicine men and traditional knowledge keepers to organize workshops and share teaching with Diné communities of all ages in schools, at community events, and at Chapter meetings. Herein lies a promise amid the late industrial predicaments of extraction on the checkerboard. In this atmosphere, Tri-Chapter residents locate both an imperative and an opportunity to strengthen land-based systems of reciprocity and kinship. The mode of grounded

[20] See Cajete (2014) on shared metaphors as the foundation of Indigenous epistemologies.

relationality (Byrd et al. 2018) towards which they labor is one in which externalities as such don't exist—not because human interactions with their milieus do not produce consequences, sometimes unintended, but because these consequences entail a form of reciprocity in the present.

Conclusion

Atmospheres are felt differently by differently situated subjects. I have argued that in the management of oil and gas in the Greater Chaco, the presumption of atmospheric commensurability is reinforced by patchwork techniques of settler governance that fragment ecological and ontological domains like air and land. This fragmentation often preempts the possibility for Indigenous claims to meaningfully disrupt administrative or judicial actions. I have shown how prevailing approaches to regulating air pollution and other impacts of the oil and gas industry manipulate scale in ways that obscure the cumulative effects of extraction, and I have highlighted examples of how this scalar work facilitates the commensuration of extraction's impacts across Indigenous and non-Indigenous worlds. On the checkerboard, this commensuration eases the expansion of fracking despite Indigenous opposition.

Importantly, however, state attempts at commensuration are only ever partially successful, if at all: an excess always remains. The persistent albeit unrecognized claims by plaintiffs and Amici in *Diné Citizens v. Bernhardt*, the teachings that the Counselor Health Impact Committee animate in their work, and the unrelenting patience of people like Mario and Samuel who keep reiterating their subtle gestures and stories, are all examples of atmospheric knowledge that evades capture. These refusals to render Diné worlds commensurate with state

techniques of assessment represent a form of resistance to both extraction and settler governance that is generative of its own political proposals (see de la Cadena 2015; Simpson 2014). In these ways, Diné residents advance what Tuck and Yang (2012) call an "ethic of incommensurability," an orientation to social difference in the settler colony that insists on incommensurability, rather than reconciliation, as necessarily foundational to decolonizing projects. The strategies of Diné residents that I have explored suggest that there may be ways of intervening in aggregate airs that do not require participants to confront an impossible double bind of rendering oneself doable or going unheard, but that instead take incommensurability as the starting point to any atmospheric politics in late industrialism.

INTERLUDE: RELAYING

With the sound of a hard slap on the bed of the pickup truck, Hazel James and Robert Tohe knew it was time to stop. The two Diné elders who were taking turns driving that day gently edged the truck forward along the shoulder of I-25 for hours. I sat in the truck bed with three young men from Jemez Pueblo, all of us donning yellow fluorescent vests. They dangled their feet off the open tailgate, as I perched on a cooler and leaned against the back window of the truck, which had been painted at dawn with white shoe polish to read: "No New Leases: Frack Off Chaco". We staged this scene along the highway in protest of the Bureau of Land Management's (BLM) decision to lease federally managed minerals in the Greater Chaco for oil and gas development. With each stop, one of us jumped out to relieve the other who had been running along the highway behind the truck, followed by a small caravan of other supporting vehicles, each decorated with similar slogans and banners. Another slap and Hazel and Robert began crawling forward again.

We relayed like this, running, for 50 miles from the BLM Rio Puerco Field Office in Albuquerque to the BLM New Mexico State Office in Santa Fe, passing through Sandia, Santa Ana, San Felipe, Cochiti, and Santo Domingo Pueblos on the way. The uninterrupted June sun reflecting off the pavement made for a scorching day, but spirits were high. As I was reminded by a fellow runner, the sun gives energy just as it may take.

Earlier, gathering with the sunrise, runners and supporters had circled to pray and set intentions for the day. The youth who led the run were warmly reminded by their elders that they were taking part in a long tradition of Native American running in the Southwest. Along the route, a few adults and young children from surrounding Pueblos joined us in the truck bed, and

the caravan of cars moving slowly behind us on the shoulder grew. Sometimes we ran in pairs, and at particularly meaningful spots passengers from the caravan jumped out to join in a group run.

For instance, young and old ran the final stretch from the highway exit into the parking lot of the BLM State Office in Santa Fe, where we were greeted by supporters awaiting our arrival. Under the shade of temporarily installed tents, everyone settled for a feast of Jemez enchiladas, pinto beans, and fresh green salad. Here, the group delivered a message directly to the BLM spokesperson who came out to greet us. The youth who helped plan the run chose the mobilizing call #RunningForOurLives to draw attention to oil and gas leasing in the Greater Chaco, the growing climate crisis, and violence against Indigenous women, girls, and two-spirit people. For them, extraction posed a threat to their lives across the connected scales of land, planet, and body. This is the message that they delivered to the BLM communications personnel, who thanked them for their “public participation”.

CHAPTER FOUR

Buffering: The Chaco Protection Act

A Compromise in 5 Miles

In December 2019, I could not have guessed the extent to which the short video clip released by the Republican Congressional Western Caucus on Twitter would presage events to come just a month later. The video opens with a panning shot of a windswept Nageezi Chapter. Over ominous music, Delora Hesuse's voice is recognizable: "they need to listen to us, understand how *we* live out here". Next, the clip cuts to a scene of people gathered in the Nageezi community center. Briefly, one resident after another describes the importance of oil and gas development for their financial wellbeing, naming the lack of other economic opportunities in the area and the critical role that lease payments and royalties play in helping them make ends meet. Then, as the music continues, white lines of text appear against a black backdrop:

> "Thousands of Navajo Indians own private land in New Mexico.
> These lands are rich in oil, gas, and agriculture.
> After forced relocation it was given to them and their families in perpetuity.
> Radical leftists have now taken the first steps to steal these lands.
> Just like they did 150 years ago.
> Stop the oppression.
> Listen to the people."[1]

As the letters fade, the screen remains black and soon the clip ends. No credits are featured.

[1]Western Caucus (@westerncaucus). 2019. "For years Navajo Allottees have embraced environmental safeguards and responsible energy development. Now radical environmentalists in D.C. want to take their away their land and their future." Twitter, December 5, 2019, 8:52 a.m. https://twitter.com/westerncaucus/status/1202616630733393920.

The video was released on the same day that the Navajo Nation Resource Development Committee (RDC) met to consider – and unanimously endorse – a resolution regarding a piece of federal legislation that would prohibit federal mineral leasing within 10 miles of Chaco Culture National Historical Park. While critical of the legislation, the RDC's resolution didn't oppose it outright. Instead, it objected to the size of the buffer proposed. The RDC stated it would only support the legislation if the 10-mile buffer zone were reduced to 5-miles (Becenti 2019).[2] A month later, the resolution moved to the Naabik'iyati' Committee of the Navajo Nation Council. Chaired by the Speaker of the Council and composed of all 23 Council Delegates, the Naabik'iyati' Committee is considered the final stop for resolutions like this one. When the Naabik'iyati' Committee voted 18-1 in favor of the resolution, it became the formal position of the Navajo Nation Council.[3] This vote, foreshadowed by the Republican Congressional Western Caucus video, would not have been imaginable just months prior when the Navajo Nation Office of the President and Vice President had expressed unwavering support for the 10-mile buffer and the protections it represented (Lizer 2019, Nez 2019).

The difference between a 5-mile and 10-mile buffer around Chaco Park was framed as a compromise between competing economic, cultural, and environmental values (Damon 2020). The search for a compromise was a response to tensions between some Diné allotment owners in Eastern Navajo Agency who wanted to protect the value of their parcels by excluding them from the larger buffer, and other Diné groups, Pueblo Nations, and environmental organizations who

[2] Resolution 0366-19, Relating to Resources and Development and Naabik'i'yati' Committees: Opposing H.R. 2181 and S. 1079, "The Chaco Heritage Area Protecton Act of 2019", Until Such Time as the Buffer Zone Surrounding Chaco Cultural National Historical Paark is Reduced to Five (5) Miles, 0366-19 § Resources & Development Committee Thence Naabik'iyati' Committee, 2019.

[3] Although he was best positioned to provide context on the bill's development up until then and would have voted against the buffer's reduction, Navajo Nation Council Delegate Daniel Tso ultimately recused himself from this vote and deliberation because of a perceived conflict of interest – Daniel is a co-owner of some allotments within the buffer.

advocated for cultural resource, public health, and environmental protections within the 10-mile zone and beyond.

However, as this chapter will examine, the controversy of the buffer also animated protracted debates about land tenure and jurisdiction. The attachments and claims stirred up by these debates are not easily reduced to a classic drama of jobs versus environment or capital versus culture: instead, they tap into what Curley (2018) refers to as geographically- and class-specific Diné "moral economies", or collectively held beliefs. As Curley writes, a "deeper appreciation of social class and diversity of motivation within indigenous communities" (ibid: 6) helps illustrate how extractive industries produce what Dennison (2012; 2017) calls "colonial entanglements", sticky legal and extralegal enmeshments among tribal actors, colonial governments, and corporate forms that often pose challenges for tribal Nations in exercising jurisdiction over their lands and resources (ibid; Curley 2018). Amid such colonial entanglements, there are no easy divisions between colonizer and colonized: rather, "few can escape the logic of settler colonialism that permeates these spaces" (Dennison 2012: 8).

While the buffer legislation that this chapter examines would only suspend the leasing of *federal* minerals, it did so within the legal geography of the checkerboard, where federally managed lands are intermixed with State, tribal trust, tribal allotted, and private parcels. The checkerboard is a materialization of colonial entanglements that are viscerally experienced by Diné residents as they go about living their daily lives. Having observed years of Mancos shale extraction, residents know that proposals that claim to affect only one parcel of land nonetheless spill over and reverberate across the landscape, whether these are air toxins or changes in kin relations brought on by the disbursement of royalties to some members of a family and not others.

Reproduced through a patchwork jurisdictional imaginary, land on the checkerboard is managed as if it were (only) a possessory interest rather than a social-ecological relation. Within such an approach to land management, drawing a boundary around Chaco Park became a reasonable administrative strategy for sorting out competing claims to responsible land use in the region. But, as I will argue, it is a tactic that dodges broader and indelible questions of authority and belonging. As Diné groups debated proposals for a buffer zone of varying sizes around Chaco Park, environmentalists, oil companies, Democrats, Republicans, and lobbyists of all stripes joined in. Meanwhile, an effort that was partly framed in the spirit of Diné cultural preservation managed to skirt any discussion of Diné authority over the lands in question.[4] That is, while both non-Indigenous proponents *and* opponents of a buffer zone were quick to jump to the defense of either Indigenous culture or economic prosperity, they did so from a position that interpreted the question of jurisdiction and responsibility within the space of the proposed buffer as already settled.[5] However, as I will explore, for Diné people living in the orbit of Chaco Park and Mancos shale extraction, it was precisely questions of jurisdiction, liability, and obligation vis-à-vis the land and its histories of care and alienation that the buffer zone controversy surfaced and, ultimately, left unresolved.

[4] The Chaco Protection Act was, crucially, also intended to protect lands and sites of cultural and traditional importance to Pueblo Nations and other Tribes, but here I focus on the Act's relevance to the Navajo Nation and particularly to Diné people living near Chaco Park.

[5] As Coulthard (2014), Povinelli (2002), Simpson (2014), and others point out, settler states and institutions are more likely to recognize Indigenous culture and rights to partake in a liberal multicultural society over the political sovereignty and authority of Indigenous nations.

Mineral Publics and the Chaco Protection Act

This chapter examines the fraught mineral politics of the Greater Chaco, where the checkerboard brings into proximity a variety of multi-scaled mineral publics. "Mineral public" is a shorthand I use to name the collectives who are imagined as the beneficiaries of mineral management decisions in the American settler colony. For example, the federal land management apparatus posits an American mineral public who benefits from revenues generated from extraction on federally managed lands, while the State of New Mexico assumes its own mineral public who has a stake in the management of State trust lands, for these lands generate revenues that fund education and other public services. Mineral publics make claims across multiple scales, corresponding to the kinds of relations of accountability and reciprocity they draw between citizenship, the land, and its governing bodies. What is owed to a public if minerals are taken from lands held by its members in common? Who decides if that land is, indeed, a common object? What kinds of responsibilities does a government have to manage the effects of mineral extraction, whether these are economic impacts, the effects of localized pollution, or climate change?

While constituted in relation to the state, mineral publics are not merely synonymous with the bodies politic to which they correspond. For example, to be of a nation does not make one automatically part of the national mineral public. Instead, mineral publics are constituted through a recursive process of attention and address (Warner 2002). As Warner (ibid) describes, membership in a public requires a process of active uptake. To be part of a mineral public entails a recognition among each member that even though public speech about mineral governance is addressed to broad audiences, it is nevertheless and simultaneously directed at you personally. *You* have a stake in mineral management. This impersonal-personal public speech comes not

only from agencies like the Bureau of Land Management (BLM) or the State of New Mexico, but also from environmental organizations like the Sierra Club, or trade groups like the New Mexico Oil and Gas Association, that beckon their audiences to add their voices to the chorus of public input into mineral management.

