THE TREADMILL OF MILITARISM:

NATIONAL SACRIFICE AREAS AND NATIVE AMERICANS*

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Abstract.  When examining environmental justice and injustice, surprisingly few studies have examined the experiences of Native Americans.  In filling this gap, we criticize and build on environmental and political sociology.  Many environmental sociologists posit that the relationship between humans and the environment (including the use of nature to deposit toxic wastes) is driven primarily by capitalism.  We make the case and provide evidence that the state’s geopolitical pursuits creates a pattern of environmental “bads” that cannot be reduced to capitalism and that coercive state policies can mold the spatial distribution of people relative to environmental dangers.  Thus, even as we acknowledge the validity of the “treadmill of production” where commercial activities generate environmental problems and housing markets are the overriding mechanism for sorting people into residential locations, we make the case that the intersection of Native American lands and the military’s toxic legacy are best understood in terms of the “treadmill of militarism.”  We have collected data on a large number of military bases that have been closed and returned to civilian use.  Specifically, we have compiled information on the proximity of unexploded ordnance to Native American lands.  We find that Native American lands tend to be located in the same county as sites that are extremely dangerous due to the presence of unexploded ordnance.  By demonstrating that Native Americans bear a disproportionate burden (in the form of exposure to environmental dangers) for the national security, this research refines and builds a bridge between environmental and political sociology.
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The issue of environmental justice and injustice has captured the imagination of activists, academics, and the public. But surprisingly few studies have examined the experiences of Native Americans. This is even more surprising given that studies examining this issue conclude that the risks borne by Native Americans are startling. Grinde and Johansen (1993) characterize current dynamics as the “ecocide of Native America”; Kuletz (2001) refers to state-sanctioned environmental violence as “nuclear colonialism”; Churchill (2002) and LaDuke (1999) describe a “struggle for the land” (see also Bullard 1994; Gedicks 1993; Small 1994; Sachs 1996; The Akwesasne Task Force on the Environmental Research Advisory Committee 1997; Marshall 1996; Roberts and Toffolon-Weiss 2001). Nevertheless, these compelling case studies of environmental injustice are poorly integrated into the environmental justice literature that has placed greatest emphasis on working class and minority populations residing in urban areas. Moreover, the U.S. military looms large in case studies of Native Americans (see especially Kuletz 2001), but the environmental justice literature has emphasized capitalism and the seamy side of economic growth (for reviews of the literature see Szasz and Meuser 1997; Mohai and Bryant 1992; Lester et al. 2001; and Liu 2001).

Our study helps to fill the gaps in our understanding of the environmental risks facing Native Americans. In doing so, we criticize and build on two valuable literatures – environmental sociology and theories of the state. Environmental sociology has emphasized the role of capitalism – and its inherent tendency to expand – to explain the
voracious consumption of natural resources and the attendant deposition of toxic waste (Schnaiberg 1980; Schnaiberg and Gould 1994). The “treadmill of production” has been especially influential in the environmental sociology literature. When concentrating on environmental inequality as related to residence (as is our focus), research has examined whether or not individuals exercise choice (as constrained by class inequality) or if racist housing policies force minorities to live in close proximity to toxic places.

For two reasons, the experiences of Native Americans do not fit into a paradigm that explains environmental injustice as the intersection of capitalist production and housing markets: 1) the most dangerous and toxic facilities in proximity to Native Americans lands are military installations, and 2) Native American reservations were not selected through market processes, rather these lands were assigned to Native Americans by a coercive state at the conclusion of genocidal wars. We are not suggesting that it is wrong to examine the role of capitalism and housing markets when studying environmental justice. Rather, we identify scope conditions under which these processes are central. In addition, we examine the unique experiences of Native Americans and develop an explanation that specifies alternative mechanisms through which environmental “bads” and people are spatially distributed. In so doing, we complement the extant environmental sociology literature and extend the study of environmental justice to examine phenomena and people who have received too little attention.

Given that the relationship between Native Americans and the United States has been marked by a long history of coercion and that military installations and activities currently pose an immediate threat to Native American lands and people, political sociology has great potential to contribute to our understanding. However, to date, this
potential has not been realized. In part, like the larger discipline, political sociology has been slow to focus on environmental phenomena. Moreover, despite a revival of interest in the state and the military, political sociology has devoted surprisingly little attention to the seamy side of U.S. militarism (Hooks and Rice forthcoming). Instead, those calling attention to militarism have typically done so by demonstrating that defense spending provides an economic stimulus (Bullock and Firebaugh 1990; Griffin et al. 1982; Hooks 1990; Hooks and Luchansky 1996) or that military mobilizations played a surprisingly positive role in social and racial policies (e.g., Janowitz 1960). Our research offers a reminder that the human/environment interface is important; this research also reminds us that the examination of the military in contemporary societies must emphasize a legacy of coercion and the distribution of “bads” as well as “goods.”