The chapter orbits around the Chaco Cultural Heritage Area Protection Act of 2019 (Chaco Protection Act), a piece of federal legislation, proposed during my fieldwork, that catalyzed the checkerboard's mineral publics into conflict. Initially introduced by New Mexico's Democratic Senators Tom Udall and Martin Heinrich, the legislation intended to withdraw federal minerals from future leasing within a 10-mile circumference of Chaco Park. As a response to the increasingly tense politics around oil and gas development in the region, the Chaco Protection Act emerged as an imagined resolution to social antagonism around land use and tenure that left the jurisdictional order of the checkerboard unchallenged.

In order to give a sense of how the buffer zone concept ignited such a dispute, ensnaring a wide variety of mineral publics along the way, I first explore a range of attachments to mineral management in the Greater Chaco. These attachments unfold different expectations of what is owed to mineral publics if and when oil and gas minerals are taken from land, and how rights and responsibilities should be distributed in the process. I begin outside an airport hotel in Albuquerque where a variety of mineral publics, including environmentalists and Eastern Navajo Agency residents, gathered to provide public testimony before the federal Royalty Policy Committee in 2018. They articulated different concepts of the underground – as national commons, as collective Indigenous homelands, or as private property – that informed their ideas about appropriate management and just compensation.

Next, I move to Nageezi Chapter, just north of Counselor, where the Chaco Protection Act and other struggles to prevent the expansion of fracking in the region have rekindled a decades-long fight to secure the rights of Diné allotment owners to lease their minerals. I sketch how the region's complex history of dispossession and hard-won rights, combined with a lack of non-extractive economic opportunities in the area, inflect locally specific concepts of self-determination and belonging.

The final section of the chapter turns to the Chaco Protection Act itself and to the concept of a buffer zone around Chaco Park at the core of the legislation. While intended to reduce the friction of mineral publics bumping up against one another, in practice the buffer concept had the opposite effect. Instead of smoothing over differences, it exacerbated already sedimented antagonisms. The buffer controversy illustrates a patchwork presumption that conflicts over land can be resolved by arriving at a rational apportioning of resources among conflicting parties. But what the buffer debacle demonstrates is that antagonisms between parties to this conflict are not only about the uneven distribution of wealth in the region but also concern disparate access to decision-making power. In particular, this chapter wrestles with the divergent concerns of a group of Diné allotment owners who, along with the U.S. Republican Party and the region's petrochemical industry, opposed the Chaco Protection Act, and the concerns of my closest Diné interlocutors, their relatives in the Tri-Chapter, and environmentalists from the Greater Chaco Coalition who ambivalently supported it.

Throughout the stories that follow, actors maintain, dismantle, and splice back together a precarious distinction between land and mineral, or between surface and subsurface. Tracking this distinction at work is important because its upkeep is one of the ways in which a patchwork imaginary dresses up dispossession as a routine process of administration. When the mineral is

managed as if separate from land, mineral leasing becomes a tactic for settler institutions to continue to alienate Indigenous lands under the guise of public revenue generation. The term "mineral public", then, is not meant to uphold a differentiation between surface and subsurface, but rather to signal how participation in public processes around mineral management often requires, albeit sometimes provisionally, taking up patchwork's terms.

Less Than a Cup of Coffee

On a late spring day in 2018, the Department of the Interior's (DOI) fledgling Royalty Policy Committee (RPC) held its second meeting at an airport hotel in Albuquerque. Established the year prior by then DOI Secretary Ryan Zinke, the RPC was chartered to "provide advice to the Secretary on the fair market value of, and the collection of revenues derived from, the development of energy and mineral resources on Federal and Indian lands" (Federal Register 82: 62, April 3 2017). DOI was widely criticized by environmental and tax-payer groups for the makeup of the RPC, which many viewed as slanted towards fossil fuel interests.[6]

Outside the Sheraton, I joined a crowd of environmentalists, faith groups, and a few Indigenous activists for a brief press conference before entering the meeting room where the RPC would entertain thirty minutes of public comment.[7] "Keep Public Lands in Public Hands" was a popular slogan on demonstrators' placards. Over the hum of highway traffic and the whoosh of airplanes taking off and landing nearby, the director of the local Sierra Club thanked

[6] In a lawsuit filed against DOI by the Western Organization of Resource Councils, a federal district court in Montana ordered DOI to explain how the public was served by the RPC and to make all meeting materials publicly available (*W. Org. of Resource Councils v. Bernhardt* CV 18-139-M-DWM*)*. Following this ruling, the Trump administration allowed the RPC's charter to lapse and appeared to effectively dismantle the committee, though not before some of the RPC's recommendations could become agency guidance. For instance, on June 7th, 2018, one day following the RPC's meeting in Albuquerque, BLM released a new policy entitled "NEPA [National Environmental Policy Act] Efficiencies for Oil and Gas" [Information Bulletin 2018-061], which formalized recommendations made by the RPC to streamline the environmental review process for leasing and drilling.

[7] After about 20 minutes of public comment had lapsed and their remained many people on the sign-up sheet to give comment, the RPC extended the public comment period by an additional 30 minutes.

everyone for coming. Holding her young son in one arm and a microphone hooked up to a small amplifier in the other, she opened the press conference: "You can lease public lands, in some cases, for less than it costs to buy a cup of coffee. And that's unacceptable," she said to nodding heads in the audience, referencing the $2 minimum bid to lease an acre of federal mineral estate.[8] Before passing the microphone to the next speaker she concluded: "It is not fair to have rock-bottom royalty payments for extraction of natural resources that belong to all of us, off lands that belong to all of us".

The idea that federally managed lands "belong to all of us", and that therefore "all of us" should have a say in their management, has been one of the American environmental movement's most powerful rallying calls. It taps into liberal sensibilities in which a white possessive logic shapes desires and assumptions about ownership and belonging of and to the nation-state (Bhandar 2018; Goldstein 2018; Moreton-Robinson 2015). The invocation of "public land" ignores incommensurable claims to land in the American settler colony. This gloss is unmistakable in Dinétah, where "public land" - even as it is materially intermixed with State, private, tribal trust, and tribal allotted land - presupposes a settler public while eliding the structure of ongoing settlement. By settler public, I do not mean a group of individual settlers, but rather the juridical space of the settler state in which the normalization of both private property and a national commons is undergirded by the dispossession of Indigenous lands (Anson 2019; la paperson 2017; Moreton-Robinson 2014; Bhandar 2018, Goldstein 2018).[9]

[8] $2 is the minimum bid per acre during competitive lease sales. When mineral parcels are sold during a non-competitive sale, the price is at $1.50 acre. Noncompetitive lease sales occur across the West, but most prominently in Nevada. Kelly et al. (2019) show how this practice effectively locks lands away from other uses.

[9] Seen in this light, federal oil and gas leasing is one mechanism through which the dispossession of Indigenous lands continues under the guise of managing a federal common. This is true regardless of whether a lease is developed. WildEarth Guardians finds that only 49% of federal public lands leased as of 2018 were actively producing (Nichols 2018).

One anti-colonial critique of public lands policy thus begins from a position of refusing the authority of settler governments to manage these lands in the first place (Anson 2019; Lister 2018; Teba 2018; Whyte 2018). This critique manifests, for example, in the assertion that The Red Nation activists painted on a banner that they bring to lease sale protests at the BLM New Mexico State Office: "Public Lands Are Stolen Lands".[10] The Sierra Club and other environmental groups are aware of this critique but, as organizations, do not embrace it explicitly. They opt instead to acknowledge, applaud, and sometimes center Indigenous resistance and cultural ties to land while continuing to refer to these lands as "public" or "wild" spaces.[11]

A second unstable and multi-scaled register in which environmental groups increasingly hail others to care about how public lands are managed is by invoking the public of a changing global climate. As the unevenly distributed causes and effects of climate change become more and more pronounced, the United States is paradoxically pursuing an agenda of American "energy dominance" grounded in the extraction of fossil fuels.[12] Since 2017, the Trump Administration has sought to lease more federal lands and waters than any other administration in the country's history (TWS 2019). The Wilderness Society found that leases developed under the Trump administration could result in up to 4.7 billion metric tons of CO_2 emissions –

[10] The Red Nation is an Albuquerque-based "coalition of Native and non-Native activists, educators, students, and community organizers advocating Native liberation" that "formed to address the marginalization and invisibility of Native struggles within mainstream social justice organizing, and to foreground the targeted destruction and violence towards Native life and land" (The Red Nation 2020).

[11] This kind of brief recognition of colonial settlement manifests, for example, in a land acknowledgement on The Wilderness Society website. The website refers throughout to "wild public lands", but the land acknowledgement, housed under a section of the website called "Equity and Inclusion", "recognizes Native American and Indigenous peoples as the longest serving stewards of the land". See also the Sierra Club's recent reckoning with founder John Muir's racism (Tomkins 2020), even as the organization continues to employ language of "public lands".

[12] The White House. "Fact Sheet: President Donald J. Trump Is Unleashing American Energy Dominance," May 14, 2019. https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-unleashing-american-energy-dominance/.

equivalent to the annual greenhouse gas emissions of all 28 member states of the European Union (ibid). While positioned violently in the claim that federally managed lands "belong to all of us", one of the ways in which environmentalist mineral publics scale this assertion enables them to hold mineral managers to account for greenhouse gas emissions that have planetary implications, affecting "all of us" unevenly and differentially.

When managed as a federal resource, federal lands generate revenue for both the U.S. treasury and States. The question of a fair price for the extraction of these lands is what brought the small crowd of protestors to gather outside the RPC meeting in Albuquerque. With oil and gas leasing, the federal government retains half of the revenue generated from each lease and annual rents, while the other half is dispersed to the State in which the leased parcel is located. The federal government further charges a royalty tax of 12.5% on oil and gas produced. Operators report production to DOI's Office of Natural Resource Revenue (ONRR), an agency charged with collecting, verifying, and disbursing royalties to State coffers and to the U.S. Treasury, along with several conservation funds.[13] ONRR collects an average of $10 billion in royalties annually from onshore and offshore oil and gas production.[14] In 2019, oil and gas production on federal lands in New Mexico generated $3.1 billion in revenue, about half of which was disbursed to the State to fund public services like education (Robinson-Avilla 2020). While those assembled outside the hotel channeled publics that generally opposed an expansion of fossil fuel extraction, at the RPC meeting they sought to express that so long as such

[13] ONRR disburses portions of revenue to the federal Reclamation Fund, the Land Water and Conservation Fund, the Historic Preservation Fund. Some revenue returns to federal land management agencies to help cover operational costs.

[14] Approximately half of this figure derives from onshore production, and a smaller portion of it derives from royalties for oil and gas produced on Native American lands – detailed in next section.

extraction were to occur, the federal government should charge royalty rates that ensure a fair return to the public.

Before long, it was time for the demonstrators to move inside for the designated public comment period on the RPC's meeting agenda. The group shuffled through the hotel doors and into a dimly lit conference room where the RPC was convened. The committee members sat in tall velvet backed chairs around a long table that filled most of the room. There was no space for members of the public to sit, so most of us gathered in the back of the room or stood along the tall beige walls. The air in the room was stuffy, with too many people crammed into a space not meant to hold them all. A sign-up sheet circulated for those who wished to address the committee through a microphone propped up on one side of the room. Most commenters advocated, in one way or another, against a decrease in royalty rates and the RPC's proposals to streamline environmental considerations in the federal oil and gas program. They cited environmental concerns and called for a fair return to taxpayers and States. The comments tended to conjure an anonymous and expansive public who would suffer an injustice from a decrease in royalty rates. But a handful of residents from Eastern Navajo Agency spoke of impacts that were felt at the intimate scales of the body and community. Take the comment of Samuel Sage, Community Services Coordinator for Counselor Chapter:

"Yá'át'ééh shí éí Samuel Sage" he began, introducing himself and then listing his clan relations in Diné Bizaad. "Did anybody understand that?".

An awkward silence filled the room.

After a brief pause, Samuel exclaimed: "That's what won the war!".

At that, the audience erupted into laughter and applause, understanding that Samuel had uttered bits of that "unbreakable code" that the U.S. Marine Corps used to transmit secret

messages and coordinate surprise tactical assaults upon enemy forces during World War II (CIA 2016).

But Samuel's tone shifted quickly. Normally a slow, quiet, and calm talker, Samuel spoke that day with vehemence. He began:

> "My father, Corporal Andy Sage of the United States Marine Corp, Navajo Code Talker. I repeat his words: 'You go abroad defending your country. Then you come back and have to fight *your government* for your homeland. And they keep *taking and taking*. And leave you nothing.'"

I've seen Samuel perform the Navajo Code Talker joke several times for bilagáana audiences. It is always well-received, at once an icebreaker and a gentle jab that most white people seem to be absorb as a leveler, a reminder that despite our differences, at one time we all fought on the same side. But that day at the RPC, the joke and the comments that followed it did a different kind of work, invoking two national bodies whose relationship is, at least at times, antagonistic. A veteran himself, Samuel insisted that Diné homelands are nested within and yet separate from the American national interest that he too has defended.[15]

Samuel continued:

> "All the BLM land that is leased around us, our community of Counselor gets nothing. We are left with all of the impacts, the negative ones. Today, our community members are suffering from illnesses, cancers […]. Currently, some of our elderlies *do* receive royalty payments. And those royalty payments, they spend coming here to Albuquerque, 130 miles from where we are at, just to make their appointments. So, all we are asking you is instead of decreasing the royalty payments, why don't you think about increasing them? Because you are taking them from our land."

Samuel reminded the RPC that the checkerboard implodes distinctions between impacts that emanate from one jurisdiction and impacts that are felt within another. While most Counselor residents reside on allotment or tribal trust lands, federal management

[15] Cattelino (2010) Dennison (2017), and Simpson (2014) make similar arguments about nested, interdependent, and entangled sovereignties in the American settler colony.

decisions to lease BLM minerals still affect these residents greatly, including their health, air quality, road conditions, vegetation, and the integrity of the entire landscape that they care deeply about (see Chapters 2 and 3). But, for all the wealth that is extracted out from under them, local Navajo Nation Chapters receive nothing in return to support their self-governance.[16] As Samuel noted, for residents who hold interests in leased allotments, royalty payments often do not go far by the time the expenses of living in an isolated rural area are taken into account. His example of a roundtrip to Albuquerque, a journey that families might need to make monthly or more often in order to attend a medical appointment or to do a big grocery run, can easily cost $150 in gas and wear and tear on a standard vehicle.[17] These are some of the reasons why what is currently being paid in the form of royalties on oil and gas extraction does not correspond to what Samuel and others feel is owed to Counselor.

And yet, Samuel's critique also destabilizes the primary question being posed about royalties – should they be increased, as environmentalists and Samuel himself also demanded, or decreased, as most RPC members advocated. Refuting any meaningful distinction between surface and subsurface, or between impacts that occur within one jurisdiction and those that bleed into another, Samuel makes clear that mineral takings in Dinétah are significant not only as a matter of current legal title but more importantly with respect to the land's history of ongoing habitation, use, and relation with Diné

[16] See Chapter 2 on the distribution of royalties to the County and School Districts.
[17] To arrive at this figure, I have done a simple calculation using the Internal Revenue Service standard reimbursement rate for gas mileage of 58 cents per mile. A roundtrip from residential areas within Counselor to Albuquerque is approximately 260 miles. During fieldwork, my biggest expense by far was fuel and maintenance for my vehicle.

people. In other words, he turns the question of national revenue generation into a question of national debt.

Like the Dawes Act All Over Again

"It was like the Dawes Act all over again," Delora's cousin said to me from across the table, describing the scene when crowds gathered inside Nageezi Chapter House in 2014, lining up to receive lease offers from middlemen. These intermediaries worked for oil and gas companies who were eager to get in on the Mancos shale boom. The image of Diné people lining up to sign contracts recalled stories from a century prior, when the first Superintendent of Eastern Navajo Agency, Samuel Stacher, is said to have lined up Diné men and heads of household to sign allotment agreements with their thumbprints (see Chapter 1). Delora and her family, vocal supporters of the oil and gas industry, navigated the leasing frenzy with tact. They sought out what they felt was a fair price for leasing their allotments and deliberated among family members about how to proceed. But they worried that some allottees were taken advantage of because they were less informed about the process and their unique property rights.

Delora and I had arranged to meet at the Nageezi Chapter House, where we sat in a small conference room adjoining the main meeting room. We spoke for about an hour before driving down the highway to visit a newly built family home. This excursion, she explained, would help me understand the "before" and "after" of the Mancos shale boom. As I drove, she pointed out pieces of land that had been allotted to her family members. Soon she directed me to pull into a dirt driveway that led to a modest new doublewide with a large welcoming front porch. As I slowed the car to a stop, she made sure I noticed the two older trailers that sandwiched the new home. Siding falling off, held together by pieces of plywood and other materials, the older homes

were the "before", a time when she and her cousin, short on gas money, would hitchhike the two hours to Crownpoint to meet with BIA about their allotments. The new home, with its vibrant green houseplants, gleaming appliances, and cheerful young children running through the halls, was the "after". Inside, we sat at the dining room table with her cousin and several relatives to talk some more.

I had seen Delora speak in public on many occasions before we met for an interview. She regularly shows up to public hearings to speak on behalf of a large group of allotment owners in the Nageezi area, just north of Counselor. Delora's message is consistent: she affirms the right of Diné allottees to lease their minerals and reminds anyone who will listen that allotments belong to their owners, not to the Navajo Nation; she points out that oil and gas development provides much needed income and financial security for allottees and their families in a region where the figures for both unemployment and people living under the poverty line both hover above 40%[18]; she insists that the extraction is safe, with no negative environmental or health impacts; and, she rails against environmentalists and Tri-Chapter residents who work alongside them. The first time I came across Delora was at the RPC meeting, where she said little about royalties per se but delivered her own message succinctly:

> "I am here today to speak to you on behalf of my family, my extended family, and the community, in support of oil and gas. We are in support of the continued development of our leases. We want to set the record straight and respectfully ask these environmental groups to stop speaking on our behalf against oil and gas. We did not ask these groups to do so."

[18] The Navajo Nation puts its unemployment figure between 42%-50% (see Lizer 2019; Navajo Nation Department of Agriculture 2020; Morales 2019). State and census figures put the number at 19.1% (see Center for Indian Country Development 2017; New Mexico Department of Workforce Solutions 2019). However, as pointed out in NMDWS (ibid) and Kleinfield and Kruse (1982), the unemployment figure on the Navajo Nation and in Eastern Navajo Agency may be higher than in the census count because nationally standardized ways of measuring the labor force tend to underestimate the size of the labor force in Indian Country. For contrast, unemployment in the United States in 2019 was approximately 3.6%, whereas in New Mexico it was approximately 5% (U.S. Bureau of Labor Statistics 2019). The official poverty rate in the United States in 2019 was 10.5% (U.S. Census Bureau 2020). New Mexico has a high poverty rate – in 2017, it was approximately 19.7% (Moskowitz 2019).

While Delora's concerns pertain to present-day policy issues, they are rooted in a longer history of family and community struggle. In the early 1980s, Delora's father Henry Hesuse founded the group Shii Shi Keyah ("this is my land") to advocate for the interests of Diné allottees who co-own mineral interests.[19] At the time, Henry Hesuse, who served as Council Delegate for Eastern Navajo Agency District #19, noticed that oil and gas companies were only interested in leasing State and federal minerals. They tended to stay away from allotments because the process of obtaining consent from all co-owners was too arduous.[20] Hesuse was concerned that the hydrocarbon resources below allotted surface lands were being drained by adjacent leases on federal and State lands. While they received no compensation in the form of royalties for this extraction, allottees nevertheless experienced negative impacts from industry's presence, especially to their livestock. Ervin Chavez, former President of Shii Shi Keyah and current Nageezi Chapter President, recounted to me one morning over breakfast in Farmington an incident in the early 1980s, when a cow belonging to a Diné family wandered onto a well site that wasn't fenced off. As the heavy weight of a pumpjack came crashing down, the cow was struck and killed.

Shii Shi Keyah began mobilizing around their rights as allottees at a time when national attention was directed at oil and gas royalty management and the federal government's fiduciary duty towards tribes.[21] In 1980, a United States Geological Survey (USGS) employee discovered

[19] As described in Chapter 1, another allottee-led struggle, *Mescal v. United States,* was waged simultaneously to the rise of Shii Shi Keyah. In the *Mescal v. United States* case, plaintiffs fought for and won right to their mineral estates which had been unlawfully taken by the United States upon the issuance of allotment patents. BLM was forced to reissue approximately 2,500 allotment patents to include the mineral estate. The group of allottees involved in Shii Shi Keyah was not part of the *Mescal* case, because their allotment patents had included rights to the mineral estate.

[20] As Chamberlain describes, this had been a concern for companies as early as the 1950s, as operators discovered that obtaining approval on a lease could require locating hundreds of individual heirs to the original allottees. Chamberlain identified one case where as many as 600 heirs had to be located (Chamberlain 2000: 88).

[21] The case most cited for the authority of the fiduciary principle is Seminole Nation v. United States, 316 U.S. 286 (1942).

that oil giant Amoco was stealing truckloads of oil from the Wind River Indian Reservation by inaccurately reporting production numbers. The scandal soon spurred a federal investigation of the entire inspection and accounting system for oil and gas on Indian and federal lands, which revealed not only that the practice of "oil theft" on Indian lands was widespread, but also that federal accounting systems for disbursement of royalties to States and tribes were woefully mismanaged. In response, Congress passed the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA).[22] Interior Secretary James Watt created a new Mineral Management Services (today, the Office of Natural Resource Revenue) that would work with BLM and BIA to manage federal and tribal oil and gas resources, ending the involvement of USGS in oil and gas management (Ambler 1990). [23]

FOGRMA provided the legal grounds for Shii Shi Keyah's next move. In 1984, the association sued the Secretary of the Interior for noncompliance with FOGRMA, alleging that the Department of Interior (DOI) was failing to provide timely payments and explanations of payments to allottees who had leases on their land, or to properly account for the oil and gas produced from allotted parcels. A week-long investigative series "Fraud in Indian Country: A Billion-dollar Betrayal" published in the *Arizona Republic* in 1987 drew attention to widespread federal mismanagement of tribal resources and other abuses at the hands of BIA that helped prompt discussions in Congress and put pressure on the government to settle its case with Shii Shi Keyah (Masterson et al. 1987). The parties entered into a consent decree in 1989, requiring actions on the part of DOI that would bring the department and its agencies into compliance with

[22] 30 U.S.C. §§ 1701 et seq. The passage of FOGRMA implemented most of the recommendations made earlier that year by the Fiscal Accountability of the Nation's Energy Resources Commission to improve the government's capacity to hold oil and gas companies responsible for their obligations under a lease (Linowes 1982).
[23] I am grateful to Alan Taradash, counsel to Shii Shi Keyah, for pointing me to this context.

FOGRMA.[24] As part of the consent decree, DOI was required to establish a special local office to assist allottees with the management of their mineral resources. The first of its kind, the Federal Indian Mineral Office (FIMO) was set up in 1992 and co-located with the Farmington BLM office to provide "one-stop customer service to allottees regarding all aspects of their mineral interests".[25] Although a 2017 Office of Inspector General Audit found that FIMO was failing to adequately perform all of its trust services, the establishment of the office and dedicated staff to work with allottees was considered a step forward.[26]

For Shii Shi Keyah, the fight was not over. The association filed amicus briefs in solidarity with the *Cobell v. Salazar* case and continued to participate in government hearings on Indian trust fund issues.[27] In doing so, the group was able to have significant influence on the 2000 amendments to the Indian Land Consolidation Act (ILCA), a controversial 1983 statute in which Congress began to lay out provisions to address the problem of fractionated land ownership across Indian Country.[28] Working with Senator Jeff Bingaman of New Mexico, Shii Shi Keyah drafted a bill, "Leases of Navajo Indian Allotted Lands", that was enacted as Title II of the amended ILCA. Title II provided an exception to federal law at the time, which stipulated that 100% of interest holders in an allotment had to consent to leasing their parcel in order for the Secretary of the Interior to approve an oil and gas lease agreement. Once enacted, the ILCA amendments of 2000 would allow for a lease on Navajo allotments if a majority of co-owners

[24] The court retained superintendent jurisdiction over the implementation of the consent decree for five years, until 1994.
[25] Office of Natural Resources Revenue, 2020, "Federal Indian Minerals Office," https://www.onrr.gov/IndianServices/fimo.html; Office of the Inspector General, U.S. Department of the Interior, "Bureau of Indian Affairs' Federal Indian Minerals Office," Audit. Washington, D.C.: 2017.
[26] Office of the Inspector General, U.S. Department of the Interior, 2017, "Bureau of Indian Affairs' Federal Indian Minerals Office." Audit 2015-EAU-079, Washington, D.C.
[27] For more on *Cobell v. Salazar*, see Chapter 1.
[28] Many individual Indian landholders and their representative groups across Indian country were critical of the amendments in Title 1, as with the Indian Land Consolidation act of 1983. See Ruppel 2008; *Babbit v. Youpee* 1997; *Hodel v. Irving* 1987.

agreed.[29] In 2015, the Code of Federal Regulations was modified for all Indian lands except those in Alaska: tracts with 20 co-owners or more now need only 51% consensus for lease approval (25 C.F.R. 162.012).[30]

Shii Shi Keyah's decades of advocacy established the conditions of possibility for the scene at Nageezi Chapter House that Delora's cousin described. In 2013-2014, when oil companies took interest in Mancos shale deposits in and around Nageezi and Counselor Chapters, they needed only obtain consent from 51% of co-owners of any allotment they wished to lease. Likewise, allottees interested in leasing their minerals could approach oil companies to begin negotiating without uniform consensus among their relatives. FIMO was set up to act as the coordinating agency, working with BLM and BIA to review and approve lease agreements.[31]

FIMO was quickly overwhelmed by a surge of leasing applications in 2014. A realty specialist who was temporarily transferred to FIMO from the Crownpoint BIA office in 2014 to help process the large volume of applications shared with me that at the outset of the Mancos shale boom, FIMO distributed $67 million in signing bonuses to approximately 11,000 allotment co-owners in northwest New Mexico. "That was just for signing bonuses!", he emphasized. While more specific information about signing bonuses is not publicly available, stories circulate that some families managed to secure six figure bonuses while others signed lease agreements for far more modest sums. In 2014-2015 alone, FIMO helped allottees negotiate over 200 lease agreements, with more leases secured in the following years. The first year of Mancos shale

[29] Title II of the ICLA stipulated that 60% of owners must agree in cases where a parcel was co-owned by more than 51 people. If a parcel had 51 or fewer owners, a consensus of 80% was required, whereas a parcel with only 10 co-owners would require full consensus among co-owners.
[30] As per 25 C.F.R. 162.012, tracts with 11-19 co-owners require a 60% consensus, tracts with 6-10 co-owners require an 80% consensus, and tracts with 1-5 co-owners require a 90% consensus.
[31] Unlike with the sale of federal or state minerals, FIMO conducts its lease sales privately. And whereas federal and state royalty rates are fixed, allottees may direct FIMO to negotiate royalty rates with the potential lessee. FIMO was quickly overwhelmed in 2014.

production was by far the most promising: FIMO distributed $96 million in royalties to approximately 20,835 individual Indian mineral owners.[32] If divided evenly between all co-owners, 2015 production generated approximately $4,600 per person. But this is not how royalty disbursements work. Instead, disbursements to individual allottees are calculated based on the fraction of the allotment that an individual owns relative to the total revenue generated from production on the allotment.