Our work builds on Pellow’s (2000) “environmental inequality formation” (EIF) framework. This framework emphasizes the historical processes through which environmental contamination occurs; it also calls attention to the agency of multiple social actors (in place of a simple victim-perpetrator model). We extend the EIF framework to consider the history of coercion and the prominence of militarism to explain contemporary environmental justice contexts for Native Americans. We also build on political sociology. Although the extant theories are inadequate to understand the contemporary dangers confronted by Native Americans, a synthesis of the EIF framework and political sociology provides guidance for this research.

Case studies provide evidence that Native Americans are forced to live with environmental injustice in selected times and places. We complement these studies with a quantitative analysis of the impact of militarism. We have collected data on the large
number of military bases that have been closed and returned to civilian use. Specifically, we assess the degree to which counties in which American Indian tribes own land house sites that are highly toxic and dangerous due to the presence of unexploded ordnance. By demonstrating that Native Americans bear a disproportionate burden (in the form of exposure to environmental dangers) for the national security, this research helps to refine and build a bridge between environmental and political sociology.

THE SACRIFICE OF NATIVE AMERICAN LANDS

Because the issue has received little attention, we begin with an overview of the available research and information on military encroachments on Native American lands. This overview identifies the distinctiveness of the Native American experience and thereby clarifies the challenge to sociological theory to understand these dynamics.

Some lands have suffered such severe and prolonged environmental degradation that it is beyond current technology to make them safe for human use. Once a locale has been seriously degraded, it often attracts additional pollution (Marshall 1996). In some cases, toxic wastes are deliberately directed to locales that are already damaged on the grounds that concentrating toxic wastes in one place is preferable to diffusing them widely. For instance, Yucca Mountain (Nevada) has been selected to concentrate the nation’s high-level nuclear wastes in hopes of decreasing risks elsewhere. Reflecting their permanent degradation and their purported contribution to the collective, these areas are referred to as “national sacrifice areas” (Kuletz 1998) or “human sacrifice zones” (Bullard 1993). A case in point is the region in the desert southwest that General Colin Powell once referred to as the “Bull’s Eye” – i.e., the “single, massive, war-game theater”
that includes the Nevada Test Site, Fallon Complex, Yucca Mountain, and China Lake. This expansive and uninhabitable “national sacrifice area” is the single largest “peacetime militarized zone on earth” (Kuletz 1998: 38-9). Because this state-sanctioned environmental violence is directed toward Native American lands, Kuletz (2001) refers to this as “nuclear colonialism.” For military planners, this seemed an obvious choice because the land “really wasn’t much good for anything but gunnery practice – you could bomb it into oblivion and never notice the difference” (quoted in Kuletz 2001: 251). But the Western Shoshone and Southern Piaute have claimed these same lands as both a traditional homeland and religious grounds for 1000s of years.

Our research examines whether or not the sacrifice of Native American lands is pervasive or if the nuclear weapons complex of the desert southwest is a visible and disturbing exception. Based on our review of the extant literature and research, we anticipate finding that impacts on Native American lands are pervasive; these impacts are not limited to the Southwest. “In order to ensure that it meets its national security mission, DoD operates and trains on vast amounts of land, including American Indian and Alaska Native lands. Evidence of DoD’s past use of these lands remains: hazardous materials, unexploded ordnance (UXO), abandoned equipment, unsafe buildings, and debris. This contamination degrades the natural environment and threatens tribal economic, social and cultural welfare” (U.S. Department of Defense 2001b).

Environmental justice research analyzes the distribution of toxic materials relative to the concentration of peoples of color and class positions. But too often the analysis has stopped at this point, leaving unexamined the historical processes that create the uneven spatial distribution of toxins and people. Due to dissatisfaction with such
analyses, Pellow (2000) stresses historical processes through which toxic materials are generated and deposited in the environment. Moreover, Pellow calls attention to the history of relations among people and between people and the environment. We approach this research through the lens provided by the EIF paradigm, but we stretch and challenge this paradigm in several respects. First, while we endorse the emphasis on multiple stakeholders and the avoidance of simple “perpetrator-victim” accounts, the issues we examine are on one end of a continuum. Specifically, we examine the environmental dangers created by militarism and the exposure of Native Americans to them. The U.S. military is powerful and well-funded – and it makes decisions behind the veil of national security. Native-Americans, in contrast, are conquered peoples forced to live on reservations chosen by the United States; they control relatively few resources and exert relatively little political influence. We study the extent to which Native Americans have been forced to make sacrifices – without their consent – as dangerous military facilities and activities were located on or near Native American lands.