Production in subsequent years was less profitable for allottees. In 2017, FIMO disbursed $15.5 million to individual mineral owners; in 2018, the number rose to $31.8 million. In 2020, before a massive dip in the price of oil caused by a global coronavirus pandemic and geopolitical tensions, FIMO disbursed nearly $15 million in the first two quarters.[33] Royalty disbursements fluctuate with the price of oil and with production itself. The drastic reduction of royalty disbursements between 2015 and subsequent years also reflects a rapid production decline curve that is now recognized as common to the extraction of oil and gas from shale. Production from fracked wells tends to decline exponentially within 1-2 years of production.[34]

As the Mancos shale boom brought a significant influx of capital in the form of bonuses and royalties to many families in Eastern Navajo Agency, it also entrenched community divisions. Some relatives and neighbors disagreed on the question of mineral leasing but had no

[32] Office of the Inspector General, U.S. Department of the Interior, "Bureau of Indian Affairs' Federal Indian Minerals Office," Audit. Washington, D.C.: 2017.
[33] Data on royalty disbursements to allottees is not available for fiscal year 2016. Incomplete data is available for fiscal year 2019: $14 million was disbursed to allottees in Spring and Fall quarter but amounts for Summer and Winter are unavailable. This data is obtained from reviewing BIA Navajo Region reports to the Navajo Nation Council from 2016-2020. Allottees in Eastern Navajo Agency are worried about the drastic change in income that might result from the reduction in oil prices.
[34] See Kelly 2019; Ngai 2018; United States Energy Information Administration (EIA). "Production Decline Curve Analysis in the Annual Energy Outlook 2020." Decline Curves. Washington, D.C., 2018. https://www.eia.gov/analysis/drilling/curve_analysis/.

say about development on a parcel adjacent to theirs, or on their own land if they were outnumbered by other heirs whose shares made up 51% or more. In a short period of time, large income disparities became apparent in the Tri-Chapter and Nageezi area, where some families were building new homes and buying new cars, while others continued struggling to get by. Rumors circulated that oil workers sold drugs and alcohol to Diné youth who now had more pocket money, fueling addictions and entrenching divisions within families.

Tensions mounted further in 2015 when a coalition of Indigenous and environmental groups, supported by the Tri-Chapter Council, initiated legal action against the Secretary of the Interior for BLM's approval of Mancos shale fracking wells prior to the completion of its Resource Management Plan Amendment (see Introduction on RMPA and Chapter 3 on *Diné Citizens v. Berhnardt*). While legal questions were debated in court, a large and diverse movement grew around protecting the Greater Chaco from fracking. Federal legislators, led by New Mexico's Senators Tom Udall and Martin Heinrich, took interest in the issue and began working towards legislative approaches to protect the area surrounding Chaco Culture National Historical Park.[35] The Chaco Culture Heritage Area Protection Act (Chaco Protection Act), first introduced in 2018 and reintroduced in 2019 upon further consultation with local stakeholders, proposed to withdraw federal minerals from leasing within a 10-mile buffer zone surrounding Chaco Culture National Historical Park (see Figure 20).[36] This buffer zone would permanently

[35] New Mexico's Congressional Representatives (2018-2020) Debra Haaland (Laguna Pueblo), Ben Ray Lujan, and Xochitl Torres Small also joined in support of efforts to protect the Greater Chaco.

[36] As an active member of the Greater Chaco Coalition, and through my work with the Tri-Chapter, I partook in responding to the initial 2018 version of the bill and negotiating improvements to the version that was reintroduced in 2019. Staff with Senators Udall and Heinrich spent time working with the All Pueblo Council of Governors, the Navajo Nation Office of the President and Vice President, some local Chapters in the Chaco area, and with environmental groups.

protect thousands of archaeological, historic, and sacred sites from the immediate effects of encroaching oil and gas extraction.[37]

The Buffer Zone

> *Buffer: "figurative; spec. used attributively or quasi-adj. to designate a state, zone, etc., lying between two others, usually owing allegiance to neither, and serving as a means of preventing hostilities between them".*[38]

In its contemporaneous sense, to "buffer" means to lessen the impact of one object or force on another, often by placing something in between them. The etymology of the verb dates to a 16th century usage of "buff", a transitive that indicates "to act and sound as a soft inflated substance does when struck".[39] In the context of a conflict, whether geopolitical or personal, a buffer is a means of reducing the possibility for antagonisms to develop or grow.

The idea of a 10-mile buffer around Chaco Culture National Historical Park first originated not with New Mexico's Congressional Delegation but rather from within the environmental community. In late 2014, as BLM was collecting its first round of public comments for the Mancos-Gallup RMPA, a coalition of national environmental organizations made a proposal to the agency about how to manage resources near Chaco. At the time, a short-lived Obama-era planning tool called the Master Leasing Plan (MLP) allowed BLM to work closely with stakeholders to help resolve resource conflicts in areas where the oil and gas industry expressed a specific interest in leasing, but where BLM also recognized that development could potentially harm public values like air quality, watersheds, wildlife, or

[37] See Reed (2020) on an estimation of thousands of sites within the 10-mile buffer. Reed and Archaeology Southwest make a case that the 10-mile zone is not arbitrary because of the large number of sites it would protect compared to a 5-mile zone.
[38] "buffer, v.". OED Online. September 2020. Oxford University Press. https://www-oed-com.proxy.uchicago.edu/view/Entry/24318?rskey=Hpm1UO&result=7 (accessed September 20, 2020).
[39] "buff, v.1". OED Online. September 2020. Oxford University Press. https://www-oed-com.proxy.uchicago.edu/view/Entry/24299 (accessed September 20, 2020).

national parks.[40] The Trump Administration rescinded the MLP tool in 2018 after BLM identified it as a genre of policy that could "potentially burden domestic energy".[41] The move was widely criticized by environmental advocates who had helped champion well-received MLPs in some parts of the West, but in the Greater Chaco the policy caused havoc.

A 2014 proposal to BLM made under the MLP framework by a coalition of environmental and preservation organizations – The Wilderness Society, the National Parks Conservation Association, Archaeology Southwest, and the National Trust for Historic Preservation – suggested creating a "Chaco Protection Zone" closed to federal mineral leasing that would buffer the park by approximately 10 miles on each side. At the time, the idea of a buffer around the park itself was not particularly controversial – indeed a similar proposal had been made in 2010 by a larger contingent of non-profits.[42] But what incensed local Diné communities and their allies was that the proposed Chaco MLP also identified a "Designated Development Area" that encompassed the communities of Nageezi, Lybrook, Huerfano, Ojo Encino, and Counselor for extraction. When asked, my colleague Mike Eisenfeld of San Juan Citizens Alliance said at the time "While the Chaco Culture National Historical Park needs protecting, indigenous communities also deserve protection from industry. The proposed designated development zone throws those living in it under the bus," (Dermansky 2015). When local and regional environmental groups strongly opposed the Chaco MLP, their alliance with

[40] See IM-2010-117. The Trump Administration did away with MLPs in 2018 (cite).
[41] BLM was directed by the Trump Administration to review agency actions that could potentially burden domestic energy production – see Trump's 2017 Executive Order (EO) 13783, *Promoting Energy Independence and Economic Growth.* United States Department of the Interior, 2017 "Review of the Department of the Interior Actions That Potentially Burden Domestic Energy, " Washington, D.C.
[42] Bureau of Land Management New Mexico, "Greater Chaco Landscape Master Leasing Plan Assessments," Farmington Field Office, 2010.

Diné communities working to protect themselves from extraction was strengthened, while a gulf emerged between them and the proponents of the buffer zone.

Given the troubling origins of the buffer concept, Tri-Chapter advocates and many environmental groups were initially skeptical of the Chaco Protection Act when it was first introduced in 2018 because it did nothing to address existing impacts of fracking for local communities. Convinced that the mineral withdrawal was nevertheless a step in the right direction, they worked diligently with congressional staff and Pueblo and Navajo governments to secure critical improvements.[43] The most prominent changes were included in a new "Findings" section of the 2019 version of the Act, which stated that "there are archeological, sacred, and historic resources located throughout the Greater Chaco region, which spans the States of New Mexico, Arizona, Utah, and Colorado".[44] Significantly, this was the first time that the region was described in a federal document as "Greater Chaco", a place-name that advocates had been using since at least 2014 to indicate that the protection of the landscape surrounding Chaco Park is critical to sustaining Diné and Pueblo lifeways into the future. The 2019 Act also acknowledged the importance of the Greater Chaco region for Pueblos and Tribes; it reiterated national standards for tribal consultation; and stated that extensive oil and gas activities in the region had impacted the "health, safety, economies, and quality of life of local communities".[45]

Shortly after the Chaco Protection Act was introduced in Congress in 2019, the newly-elected State Lands Commissioner Stephanie Garcia Richard signed an Executive Order that

[43] FrackOffChaco, 2018, "#ItsNotOver - Response to Federal Legislation, Call for Greater Protections for Greater Chaco," May 18, https://www.frackoffchaco.org/blog/its-not-over.
[44] H.R. 2181, Chaco Culture Heritage Area Protection Act of 2019, 116th Congress, 1st Session.
[45] Ibid. Alongside his advocacy for the Chaco Protection Act, Senator Udall secured $1 million in the Fiscal Year 2020 Interior, Environment, and Related Agencies Appropriations bill to fund an ethnographic study conducted by Pueblo and Navajo governments to identify significant areas within the Greater Chaco region. BLM and BIA did not wait for the completion of this study before finalizing the draft Farmington Mancos/Gallup RMPA-EIS. The bill also continued a one-year moratorium against leasing within the 10-mile buffer zone.

placed a temporary 4-year moratorium on leasing of State Trust lands within the same 10-mile zone identified in the federal bill, effectively withdrawing over 72,000 acres from development and strengthening the potential impact of the Chaco Protection Act.[46] I attended a signing ceremony of the Executive Order at Counselor Chapter House on a cloudy April afternoon. After a prayer and several short heartfelt speeches, Commissioner Garcia Richard signed the document and posed for a photo with local leaders from Pueblo and Diné communities. The recognition by the State Land Office of the importance of the area surrounding Chaco was applauded by tribal leaders who have been working on the issue for years.

While support for the Chaco Protection Act grew among environmentalists and tribal governments in 2019, a group of allottees led by Delora Hesuse emerged as vocal opponents of the legislation, and they were joined by the Western Energy Alliance, which represents small oil and producers in the region, as well as many small business groups (Sgamma 2019).[47] Although the Act would only withdraw federal minerals from leasing, allottees in the Nageezi area became concerned that it would nonetheless discourage operators from leasing and drilling allotted minerals in the area. Within the 10-mile buffer zone, there are 471 allotments, co-owned by approximately 22,077 allottees (Damon 2020).[48] While some of the allotments are congruent, many stand alone, surrounded by federal and State lands. As Delora put it during a legislative

[46] New Mexico State Land Office Executive Order No.2019-002, "Moratorium on New Oil and Gas and Mineral Leasing in Greater Chaco Area", April 27, 2019. New Mexico State Land Office also created a temporary Chaco Working Group to help inform the management of state trust lands. I served as a member of the working group, where I represented the non-profit San Juan Citizens Alliance.

[47] A group led by Delora also intervened in the *Diné Citizens v. Bernhardt* litigation, in support of the defendants (Department of the Interior, and amici oil companies).