Our second adaptation of the EIF paradigm centers on the role of the state and of coercion in creating conditions of environmental injustice. In the abstract, the EIF paradigm can be adapted to consider instances in which political decisions and coercion are central processes. However, to date, this paradigm has examined episodes in which 1) profit-seeking firms have played the central role in creating and dumping toxins, and 2) individuals and market forces have played a prominent role in the residential location of individuals and social groups. But Native Americans did not select lands in the context of a market. Instead, the United States, typically in the wake of military campaigns, dictated the location of reservations. In turn, the selection of sites for
dangerous military activities was driven by militarism, not capitalism. We draw on political sociology to refine and expand the EIF framework – making this approach better able to analyze the environmental “bads” produced by militarism and the tendency for tribal lands to be near these “bads.”

Pellow (2000) and others (Adeola 2000; Szasz and Meuser 1997, 2000) emphasize that environmental inequality is the result of historical processes and negotiations among many stakeholders. Stakeholders who are unable to effectively mobilize resources are most likely to suffer from environmental inequality. Scarce resources may include clean and safe living, recreational and work environments. They can also include power, wealth and status. Thus, the inability to access these resources often means living and working under dangerous conditions, with very little power, wealth or status (Pellow 2000: 589).

While individuals and groups have differing access to scarce resources, they are agents who make choices. And, over time, these choices are of decisive importance (Pellow 2002).

“In settler nations indigenous populations are stripped of their rights, especially land rights, and the state invites immigrants from cultures similar to that of the former colonizer to come and live” (Janoski 1998: 143-44). After losing their lands in the 19th Century, Native Americans were forcibly removed from parents and forced to attend English-only boarding schools during the 20th Century. Federal agencies charged with “caring” for Native Americans were notoriously corrupt -- often openly hostile to them. Although Native Americans were stakeholders, their ability to alter the location or the activities concentrated on military bases was undermined by de jure and de facto inequalities. As has been common throughout the world, the indigenous peoples of North
America “and their rights to land, natural resources, clean air, good health, and environmental protection, are viewed by the dominant group as expendable for the sake of national security, national unity, and economic development” (Adeola 2000: 688).

Two well-known episodes – the Cherokee’s “Trail of Tears” and the Massacre at Wounded Knee – bring into sharp relief that struggles over land and brutal treatment have been pervasive. In the early 19th Century, the Cherokee Nation, centered in Georgia, was prosperous and formally recognized by the United States. In 1830, while making his first address to Congress as President, Andrew Jackson vowed to remove all Native Americans to the Western United States (Wilkins 1986). Emboldened by the Jackson’s fiery rhetoric, Georgia passed laws that were demonstrably inconsistent with the treaty between the Cherokee Nation (then located within Georgia) and the United States. Georgia declared Cherokee laws null and void, suspended Cherokee law enforcement agencies, and banned the testimony of Native Americans against whites in a court of law (Wilkins 1986). In 1832, after multiple appeals, the Supreme Court eventually ruled that the laws known as the Georgia Indian Code were unconstitutional. Recognizing the validity of the treaty between the Cherokee Nation and the United States, Supreme Court Justice John Marshall announced that the State of Georgia had no right to enter Cherokee land without Cherokee permission and that the State of Georgia had no power to arrest the Cherokee or their guests within the Cherokee jurisdiction. The State of Georgia refused to adhere to the Supreme Court ruling; in fact, under the banner of state’s rights, Georgia rejected the Supreme Court’s jurisdiction over the case (Wilkins 1986). President Jackson defiantly sided with Georgia and is quoted as saying: “John Marshall has made his decision; let him enforce it now if he can” (Wilkins 1986: 236).
There are several facets of this tragic episode of note. First, although his actions defied the constitution, President Jackson was responsive to the electorate – an electorate restricted to white males. “Questions of who ‘belongs’ create a good deal of tension when the ‘people’ are supposed to rule” (Markoff 1996: 137). Jackson was committed to extending and protecting the enfranchisement to poorer whites. In this sense, he protected and defended democracy. In an irony that is not restricted to the United States - an irony noted and condemned by de Alexis de Tocquesville -- the defense of democracy for those included came at the expense of Native Americans excluded from the polity (Satz 1991: 34; see also Markoff 1996: 57-9). Thus, even as Jackson’s defiance threatened the constitutional foundation of the young nation, this defiance was responsive to the will of the white electorate. Second, it is hard to identify a tribe that brought more resources or made fuller use of U.S. law than did the Cherokee (Perdue 1991; Wilms 1991). The Cherokee were highly literate, assisted the colonies in the American Revolution, signed a binding treaty with the United States, and had numerous allies in Congress. Moreover, despite the State of Georgia’s repeated and deliberate provocation, the Cherokee responded in a disciplined and non-violent fashion – thereby removing any pretext for armed invasion. “The Cherokee had made a stupendous effort but the issue was not one over which they could exert the slightest control” (Van Every 1966: 79). In 1838, under threat of force, the Cherokee reluctantly agreed to move to Oklahoma. Their trek from Georgia to Oklahoma became known as the “Trail of Tears” because a lack of food, harsh weather, disease and harassment by whites along the way resulted in the death of twenty percent of the Cherokee people (Newton 1992). Third, the “Trail of Tears” was part of a larger ethnic cleansing (to use contemporary terminology).
That is, in 1830, Jackson campaigned on his commitment to remove all Native Americans from the lands east of the Mississippi River. He fulfilled this campaign promise. In the 1830s, scores of eastern tribes were forcibly relocated to the western territories. The suffering and betrayal of the Cherokee are striking – but they were not alone in this regard. The Cherokee provide an evocative example because they had so successfully adapted to the American political order that they successfully argued their case before the highest legal authority defined by the Constitution – and were still subject to lawless dispossession.

When surveying the dispossession of indigenous peoples throughout the world, Adeola (2000: 702) points out that “the efficacy of grassroots social movements under a repressive regime is extremely low.” The Massacre at Wounded Knee highlights the repressiveness that permeated U.S. treatment of Native Americans and the danger of resistance. Being excluded from the polity, the Constitution afforded no protection to Native Americans. In fact, any hint of Native American social movement, irregardless of its form or intent, resulted in deadly repression. A series of events led to the massacre at Wounded Knee in December of 1890. In the years and months preceding this massacre, the United States imposed a policy of dividing the lands of the Sioux Nation into small parcels and allowing white settlers to acquire the most productive lands (Brown 1970).

Over this period, there developed a mode of resistance which, although harmless, culminated in the Massacre at Wounded Knee (DeMallie 1991: xvi). The “Dance of the Ghost” was viewed by Native Americans as a religious ceremony that called forth dead ancestors to repopulate Indian lands. Further, Native Americans believed that the shirt worn while dancing would protect Indians from the bullets and horses of the American
soldiers (Brown 1970). The Ghost Dance spread across the Native American peoples in the Western United States. Frontier settlers and the military associated the dance with “impending warfare” and official orders to cease the dance became priority for the military (DeMallie 1991: xvi; Brown 1970). Eventually, the confrontation over the Ghost Dance led to the final massacre in the American conquest of North America. On December 29, 1890, over 300 people – many consisting of unarmed women and children -- were slaughtered by the United States military (Brown 1970). Hence, any hint of a social movement on the part of Native Americans, even a religious ceremony, was crushed by the U.S. government – in this case, crushed through military force.

The Massacre at Wounded Knee provides more than a symbolic backdrop for this analysis. Fifty years after this massacre, the Sioux once again confronted the power of the U.S. military, and once again the issue was land. However, by the 1940s, the land acquisition was undertaken as part of the World War II mobilization effort and the ceded lands were used by the military (not white settlers). “In the 1940s, the U.S. government seized approximately 342,000 acres of the Pine Ridge Reservation in South Dakota for a bombing range to train WWII pilots. The land seizure forced 125 Oglala Sioux families to sell their farms and ranches for three cents an acre” (Featherman-Sam in Gaddy 1997). After being forcibly uprooted, the residents of this reservation have been forced to live in close proximity to an extremely dangerous bombing range. In fact, after the bombing range was decommissioned, cleanup was long delayed because these lands were deemed
too dangerous for clean up crews due to “the large number of unexploded ordnance there” (Gaddy 1997; see also Bartimus and McCartney 1991; Churchill 2002).}

We provided detail on the experiences of the Cherokee and the Sioux to highlight pervasive trends – the expropriation (often unlawful expropriation) of Native American lands and suppression of grassroots social movements. For both the Cherokee and the Sioux, and for tribes across the nation, the sovereignty and spiritual beliefs of Native Americans were overrun by the expansionistic policies of the U.S. government. Armed repression quelled armed uprisings and non-violent social movements -- irregardless of treaties, Supreme Court rulings, or the benign nature of the cultural practice in question. As conquered peoples living under a repressive regime, the voices of Native Americans were stifled when decisions concerning military bases were made. The U.S. military – the same organization that spearheaded a genocidal military campaign against Native Americans during the 19th Century – operated with a great deal of latitude during the military emergencies of the 20th Century. The military claimed lands and resources from all property holders – but these powers were magnified when dealing with Native American peoples. The lands ceded to Native Americans were the least attractive in the eyes of European-Americans and the rights of Native Americans were sharply circumscribed; these conditions make it likely that the more dangerous military installations are disproportionately located on or near Native American lands.