[48] An analysis by Navajo Nation Council legislative staff found that within the 10-mile zone, there are 53 leased allotments comprised of 8,479 acres, co-owned by 5,462 allottees. There are an additional 418 unleased allotments within the 10-mile zone covering 66,576 acres and co-owned by 16,615 allottees. It is unclear from this breakdown whether there is overlap in ownership between the leased and unleased allotments – if there is, the total number of allottees within the 10-mile zone may be less than 22,077. The Navajo Nation valued these 471 allotment properties at approximately $3 billion. Within the 5-mile buffer zone, only 51 allotments are unleased (as opposed to 418 within the larger zone). See Damon 2020.

hearing on the Act before the House Committee on Natural Resources, Subcommittee on National Parks, Forests and Public Lands in Washington. D.C.**:**

> "The bill would put off limits my mineral rights and the mineral rights of thousands of allottees. While the bill claims not to affect my mineral rights, in fact, many allottee lands are surrounded by federal lands that would be withdrawn by this bill. If BLM lands are withdrawn around our allotments, that means oil and gas companies cannot access our lands, because they won't be able to access the federal lands.
>
> Furthermore, since the oil and gas is accessed using horizontal drilling, putting the federal lands and minerals off limits will mean my minerals are also off limits. Because of the checkerboard pattern of lands, where allottee lands are often surrounded by BLM lands, particularly in the northeast segment of the buffer, if companies cannot access all minerals along the lateral of a horizontal well, they will not access any." (Hesuse 2019)

The Act did contain language about its non-effect on existing rights, including tribal and allotted mineral rights, and specified that it would not interfere with rights-of-ways needed for infrastructure like roads and powerlines that could improve life for communities in the buffer zone. But Delora's concern that the Act could disincentivize the development of allotments was simply not examined in depth by the bill's sponsors. Nor was the complex question of whether an operator would be permitted to extend a lateral drill bore underground through a patch of federally managed minerals in order to access allottee minerals assessed. While these concerns were dismissed by the bill's sponsors, for Delora, the Act, combined with a temporary moratorium on federal mineral leasing within the 10-mile buffer, sent a "strong signal to oil and gas companies that generate the income on our behalf that investment in the area is risky and uncertain in the long term" (ibid).[49]

[49] As the Chaco Protection Act was debated in Congress and the RMPA was becoming an increasingly controversial project, DOI Secretary Bernhardt visited Chaco Culture National Historical Park upon the request of New Mexico Senator Martin Heinrich. During this visit, Bernhardt agreed to issue a temporary moratorium on leasing within 10 miles of the park (Streater 2019).

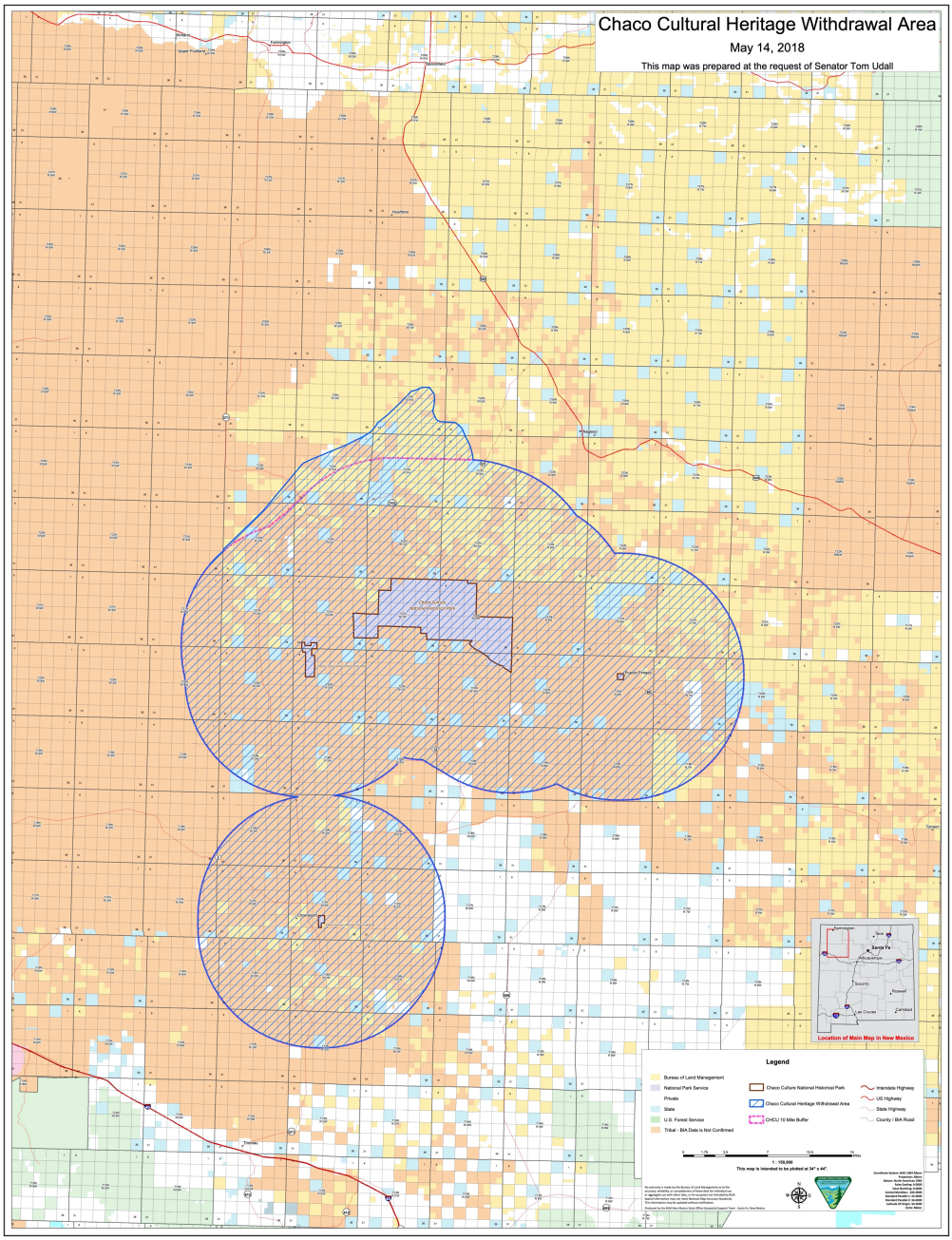

Figure 20 – Chaco Cultural Heritage Withdrawal Area Map illustrating the proposed 10-mile buffer zone, produced by the Bureau of Land Management at the request of Senator Tom Udall. 2018.

On the day of Delora's testimony, the Western Energy Alliance addressed a letter to Raul Grijalva, Chairman of the House Committee on Natural Resources, in which President Kathleen Sgamma expressed concern not for the oil and gas companies that her organization represents, but for "the local economy and the livelihoods of thousands of Indian allottees". The letter continued:

> "While the bill purports to leave Indian allottees unaffected, the reality is that the interlocking nature of the federal and allottee estates means that companies will avoid developing in the area. With today's horizontal drilling of two-mile laterals it is not possible to avoid the federal mineral estate while still producing on pockets of allottee minerals. If the bill passes, companies will have no recourse but to avoid developing Indian allottee energy resources" (Sgamma 2019).

Samuel Sage, Counselor Chapter Community Services Coordinator, also testified before the Subcommittee that day. He painted a different picture than Delora, not contradicting her statements but highlighting different values of land and place. An allottee himself, he imparted that there was a less unified stance among allotment owners regarding oil and gas development than Delora implied:

> "Growing up on my homeland was wonderful, clean and noise free. Early mornings sun raise, cool breeze from the east would bring the smell of rain, wet dirt. It was quiet…. Navajo traditional medicine people and herbalists had no problems gathering plants for medicinal purpose. The plants grew every year and wildlife were abundant."

Then, Samuel described a litany of damage brought on by the oil and gas industry and federal land managers. It began in full force in 2013 with the advent of fracking, when industry "moved into the community and started their destructions". Samuel went on to narrate how BLM proceeded with lease sale after lease sale despite its own admission of failure to conduct adequate cultural resources surveys,[50] and he conveyed that many allotment owners had been

[50] In March 2018, then DOI Secretary Zinke deferred a lease sale set to take place in the Greater Chaco, within the Farmington Field Office boundary, citing concerns expressed by tribes and understudied impacts to cultural

misinformed by land agents about the nature of the leases they were asked to sign. Towards the end of his testimony, Samuel came full circle, but this time conjuring a different image of his homeland:

> "The life of our community has been changed and is now unbalanced. People now regret they agreed to lease their land for this new type of fracking and drilling. Every day, we see the oil and gas being pumped from the ground, the water spilling out and contaminating the land, our cattle walking in the waste-water pits and the elders and children getting sick more. … Today, our traditional medicine people and herbalist[s] are having a hard time locating and gathering plants for medicinal purposes. The plants are no[t] there, in the area. They have to travel to the mountains to gather the plants. Early mornings are no longer quiet, you can hear truck traffic, pump jacks, drilling rigs and clinking of metal pipes. Bright lights, dust in the air, along with the smell of rotten eggs. Wildlife have left the area. In some areas the vegetations are drying up. Community members are complaining about the ground rumbling and shaking after midnight to early in the morning. While the cities are enjoying the benefits of the extraction we are left with the negative impacts. I believe the Chaco Protection Act will help our ancient land as well as our living communities."

For Samuel, who had devoted most of his testimony to describing how Counselor had been "over run" by fracking, the Chaco Protection Act represented a step towards restoring a semblance of balance to the land and people. Yet for Delora and her relatives who had fought so hard to hold onto the value of their allotments and the rights guaranteed to them by the federal trusteeship, the 10-mile buffer threatened what little they had secured.

Two weeks after the hearing in Washington, Nageezi Chapter hosted the Resource Development Committee (RDC) of the Navajo Nation Council for a special meeting on the Chaco Protection Act. Ervin Chavez, Nageezi Chapter President and former President of Shii Shi

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resources. BLM said at the time that there were over 5,000 cultural sites in the proposed leasing area alone, and the impacts of oil and gas development on these sites had not been adequately studied. See United States Bureau of Land Management, 2018, "BLM Defers Oil and Gas Lease Sale in New Mexico," March 2, https://www.blm.gov/press-release/blm-defers-oil-and-gas-lease-sale-parcels-new-mexico.

Keyah, had requested that the RDC meet with Nageezi residents who would be impacted by the proposed legislation.

I arrived at the community center on a bright June morning, just before the meeting started. The center is a large warehouse building that doubles as a gymnasium. It sits in the Nageezi Chapter complex just off Highway 550, across from the seniors'center and Chapter House where I had met with Delora a few months prior. Inside, the space was packed with hundreds of residents sitting in rows on folding chairs and bleachers. The room felt jittery. Eyes darted around, assessing the crowd. Hushed whispers combined to produce a heavy white noise. At the front of the room, the six Council Delegates who composed the RDC sat behind a table facing the crowd. Once the meeting was underway people began lining up behind a microphone positioned to address the committee.

Nageezi residents expressed a wide range of sentiments about the growing movement to protect Chaco. In line with conservationists, some worried about environmental degradation. Others voiced anxieties about financial loss and land-use restrictions that they felt the environmentalists simply didn't get. It would be a mistake to characterize these overlapping concerns as necessarily at odds with one another or as signaling a crisis of local Diné culture. Instead, their co-presence is a reminder that while wealth – or even a moderate living – often defies a prevalent structure of expectation for Indigeneity in the United States, cultural distinctiveness, economic prosperity, and tribal sovereignty need not be not mutually exclusive (Cattelino 2010).[51] Of course, the question of sovereignty in this case is not a straightforward one. Allottees in Dinétah have inherited a form of property established in the 19th century to

[51] In addition to the Seminole Tribe of Florida with whom Cattelino works, she points out other instances in which the U.S. Supreme Court has imposed a "moderate living" to limit treaty rights (2010). See *Washington v. Washington State Commercial Passenger Fishing Vessel Association,* 443 U.S. 658 [1979].

weaken Native sovereignty and land relations (see Chapter 1). Their relation to the Navajo Nation, the sovereign body representing Diné people in negotiations with other polities, is an ambivalent one.

At the RDC meeting, some residents, particularly elder women, stressed that Chaco is a special place, that there are medicines that grow in the canyon and nowhere else, that unforeseen consequences occur when minerals are removed from the earth without proper protocol. Others spoke of the extra, often crucial, income that leasing and drilling have generated for the area. Some acknowledged, occasionally with a touch of humor, that the distribution of this income has been uneven. "We've had two grandmothers become millionaires", one man exclaimed, "and two others, half millionaires!". One grandmother "drives a Cadillac Escalade now!", he said. In contrast, he described his own earnings as "chump change". Another man made a joke about the Cadillac that sent laughter rippling across the room: elders may be driving Cadillacs, but they are still eating commodity foods![52] While comments differed in form and content, one message came through resoundingly: Nageezi residents wanted a fair price for their minerals, and they wanted a seat at the table along with federal, State, and tribal officials when land management decisions were being made.

A Diné woman who lives a quarter mile from the park boundary emphasized the importance of consultation with local communities, focusing her comment not on the monetary consequences of the Act but on a history of forced Diné removal from Chaco Canyon. First, in 1907, the biláaganas wanted to make a monument, so they kicked out many Diné families and

[52] This joke references the legacy of the commodity food program (Food Distribution Program on Indian Reservations or FDPIR) in Indian Country, as well as how some people got big signing bonuses for leasing their allotments, but their leases are still not developed – once the first influx of cash was gone, people were still struggling to get by.

cancelled allotments that had been made. Then, in the late 1930s and early 1940s, Washingdon[53] no longer wanted Navajo people living near or in the Canyon, so they kicked them out again. They demolished all their homes and sheep corrals.[54] "And now they want to establish a 10-mile buffer around the monument?!", she exclaimed with incredulity. Expressing disbelief at the proposal to create yet another set of land-use restrictions for Diné people in the area, she recounted a discouraging experience two months prior, where I was also present, that indicated to her that the concerns of allottees were not taken seriously by the proponents of the bill.

In April of 2019, members of the United States House Committee on Natural Resources conducted a field hearing in Santa Fe on the Chaco Protection Act and proposals to improve air quality regulations for oil and gas.[55] The day before the hearing, Congressional Representatives Debra Haaland, Ben Ray Lujan, Raul Grijalva, and Alan Lowenthal participated in an abbreviated "Fracking is Fracking Reality Tour" led by Navajo Nation Council Delegate Daniel Tso, which ended with a visit to Chaco Park.[56] There, they were joined by Navajo Nation President Jonathan Nez and Acoma Pueblo Governor Brian Vallo. The tour and park visit were private affairs, not publicly advertised. I had an opportunity to attend by invitation of Delegate Daniel Tso because of my work with the Greater Chaco Coalition and the Tri-Chapter Council. Several organizations within the coalition had for years been lobbying politicians and organizing their members to rally support for the enactment of formal protections for Chaco Park, the broader landscape, and the communities living in the area. This relationship-building had secured a few members of the coalition an invitation to the tour. Meeting early in the morning at the

[53] Washingdon is Diné slang for Washington.
[54] On the forced removal of Diné people from Chaco Canyon in the 1930s and 1940s, see See York 1990, Byszewski 2014.
[55] The Committee was particularly interested in building evidence against the Trump Administration's attempts to rollback Obama-era methane regulations.
[56] See Chapter 1 for more on Daniel Tso's famous "Fracking is Fracking Reality Tour".

Counselor Post – a store that today doubles as a gas station and post office – a small group of environmentalists, journalists, Congressional Representatives, staff, and Tri-Chapter leaders set off on the dirt roads to look at Mancos shale extraction.[57]

At the park's visitors' center, the group was met by a larger crowd than they had anticipated. About ten Nageezi residents, led by Delora Hesuse and Ervin Chavez, had learned of the day's schedule and had arrived early at the park to intercept the Representatives. Everyone struggled to fit into the small room at the back of the visitors' center where tribal leaders and a member of the Greater Chaco Coalition delivered short speeches and presentations about the importance of the Greater Chaco landscape and the climate impacts of extraction. When presentations concluded, congressional staff immediately ushered the Representatives outside for a press conference and a tour of the park's kivas and great houses. But inside, the group of allottees wanted to ask questions and share their concerns. As the room quickly emptied out, it became clear that they would not have an opportunity to do so. Upset, the allottees held their own meeting in the small space, expressing now-heightened anger and concern over the Chaco Protection Act. This experience of feeling ignored by tribal and federal legislators cemented the group's skepticism of and opposition to the Act.

Two months later, back at the RDC meeting at Nageezi, Ervin Chavez rose to give a comment. Congress' lack of proper consultation with allottees in Nageezi was "pitting Navajo people against Navajo people", he said. He then floated an idea that would soon gain traction within the Navajo Nation and the national Republican Party. Ervin suggested that perhaps a

[57] Staff with the non-profit Earthworks had brought a high-tech infrared imagining camera through which Representatives were able to see otherwise invisible methane emissions coming off of oil and gas infrastructure. Seeing unregulated pollution with their own eyes, as the Representatives would repeat at the field hearing in Santa Fe the next day, was deeply impactful.

compromise could be reached between the imperatives of preservation and economic development: how about a 5-mile buffer?

With the suggestion of a 5-mile buffer, the aspirations of the bill's proponents began to unravel. For Tri-Chapter leaders, the Greater Chaco Coalition, and several other groups supporting the bill, the proposed 10-mile buffer already represented a concession that some had been reluctant to make in the first place. They had supported it because, on the one hand and significantly, the 10-mile protection zone would have shielded Chaco canyon and thousands of archaeological, historic, and sacred sites from oil and gas extraction. On the other, the buffer did not meet many groups' stated goals of landscape-level protection, nor did it promise to improve conditions for Diné communities affected by extraction just outside of the buffer.

As the 5-mile buffer proposal quietly gathered momentum, sponsors of the 10-mile buffer shepherded the legislation through the U.S. House of Representatives, where it passed with a vote of 245-174 on October 30, 2019. On the Senate side, however, Senators Udall and Heinrich struggled to secure needed Republican support for the bill. Republicans and industry champions staunchly opposed the legislation on the principle that it represented one of the largest mineral withdrawals in the country's history. The Congressional Budget Office estimated that the passage of the Chaco Protection Act would result in approximately $3 billion of foregone federal government income from the prohibition of federal mineral leasing and the termination of non-producing leases within the proposed buffer zone.[58]

Meanwhile, the office of Arizona Congressman Paul Gosar, Republican Leader on the House Subcommittee on Energy and Mineral Resources and Chairman of the Republican Western Caucus, lent encouragement to the allottee opposition of the Act. Congressional staff

[58] Congressional Budget Office, "H.R. 2181, Chaco Cultural Heritage Area Protection Act of 2019." Cost Estimate. Washington, D.C.: As ordered reported by the House Committee on Natural Resources on July 17, 2019.

and counsel for Gosar attended an RDC meeting in Nageezi in November 2019, during which they recorded short video interviews that were then edited together into the clip that opened this chapter (Damon 2020). It would not be long before the RDC would send the 5-mile buffer resolution off to the Naabik'iyati' Committee, where the Navajo Nation Council would assert a strong position against the 10-mile buffer zone.

Although Navajo Nation President Jonathan Nez still stood behind the Chaco Protection Act (Becenti 2019), the Nation's legislative branch had clearly spoken. Without the Nation's support, the Congressional sponsors of the Act chose not to push for a hearing in the U.S. Senate Energy and Natural Resources Committee. In early 2020, the bill stalled. Before Diné proponents of the Act could try to convince Council Delegates to change their minds by correcting what they saw as misinformation spread by the industry-backed Republican Western Caucus and Delora Hesuse's group, the Navajo Nation rapidly had to put all non-essential legislation on hold to respond to the coronavirus pandemic.

The 10-mile buffer concept, while still alive, was dealt a serious blow. If the goal of the 10-mile buffer had initially been to protect Chaco Park and thousands of sacred sites from encroaching oil and gas development, the 5-mile buffer seemed intended to cushion the shock of the proposed mineral withdrawal. In doing, both proposed buffers also distracted from two distinct, yet intertwined, experiences of impasse produced by patchwork's colonial entanglements (Dennison 2012; 2017). Neither Diné citizens who want an end to federal mineral leasing near Chaco in order to maintain their lifeways, nor Diné citizens who want to preserve the value of their allotments in order to maintain theirs, were afforded an opportunity to voice disagreement in any terms other than those of existing surface and subsurface title.

The production of this tight discursive space – in which the political question becomes one of how big of an exclusion zone to draw around Chaco Park – is an effect of patchwork, of apprehending land management as the management of a possessory interest rather than the management of social and ecological relations. Within this space, Tri-Chapter residents who supported the Chaco Protection Act found themselves confronting the claims of the allottee group by insisting that the Act would not affect them due to the *federal ownership* of the lands at stake, while the allottee group insisted upon *individual property rights* above all other forms of identification and belonging. In both cases, Diné people forged at times uneasy alliances with environmentalists and Democrats, oil companies and Republicans, to wage a fight over federally managed lands where they exercised no recognized jurisdiction. And in both cases, Diné people found themselves arguing on either side of a debate that, either way, would not end in an extension of authority to them collectively.

Conclusion

This chapter has sketched how multiple mineral publics form around mineral management in the Greater Chaco. They articulate stakes that traverse local to planetary scales: from preserving the integrity of the landscape and all that it holds, to reducing greenhouse gas emissions, to ensuring that mineral extraction generates a fair return to federal, state, tribal, and allottee publics. But antagonisms around mineral management run deeper than any of these stakes alone. They tap into longer histories, attachments, and inheritances that have as much to do with what is owed to whom as to who has the authority to decide.

As the Chaco Protection Act debate illustrated, the checkerboard's colonial entanglements (Dennison 2012) generate profound ambiguity about these questions. Reproduced

through a patchwork imaginary, the checkerboard pits one land holder against another in a battle of possessory interests. In the fight to protect the Greater Chaco landscape – or to secure access to extract minerals from it – parties find themselves waging their disagreements through lands to which they invoke different legal and extra-legal relationships. By the time the Republican Congressional Western Caucus released the short video in which it proclaimed that "radical leftists have now taken the first steps to steal these lands, just like they did 150 years ago", the terrain was so confused that this statement made a twisted kind of sense. While not an accurate representation of the violent process of ongoing settlement in the region (see Chapter 1), the statement did obliquely point to resonances between the land's past and present managerial politics that were animated by the Chaco Protection Act and its proposed buffer. The buffer – whether defeated all together or enacted in the shape of a 5-mile or 10-mile zone – would have immense material consequences for Diné people, Pueblo Nations with ties to the land, and the oil and gas industry, among others. But as Diné actors who supported the legislation and those who opposed it both recognized, the buffer zone was a strategy for resolving land-use conflicts that did not break with previous colonial administrative tactics. Instead, beginning from a patchwork concept of land that took for granted its federal ownership – and, by extension, the legitimacy of claims by multiple non-Native mineral publics with interests in the management of the space – the Act was an attempt to resolve competing claims near Chaco by arriving at a properly balanced apportioning of resources and access. Within such a liberal imaginary, there was little room to consider either Samuel Sage nor Delora Hesuse's critical prompts about the distribution of reciprocity, debt, and representation in the debate about mineral management occasioned by the Chaco Protection Act.

INTERLUDE: THE VIRTUAL PUBLIC COMMENT

"Substantive, specific comments are the most useful for this process", the BLM public relations specialist instructed the audience over Zoom in mid-May 2020. Her head bobbled at the top right corner of the screen, while a slide displayed examples of "poor", "good", and "best" comments that an individual might provide concerning the Draft Farmington Mancos-Gallup Resource Management Plan Amendment and Environmental Impact Statement (RMPA-EIS). A "poor comment" is one that merely expresses support or opposition for the RMPA-EIS, without justification. A "good comment" identifies a gap in BLM and BIA's analysis, while the "best" kind of comment provides supplementary scientific information to fill a perceived gap (see Figure 21).

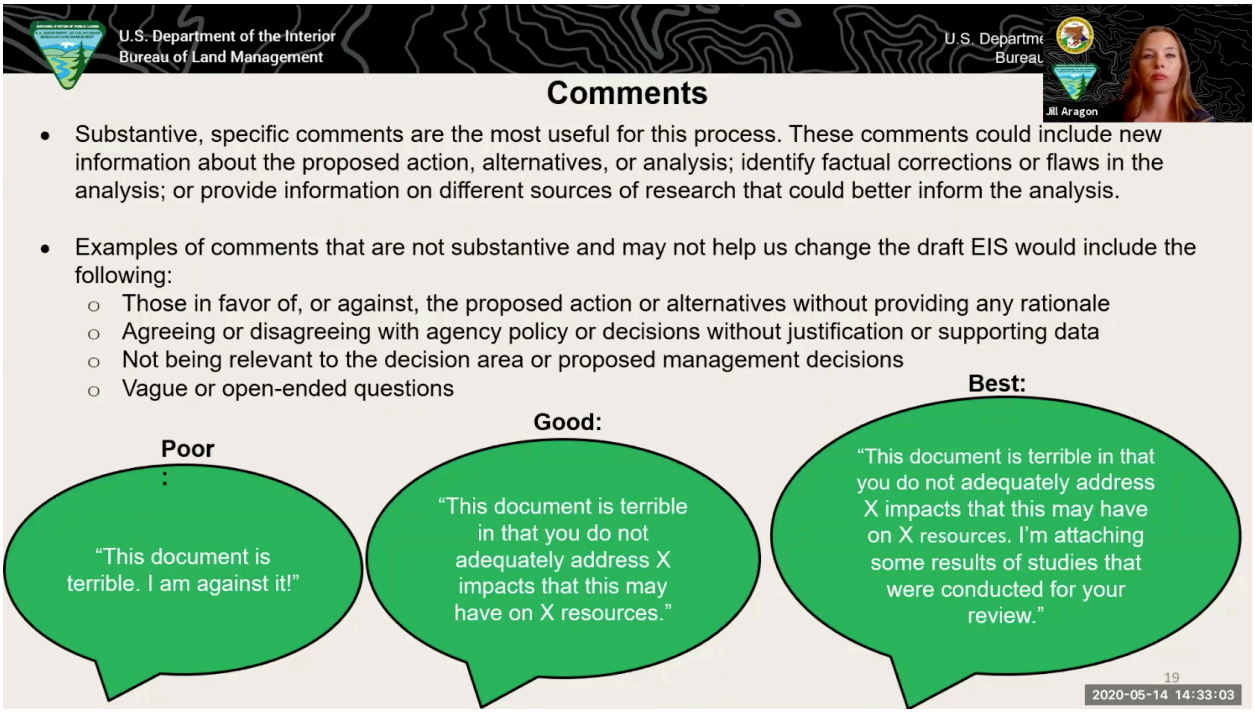


Figure 21 – Slide from Virtual Public Meeting hosted by the Bureau of Land Management and the Bureau of Indian Affairs on May 14, 2020.