1 Access to information about individual tribes and installations may be found in a database maintained by the Department of Defense (2002), available online at: https://naets.usace.army.mil/web/tribe/tribe.cfm.
TREADMILLS OF PRODUCTION AND MILITARISM

The preceding discussion emphasized the unique experiences of Native Americans – the environmental dangers they confront have been generated by the military and they did not choose their place of residence. Although the EIF paradigm provides sufficient flexibility to accommodate the historical experiences of Native Americans, the dominant theme in the environmental justice literature diverts attention away from these experiences. Table 1 summarizes our extension of the EIF paradigm to better attend to geopolitical motives for generating environmental dangers and the role of political coercion in determining residency.

Table 1, about here

Table 1 is concerned with the spatial processes that distribute people relative to environmental “bads”. There are two major driving forces that mold residential location: the market and the polity. Likewise, there are two major processes through which environmental “bads” are generated and distributed: capitalism and militarism.

The ensuing discussion elaborates each of the four cells in Table 1, beginning with the “treadmill of production” (Schnaiberg 1980; Schnaiberg and Gould 1994) where toxins are generated through the actions of private firms in a capitalist economy and people selecting residency in the context of a market. This dimension of environmental justice figures prominently in the literature. In turn, we discuss the cells labeled “military-industrial complex” and “coercive polity” – using the “treadmill of production” as a point of reference. Finally, we identify the specific features of the “treadmill of
militarism.” Our research centers on only one cell in Table 1 -- the “treadmill of militarism,” but clarifying the unique features and the scope conditions of each type of environmental inequality helps us to more generally understand the generation of environmental inequality.

Treadmill of Production

The “treadmill of production” thesis (Schnaiberg 1980; Schnaiberg and Gould 1994) casts a long shadow over environmental sociology, including attempts to understand environmental inequality. The “treadmill of production” calls attention to capitalism’s expansionary tendencies – and to associated draws on natural resources and flows of toxic wastes (Schnaiberg 1980; Schnaiberg and Gould 1994). This term is not only rhetorically powerful, but it captures a fundamental dynamic of capitalism.

The treadmill of production places emphasis on an “economic growth coalition” of business, labor, and government that promote and defend economic expansion. The result is that capitalism creates a set of unwanted outcomes: natural resource withdrawals and waste additions. In many instances, the entire community, regardless of class or ethnicity, faces exposure to these dangers; however, due to institutional racism and class inequality, “the most vulnerable groups [are] the poor, unskilled laborers, and the skilled blue collar” residents (Gould, Schnaiberg and Weinberg 1996: 13). Thus, the treadmill of production points to the role of housing markets in the uneven distribution of people relative to environmental dangers. Housing markets distribute people according to purchasing power. To the extent that environmental dangers are recognized, housing in close proximity is less valued relative to housing in areas thought to be safe. The
treadmill of production is not naïve about racism. There are several sorting mechanisms through which the residential market is thought to operate; mainly it is suggested that race, class, or some combination of the two are the driving mechanisms behind residential discrimination (Massey and Denton 1993; Oliver and Shapiro 1995; Conley 1999). Thus, it is consistent with the treadmill of production thesis to expect racial minorities and poor peoples to be differentially affected in housing markets.

Where environmental “bads” are the result of capitalist production and the unequal exposure to these dangers is a function of housing markets, a form of environmental inequality is created that is consistent with the expectation of the treadmill of production. In their insightful research into the Silicon Valley work, Szasz and Meuser (1997, 2000) make compelling use of this framework. Similarly, Pellow (2002) makes good use of the treadmill of production framework to examine recycling in Chicago: consistent with a recognition that people exercise a degree of choice (obviously constrained by economic resources) – he demonstrates that even the least privileged exercise a measure of agency with regard to working and living near dangerous facilities.

We call attention to the value of recent research in this tradition to clarify our intent and our contribution. We are not challenging the value of the treadmill of production per se; rather we are identifying the scope conditions under which its value is highest. In the case of unexploded ordnance on or near Native American lands, neither of the conditions assumed by the treadmill of production are in place: these environmental dangers are created by militarism (not capitalism) and the location of Native American reservations were not “chosen” in the context of a market.
Coercive polity

Using the treadmill of production as a point of comparison, the environmental inequality associated in a coercive polity is similar in that capitalism generates the environmental “bads” but differs in that coercive (and often racist) state policies play a prominent role in determining residential location. South Africa, under apartheid, offers a stark example of this form of environmental inequality. The South African state deliberately and systematically “located black communities ‘downwind and downstream’ of polluting industries and poorly managed waste landfill sites” (Hallowes and Butler 2002: 71). Consider the case of South Durban. In the 1940s, South Durban committed itself to attracting industrial facilities and successfully attracted several large petrochemical facilities. As part of this industrial development, the city identified an industrial development area with adjacent “black residential areas providing a workforce” (Peek 2002: 207). Blacks in South Durban (living in the only neighborhoods open to them) made their lives in the shadow of more than 150 smokestacks and breathed air contaminated by extremely high levels of sulfur-dioxide. The creation and deposition of toxins in the environment was driven by capitalism, indeed the polluting facilities are owned by large multinational corporations. But the concentration of blacks near these environmental dangers was dictated by the coercive apartheid state (Peek 2002).

The distinction between environmental inequality generated by the treadmill of production and that caused by a coercive polity is often blurred. For instance, in contemporary South Africa, the legacy of apartheid looms large. The black residents of South Durban are now “free” to move away from the environmental dangers concentrated near traditional black neighborhoods. But their homes are of relatively little value (if
they own), and they lack the economic resources to buy into more affluent and less polluted neighborhoods. Although class disadvantage – not overt racism – continues to expose blacks to environmental dangers, the racist policies of apartheid insured that traditional black neighborhoods were disproportionately close to environmental dangers and left black families at an acute class disadvantage.

Environmental inequality in the United States also displays the imprint of the nation’s racist history. Roberts and Toffolon-Weiss (2001) recount the centrality of slavery and segregation in shaping environmental inequality in contemporary Louisiana. Slave owners located slave quarters adjacent to the plantation. In the 20th Century, sharecropping arrangements enforced by a racist state trapped blacks on these same lands. When Louisiana lured industrial firms to locate in the Mississippi Delta, these firms were attracted to the former plantation lands because it was easier to negotiate with a single landowner. As such, from New Orleans to Baton Rouge – a region referred to as the “chemical corridor” (Roberts and Toffolon-Weiss 2001: 3) – large petrochemical factories dump dangerous chemicals into the air, water and ground. Most of these factories are located on former plantation lands – and are surrounded by traditionally black villages and hamlets. As in South Africa, blacks are now legally “free” to move away. But the residential location of black families was put in place by coercive state policies not market choices, and this freedom is undermined by the lack of economic resources that are a direct result of slavery and segregation.

In the debate over persistent residential segregation, those most influenced by William Wilson (1978) place emphasis on the nation’s racist past – not contemporary racism. Sharp inequalities in wealth (especially equity in primary residence) place
minorities at a sharp disadvantage in housing markets (Oliver and Shapiro 1995). Blacks (and other minority populations) with sufficient economic resources are free to select where they live; the observed racial and ethnic segregation is perpetuated by close correspondence between class inequalities and race/ethnicity. Alternatively, Massey and Denton (1993) challenge the assertion that segregation is sustained by market processes. Instead, they emphasize the role played by state policies and the state’s acceptance of institutionalized racism in the real estate and banking sectors.

To the extent that residential choices are primarily a function of class processes, then attendant environmental inequality conforms to the “treadmill of production” processes discussed above. Where state-led racism plays the more prominent role, then the study of environmental inequality must attend to these racist policies and avoid exaggerating the role of markets in determining residential locations. Although racist policies have figured most prominently in this discussion, it is possible that coercive state policies influence residency on the basis of criteria other than race/ethnicity. As will be discussed in greater detail below, national security agencies have often commandeered property deemed to be important to national security. We are conducting research into the experiences of Native Americans; people for whom residential location has little to do with housing markets. Rather, the United States dictated the location of reservations to defeated Indian nations. Failure to stay on the reservation or defiance of U.S. policies by residents of the reservation resulted in incarceration and death. In turn, when expanding the military force and power in the 20th Century, national security agencies laid claim to Native American lands and properties near to reservations. Given this history, to
understand the fate of Native Americans, the emphasis must be on the state’s coercion, not on the free choices of actors in a market setting.