Almost three months prior, in late February 2020, BLM and BIA had released the long-anticipated Draft RMPA-EIS just weeks before the coronavirus pandemic would dramatically

alter daily life in New Mexico and across the Navajo Nation. The 1,328-page planning document and 300-page appendices examined four scenarios, or "Alternatives", for oil and gas development across some 4 million acres of federally managed land in northwestern New Mexico, including tribal trust and allotment lands managed in trust by BIA. The four Alternatives allowed for between 2,345-3,101 new oil and gas wells, concentrated in the Nageezi, Lybrook, and Counselor areas, and stipulated different conditions for the protection of natural and cultural resources. While BLM and BIA had indicated their preference for Alternative C, which would authorize over 3,000 new wells, the purpose of the public comment period was to receive feedback that would help the agencies select the most appropriate alternative or mix of planning stipulations across alternatives.

The release of the Draft RMPA-EIS triggered a 90-day public comment period required by the National Environmental Policy Act (NEPA). Individuals and organizations were invited to submit written comments to BLM and BIA regarding the plan and to attend public meetings, yet to be scheduled, where they could provide their comments in person. However, within a month of the Draft RMPA-EIS' release, tribal governments, federal and state elected representatives, and environmental groups across New Mexico began requesting an extension.[1] Emergency public health orders in effect across the State, Pueblos, and the Navajo Nation to contain the spread of the coronavirus would prevent in-person meetings for public comment or tribal consultation, events that are normally at the cornerstone of any NEPA process for an action as significant as the RMPA-EIS. Moreover, tribal governments and communities most affected by the pandemic and the proposed actions in the RMPA-EIS were focused on providing essential

[1] Cite requests from Udall, Heinrich, Haaland, Lujan; APCG; Daniel Tso; Navajo Nation; Greater Chaco Coalition.

services during a public health crisis: they did not have the capacity to engage in the RMPA-EIS process at this time.

The Department of the Interior failed to respond to any of the requests for extension, and instead announced a series of "virtual public meetings" to be conducted in mid-May on the online platform Zoom.[2] This move was met with widespread criticism, especially from Diné and Pueblo governments and people who often live in areas without access to broadband internet, cellphone service, or electricity. According to Navajo Nation President Jonathan Nez, approximately 60% of Navajo Nation residents do not have access to the internet from their homes (Chamberlain 2020).

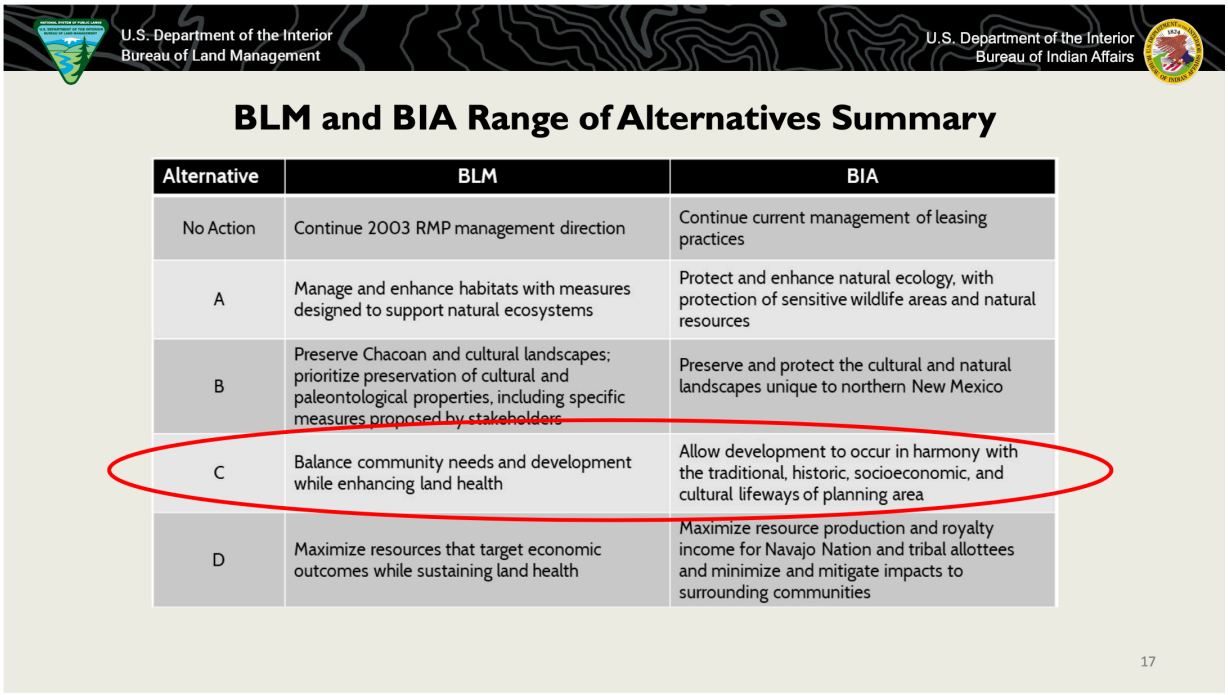
Almost every person who did log on or call in during the week of virtual public meetings did so in protest.[3] They provided what BLM might call "poor comments". Refusing to engage BLM and BIA on the content of the draft planning document, commenters instead critiqued the agencies for moving forward with the planning process at moment when the planning area was among the worst hit by Covid-19 in the country.[4]

The meetings were facilitated by staff from a Four Corners-based environmental consulting firm, EMPSi, that works with industry and the federal government to help both meet regulatory requirements. At the onset of each meeting, all participants were muted. We could not see one another on the screen, nor did we have access to a list of those present.[5] Although the

[2] On May 21st, days before the public comment period was set to end, DOI Secretary Bernhardt announced an extension until September 25, 2020. However, BLM and BIA did not hold further public comment meetings, virtually or in person. They did, instead, hold "open-houses", virtual meetings where individuals were invited to ask questions about the Draft RMPA. The agencies were not required to take the questions or comments they received into account in revising the plan.
[3] There was a total of five public comment meetings.
[4] In May of 2020, the Navajo Nation had the highest Covid-19 infection rate in the country.
[5] When asked by a participant in the "chat", EMPSi staff indicated that 90 participants were present at the first meeting. In subsequent meetings, the number hovered between 40-60. It was not clear how many of these people were BLM and BIA employees.

audio quality of the meeting was clear, the video struggled to transmit crisp real-time images. The faces of BLM, BIA, and EMPSi staff shook terrifyingly at times, like eggs about to hatch.

The meetings began with a presentation by BLM and BIA staff on the background and purpose of the RMPA-EIS. The agencies shared a slide that summarized the range of Alternatives analyzed in the planning document. Each Alternative from A to D was given its own theme: protecting ecology, protecting culture, protecting lifeways, and maximizing production. The slide portrayed these general goods in such a way that the distracted viewer might not even grasp that the proposal under consideration had to do with oil and gas extraction (see Figure 22).



Alternative	BLM	BIA
No Action	Continue 2003 RMP management direction	Continue current management of leasing practices
A	Manage and enhance habitats with measures designed to support natural ecosystems	Protect and enhance natural ecology, with protection of sensitive wildlife areas and natural resources
B	Preserve Chacoan and cultural landscapes; prioritize preservation of cultural and paleontological properties, including specific measures proposed by stakeholders	Preserve and protect the cultural and natural landscapes unique to northern New Mexico
C	Balance community needs and development while enhancing land health	Allow development to occur in harmony with the traditional, historic, socioeconomic, and cultural lifeways of planning area
D	Maximize resources that target economic outcomes while sustaining land health	Maximize resource production and royalty income for Navajo Nation and tribal allottees and minimize and mitigate impacts to surrounding communities

Figure 22 - Slide from a from a Virtual Public Meeting hosted by the Bureau of Land Management and the Bureau of Indian Affairs on May 14, 2020.

As a BLM staffer walked the virtual audience through the slide, I used the "chat" function on Zoom to ask whether someone at BLM might clarify for the audience how many new oil and gas wells would be made possible in each Alternative. My question was not answered. Instead, an EMPSi staff person replied in the chat with a page number where I could find the

figures in the Draft RMPA-EIS. As the dizzying table I was pointed to showed, there was not all that much difference between the Alternatives when it came to foreseeable new development or disturbed acreage.[6] Alternative A would see 2,619 wells; Alternative B, between 2,345 and 2,622; Alternative C, just over 3,000, and Alternative D, 3,101. In a region of 40,000 active and abandoned oil and gas wells, the difference between maximizing production, preserving cultural landscapes, enhancing ecosystems, and meeting community needs seemed to hinge, per the Draft RMPA-EIS, on just a few hundred wells. Despite the overwhelming feedback supporting a moratorium on further leasing and development in the region that both agencies received during public scoping regarding the RMPA-EIS in 2016 (see Introduction), in their final analysis they only gave consideration to Alternatives that would allow significant extraction.[7]

Thirty minutes or so into each meeting, the public comment period would begin. Each commenter was given three minutes to say their bit, a standard agency practice. At in person meetings, the time is usually kept by a facilitator, who signals to the speaker when they need to wrap up, often with a gesture or a timecard. On Zoom, a large countdown clock occupied the center of the screen (see Figure 23).

[6] The Alternatives did vary in terms of approaches to managing other resources like vegetation. They also varied substantially in terms of which lands they would open or close to leasing, as well as the quantity of lands open to leasing.

[7] Bureau of Land Management Farmington Field Office and Bureau of Indian Affairs Navajo Regional Office, 2017, "Farmington Mancos-Gallup Resource Management Plan Amendment and Environmental Impact Statement Scoping Repoert Volume I and II." Department of the Interior.

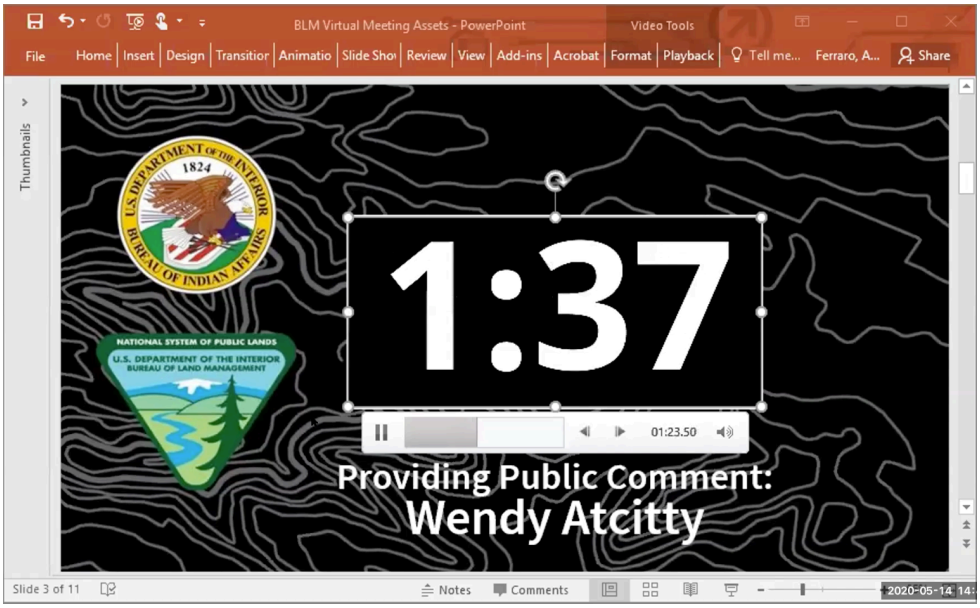


Figure 23 – Screenshot of a slide from a from a Virtual Public Meeting hosted by the Bureau of Land Management and the Bureau of Indian Affairs on May 14, 2020. In this image, Wendy Atcitty (Diné) has one minute and thirty-seven seconds left to speak.

In her study of energy politics in the Navajo Nation, Powell (2018) notes that in arenas of public testimony, residents rarely speak to the technical merits of a project but instead invoke the attachments its success or failure would threaten, such as livelihoods and lifeways rooted in particular economies and relations with the land. I have also observed this refusal to engage the technical on numerous occasions. Powell calls it the "affective aspect of energy politics" (2018: 184). Its various modes of expression galvanize social movements throughout public hearings (ibid). In the in-person public hearings that inform Powell's account, and in those that I have attended over the course of my research, Diné people often also refuse to limit their comments to the allotted three minutes. As Powell suggests, this rejection of the scripted process prescribed by federal agencies is itself a way of contesting expertise. When hearing participants confront technocratic expertise in this way, providing "poor comments" that fail to contain themselves in breadth or in time, the air in a hearing room begins to prickle. As the refusals accumulate, the atmosphere buzzes with the transgression and the solidarities and antagonisms it produces.

On Zoom, in May 2020, I sat alone in my Santa Fe kitchen. I could not exchange a sympathetic glance or pat on the back with other meeting attendees. Some who participated did not have the comfort of doing so from their homes. Instead, they hiked up to the highest point near them where they might be so lucky as to find a cellphone signal. It would take some of them several tries to connect.