*Military-Industrial Complex*

Using the treadmill of production as the point of reference, the environmental inequality generated by the military-industrial complex differs with regard to the processes that generate environmental “bads.” Whereas capitalism provides an expansionary imperative in the treadmill of production, geopolitical competition among states – especially arms races and wartime mobilizations – push the state to expand the military-industrial complex and its impact on the environment. Over the past quarter century, a growing number of scholars and a large body of evidence suggest that wars and warmaking are of decisive importance – and that geopolitical dynamics cannot be reduced to domestic dynamics and structures (Giddens 1985; Hooks and McLauchlan 1992; Mann 1986; Shaw 1988). As Mann (1988) points out, states – not firms and not classes – declare and wage wars. Moreover, wars are typically fought to accomplish geopolitical, not commercial objectives. Under capitalism, firms often profit from war (sometimes scandalously so) and, in some instances, states wage war to protect commercial interests. Nevertheless, it is a gross distortion of the historical record to assert that warmaking is derivative of capitalism or that economic elites are in command of the state’s geopolitical agenda. Recognizing the distinct logics of capitalism and militarism, Tilly (1990) refers to a process of “negotiated accommodation” to capture the give and take between the state and prominent economic institutions and actors. The United States offers a case in which the state secured the resources to pursue geopolitical objectives in
exchange for a generous accommodation of the dominant class at home (Friedberg 1992; Hooks and Luchansky 1996).

Geopolitical competition creates expansionary dynamics. Whereas corporations increase production in order to increase profits or market shares, states increase the size and lethality of military forces in order to fend off or subordinate rival states. Coming from very different theoretical backgrounds, E.P. Thomson ([1980] 1982), Martin Shaw (1988), Martin Kolko (1994), and Michael Mann (1988) each point to the distinctive spiral of arms races and military mobilizations. From 1800 to 1950, in the United States and other nations, there was an exponential growth in the size of armed forces (expressed in absolute size and as share of total population), a deliberate inducement of technological innovation designed to enhance the reach and lethality of weapons, and a diversion of a large share of the national economy to warmaking (Van Creveld 1989). In the post-World War II era, the emphasis on science and capital-intensive weaponry has resulted in a relative decline in the number of soldiers and in the share of industrial output diverted to warmaking (Shaw 1988). Nevertheless, in the United States, approximately 10 percent of the gross national product was consumed by the Department of Defense throughout the 1950s (Hooks 1990). Even as the U.S. adopted a laissez faire posture in many aspects of economic governance -- the state has left its mark on business practices and the products consumed in the defense sector (Markusen and Yudken 1992).

By the same token – and of direct concern for understanding the spatial distribution of environmental “bads” – the state has been the central actor in determining
the location of defense facilities.² Markusen et al. (1991: 26-27) reject "old-fashioned geographical location theory" that ignores or subsumes defense-related investments. Instead, they contend that the most important factor in the location of military bases and defense industries has been "the United States' mission, the vision the President and Pentagon top brass share about the nation's global role. As this vision has changed -- from isolationism to global conflict to cold war [and to a war on terrorism] -- so has the basic philosophy of the right strategic response." When studying World War II mobilization, Hooks (1994b) found that the factors influencing the location of wartime investments varied by sector. Specifically, despite extraordinarily large investments in the steel industry (a civilian industry), the state’s investments were concentrated in the prewar steel centers (thereby reinforcing the extant and commercially-driven concentration of this industry). In contrast, the factors commonly found to predict the location of steel and other commercial industries had little influence on the state’s decision to locate military bases. Instead, these facilities were built in locations associated with the logistic and strategic demands of simultaneously fighting in Europe and the nation’s first war in Asia. Finally, in the aviation sector (an industry dominated by private firms that were highly dependent on defense sales) showed both commercial and strategic influences. That is, investments were directed toward centers with an extant manufacturing base, especially those cities in which aircraft firms were headquartered.

² Fox (1971) explores the manner in which geopolitics agenda influenced overland transportation in early modern Europe. In a similar vein, van Creveld (1989) examined the state's role in building and maintaining 19th Century telegraph and railroad arteries.
Nevertheless, following strategic planning priorities, sizeable investments were made in the interior of the country (protected by the Appalachian and Rocky Mountains).