What is the rush? This is the question many commenters posed to BLM and BIA over Zoom. It went unanswered. The agencies had been working on the Draft RMPA-EIS for six years. It had been promised several times before and had not materialized. Amid a global pandemic and crashing oil prices, would it really do any harm to delay the process a while longer until those impacted by it could meaningfully participate?[8]

It is not unusual for a complex EIS to take six years to prepare. The average EIS takes approximately 4.6 years, but some take much longer.[9] What was striking about the Draft Farmington Mancos-Gallup RMPA-EIS was how it affirmed, in retrospect, the practices that BLM and BIA had been employing since before they began research and analysis for the amendment process. The 2020 Draft RMPA-EIS was poised to provide post facto justification for management decisions that allowed for the expansion of Mancos shale extraction whose potential impacts had, until now, yet to be even cursorily analyzed.

What would a "best comment" look like on such a document, whose conclusions had seemingly been arrived at prior to its writing? Assuming that you had internet access to

[8] On the relation between the pandemic and the crash in global oil prices, see Cho (2020) and Nagle (2020).
[9]See deWitt and deWitt (2013) and United States Government Accountability Office, 2014, *National Environmental Policy Act: Little Information Exists on NEPA Analyses,* GAO-14-369. As noted in the Conclusion, the Trump Administration moved to streamline the EIS process, limiting completing time to two years for EIS processes that began after 2017. See Secretary of the Interior, "Streamlining National Environmental Policy Act Reviews and Implementation of Executive Order 13807, 'Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects.'" Washington, D.C.: Department of the Interior, August 31, 2017.; "Executive Order 13807: Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects," August 15, 2017. Federal Register Vol 82 No. 163.

download its hundreds of pages or request a mailed copy, that you could read the English text it contained, that you were not tending to sick relatives during the comment period, what additional information might you provide to BLM and BIA? Would it make a difference?

CONCLUSION

By the time BLM and BIA began seeking feedback on the Draft Farmington Mancos-Gallup RMPA-EIS in the Spring of 2020, the Permian Basin in southeastern New Mexico and Texas had eclipsed the San Juan Basin in more ways than one. In a few short years, fracking and finance capital had transformed this previously depleted field into the largest producing oil patch in the country and the world. But as production skyrocketed in the Permian Basin, it waned in the San Juan, where it was burdened by legal challenges, a growing social movement, and, lastly, a dramatic drop in prices brought on by the coronavirus pandemic, leading some industry insiders to predict the basin was "on the verge of collapse" (Robinson-Avila 2020b).[1] Meanwhile, the forces that catapulted the Permian into the limelight also unleashed vast quantities of methane into the atmosphere.

As these Earth-shattering changes were underway, a new European satellite launched. It was equipped with an imaging spectrometer called TROPOMI, which took measurements of the atmosphere as it orbited the planet fourteen times a day.[2] Researchers from across the world quickly began analyzing TROPOMI data to see what it revealed about methane emissions from oil and gas production regions of the United States (de Gouw et al. 2020). In TROPOMI's initial retrievals, the Four Corners methane anomaly did not appear. Instead, the Permian Basin stood

[1] At the time of writing, it remains to be seen how the Permian Basin, and the oil and gas industry at large, will weather the pandemic. But see Hu (forthcoming) on how the industry continually reinvents itself and its frontiers to prolong its existence.

[2] The new satellite, Copernicus Sentinel-5 Precursor, and TROPOMI, were envisioned to fill a gap in global atmospheric data that began when the European Space Agency lost contact with Envisat and SCIAMACHY (European Space Agency 2020). See "Methane Matters". Sentinel-5 was launched in 2017 with a primary orbit term of 7 years.

out in blotches across West Texas and as a veritable red smear streaking through southeastern New Mexico (ibid; Zhang et al. 2020) (see Figure 24).

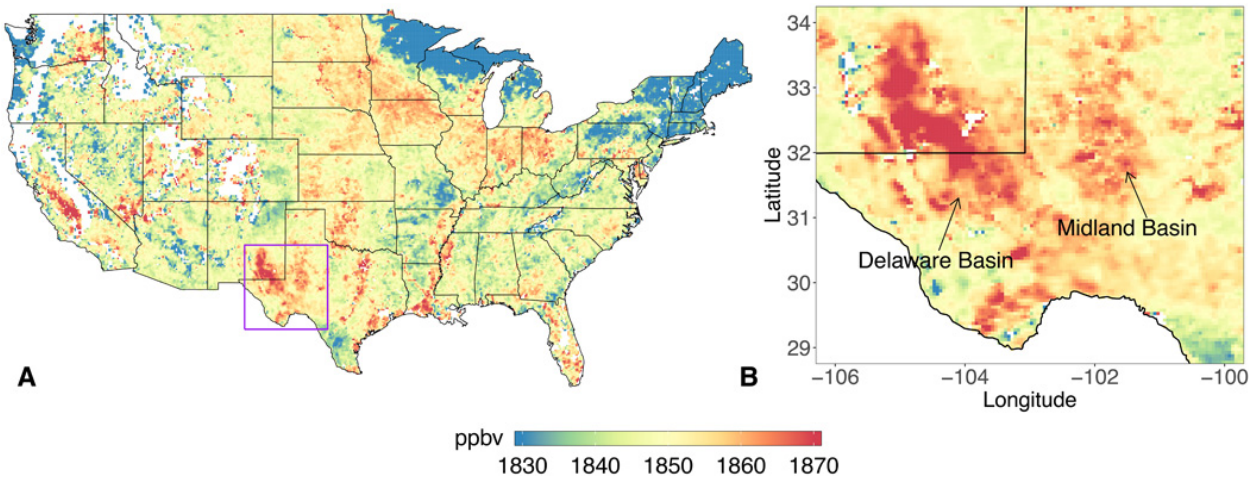


Figure 24 – Satellite observations of the "Permian methane anomaly", from Zhang et al (2020). Licensed under CC BY-NC 4.0

It is possible, scientists note, that the San Juan Basin did not shine red for TROPOMI because of the limited amount of valid data collected over the Rocky Mountains in the first years of the satellite's orbit: topography, cloud cover, and low surface albedo can all affect the quality of remotely sensed data, making accurate measurements particularly difficult over mountainous regions (note the blank white space over the Rockies extending into New Mexico).[3] Meanwhile, studies conducted at other scales reveal that air quality throughout Dinétah remains poor, with San Juan and Rio Arriba counties nearly exceeding national ozone standards,[4] and San Juan and

[3] See Pétron et al. 2020 for an explanation. de Gouw et al. (2020) note enhancements of methane in the atmospheric column over the San Juan Basin on January 3 and 4, 2019. Analysis of TROPOMI data for periods after 2019 may reveal further enhancements.

[4] In 2018, the New Mexico Environment Department began developing regulations to reduce ozone precursors (volatile organic compounds and nitrogen oxide) in counties that exceed 95% of the national ozone standard. See 20.2.50 NMAC Draft Rule

Sandoval Counties each receiving an "F" in 2020 from the American Lung Association for ozone pollution.[5] The strong presence of ozone, whose precursors are emitted from the oil and gas production process, suggests that methane, too, is escaping into the air.[6] It just isn't being systematically measured.[7]

As new data becomes available to track the expansions and contractions of American petrocapitalism in the atmospheric column, the Greater Chaco may no longer stand out as an anomaly. But it is still a hotspot, an uneven concentration of waste, exposure, and extractive infrastructure sustained by patchwork. Even if predictions of the San Juan Basin's decline prove true and this bust is not met with another boom, the infrastructures associated with a century's worth of extraction will need to be managed if non-producing wells are to be prevented from leaking methane and other substances into the air, groundwater, or onto the Earth's surface (Chamberlain 2020; Ferrar 2020; Frazier 2020). By the U.S. Government Accountability Office's estimate, plugging and reclaiming a single well can cost anywhere from $20,000-$145,000.[8] Schuwerk and Rogers (2020) find that the liability for shutting in a modern horizontally drilled shale well, as opposed to a shallower vertical well, is even higher: upwards of $300,000 per well. They estimate the cost of closing oil and gas wells in New Mexico at $10 billion, but federal and State bonds collected from industry only currently cover 2% of that

[5] Rio Arriba County received a C, while data for McKinley is not available because insufficient monitoring exists. See American Lung Association, 2020, "State of the Air: New Mexico," https://www.stateoftheair.org/city-rankings/states/new-mexico/;

[6] Indeed, New Mexico's methane strategy attempts to address methane pollution by reigning in VOCw and NOx emissions, as well as by regulating venting and flaring. This is because the New Mexico Environment Department does not have authority to regulate methane as a greenhouse gas, but can regulate air toxins like VOCs and NOx, while the Energy, Mineral, and Natural Resources Department can only regulate methane as a "waste" product, i.e. as a form of natural gas, not as a greenhouse gas (see "Double Drilling"). At the time of writing, this rule is still in development but will be subject to future research and analysis.

[7] Not only is there a lack of monitoring infrastructure in the State (Tsosie et al 2020): state agencies have insufficient funding to hire inspection staff (Redfern 2020).

[8] United States Government Accountability Office, 2019, "Oil and Gas: Bureau of Land Management Should Address Risks from Insufficient Bonds to Reclaim Wells." Washington, D.C.

figure.[9] State and federal governments, and their publics, may very well end up on the hook for plugging an increasing number of "orphan wells", wells for whom there is no legally liable party.[10]

In August 2020, Marathon Petroleum Corporation announced the permanent closure of its refinery in Gallup, New Mexico, where most oil extracted in the Greater Chaco had been sent for processing (Seba 2020). With the next closest facility some 400 miles away in the Permian Basin, the closure of the Marathon refinery called into question the version of the future being sold in the Draft RMPA-EIS, for which BLM and BIA were still seeking public comment.[11] As oil and gas prices plummeted and the region's markets dwindled, Eastern Navajo Agency leaders were incredulous that BLM and BIA were rushing to finalize a plan that prioritized further oil and gas extraction above all other land uses.[12]

BLM and BIA, for their part, were under increasing pressure from the Trump Administration to finalize the RMPA-EIS. Not only had the Administration drastically shortened the time frame in which federal agencies must complete Environmental Impact Statements: in response to President Trump's June 2020 Executive Order "Accelerating the Nation's Economic Recovery from the COVID-19 Emergency by Expediting Infrastructure Investments and Other Activities", the Department of the Interior (DOI) had selected the RMPA-EIS as one of several

[9] See supplementary web report to Schuwerk and Rogers (2020). Carbon Tracker, "Billion Dollar Orphans: Why Millions of Oil and Gas Wells Could Become Wards of the State," October 1, 2020. https://carbontracker.org/reports/billion-dollar-orphans/.

[10] Ibid; SChamberlain 2020; United States Government Accountability Office, 2019, "Oil and Gas: Bureau of Land Management Should Address Risks from Insufficient Bonds to Reclaim Wells." Washington, D.C..

[11] The public comment period, initially scheduled to end on May 28th, was extended to September 25, 2020. See "The Virtual Public Comment".

[12] Elected representatives and community members voiced this incredulity during a week of "virtual open houses" hosted by BLM and BIA in August 2020. The purpose of these events was for members of the public to ask questions about the RMPA-EIS, though the vast majority of participants called in to protest the process.

projects to be streamlined.[13] In addition to economic recovery, no doubt also on the Administration's mind was the upcoming 2020 November election, in which President Trump would face off against, and ultimately lose to, Joe Biden, who pledged to ban new oil and gas leasing and permitting on federally managed lands (Richards 2020).[14] But when the DOI succumbed to loud demands from tribal governments, elected leaders, and civil society to extend the public comment period for the RMPA-EIS until September 25, 2020 (see "Virtual Public Comment"), it ran out of time to finalize a Record of Decision on the document before 2021 as it had planned.[15] At the time of writing, a final RMPA-EIS is still pending.

As DOI sorts out its timelines for major projects like the RMPA-EIS, its agencies continue to reproduce patchwork in their management of the Greater Chaco. The Biden Administration may redirect agency priorities towards cleaner energy sources and allow for the protection of sensitive areas, and these moves would likely be welcome by the Greater Chaco Coalition and my colleagues in the Tri-Chapter.

But nothing short of a reconfiguration of land relations, an undoing of patchwork, will begin to cool down this hotspot.

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[13] EIS projects initiated after the signing of Executive Order 13807 in 2017 would have to be completed within 2 years. This did not apply to the Farmington Manco-Gallup RMPA-EIS, since it had been initiated prior to the signing of the Executive Order, but BLM and BIA staff expressed that they were under definite pressure to expedite the process and limit the length of the document. Page limits and additional guidelines for streamlining the National Environmental Policy Act process and shortening the timeline on EIS projects were ordered in Secretarial Order 3355 in 2017. See Secretary of the Interior, "Streamlining National Environmental Policy Act Reviews and Implementation of Executive Order 13807, 'Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects.'" Washington, D.C.: Department of the Interior, August 31, 2017.; "Executive Order 13807: Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects," August 15, 2017. Federal Register Vol 82 No. 163.

[14] New Mexico Democratic Governor Michelle Lujan Grisham has, however, stated that she would request a waiver for New Mexico if such a ban were instituted, so that the State could continue producing oil and gas upon which it relies economically (Volcovici 2019).

[15] See Bureau of Land Management, and Bureau of Indian Affairs, 2020, "The Farmington Mancos-Gallup RMP Amendment/EIS Newsletter", Issue 3.

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