The distinctiveness of the military-industrial complex is also reflected in the creation and management of environmental “bads.” In some instances, the toxins deposited by defense facilities are identical to those found in the civilian sector. Most notably, large quantities of petroleum are stored at army bases, shipyards and airfields. Where storage tanks leak (and many have) the resulting pollution is comparable to civilian petroleum leaks. But the military also creates and stores products designed to kill people. These highly toxic materials (nuclear, chemical and biological weapons) and the chemicals used to create them pose extraordinary dangers. Even conventional weapons contain highly toxic chemicals that damage the environment when leached into the ground and water. Not only does the military create and store the most dangerous materials known to humankind, but national security concerns give rise to a very different organization to monitor and remediate defense facilities. For active facilities, military personnel conduct assessments and develop plans for remediation. Whereas the public’s right to know is an over-riding norm in civilian waste-sites, the release of information about defense facilities is censored depending upon national security considerations (see Jacob 1992; Shulman 1992; see also U.S. Department of Defense 2000, 2001a).

In the United States, geopolitics has influenced the location of military bases and munitions factories – but the state’s coercion typically stopped at the gates of the factory, shipyard, airfield or military base. That is, national security concerns have rarely been extended to displace the functioning of housing markets in the residential areas around defense facilities. Residents were free to move away, but those with fewer economic
resources frequently found themselves unable to move away from a dangerous facility. Thus, although the dynamics that generated the environmental “bads” are distinct, the processes that place some individuals at disproportionate risk were often similar to those characteristic of the treadmill of production.

**Treadmill of Militarism**

The term “treadmill of militarism” reflects our debt to the treadmill of production for drawing attention to expansionary dynamics that result in the creation and deposition of toxins in the environment. But this terminology also reflects the specificity of the phenomena we examine and the importance of looking beyond capitalism and markets (including those markets distorted by institutional racism) to understand the full range of environmental inequality. Militarism and coercion have played a pivotal role in all aspects of the Native American experience. With regards to environmental inequality, the treadmill of militarism – like the military-industrial complex – is marked by the influence of geopolitics in the spatial distribution of environmental “bads.” This type of environmental inequality is also marked by a coercive (and often racist) state through which vulnerable populations are forced to live in proximity to dangerous facilities.

Erik O. Wright provides an insightful discussion of non-economic forms of oppression:

In the case of nonexploitive oppression, the oppressors would be happy if the oppressed simply disappeared. Life would have been much easier for the European settlers in North America if the continent had been uninhabited by people. Genocide is thus always a potential strategy for nonexploitive oppressors…. The contrast between North America and South Africa in the treatment of indigenous peoples reflects this difference poignantly: in North America, where the indigenous people were oppressed (by virtue of being coercively displaced from the land) but not exploited, genocide was the basic
policy of social control in the face of resistance; in South Africa, where the European settler population heavily depended upon African labor for its own prosperity, this was not an option (Wright 1997: 11-12).

It is not only the case that exploitation was not the dominant form of oppression, but the areas in which Native Americans are concentrated is characterized by relatively low levels of economic activity and relatively few employment opportunities.

For those emphasizing the treadmill of production, the state does not directly benefit from environmental inequality; but it promotes regional growth (Szasz and Meuser 2000) and the profitability of large corporations (Pellow 2000). For Pellow (2000: 594), this facilitative role has become pronounced in recent years, accelerated by globalization. However, the actions that concern us preceded this recent wave of globalization and were not pursued for the sake of corporate profitability. During a time of war, the state exercises expansive property rights and uses these powers to acquire land and other resources. Military bases were built and operated in the name of national security; national security planners were concerned with strategic planning and with the secrecy and security of military operations (Hooks 1994a).

Over the first 150 years of its existence, the United States was exceptional among the world’s leading powers because the “backbone of the American army was a locally based militia system” (Skowronek 1982: 86). Its standing army and professional officer corps were modest when compared to the European powers of the 19th Century. However, the demographic, technological, and logistical advantages enjoyed by the United States -- coupled with the devastating impact of Old World diseases -- overwhelmed Native American resistance as the nation expanded from the Atlantic to the Pacific (Diamond 1999). “It is generally supposed that the American ideal is peace. But
unfortunately for this high-school classic, the U.S. Army, since 1776, has filched more square miles of the earth by sheer military conquest than any army in the world, except only that of Great Britain” (Fortune Magazine in Mills 1956: 177). Even if the military was less professionalized than the great powers of Europe, through a succession of 19th Century wars, the United States exerted its claim over the lands of North America. Native American peoples were forcibly relocated to much smaller – and in the eyes of European-Americans – unattractive (if not useless) tracts of land.

In their study of Silicon Valley, Szasz and Meuser (2000) emphasize the inexorability of economic growth and resulting ecological harm. In the 19th Century, the westward expansion of the United States – and the accompanying displacement of Native American peoples – was also inexorable. While capitalism contributed to this expansion, the conquest of North America was propelled by demographic and geopolitical dynamics. This expansion was in large measure a statist project to prevent a geopolitical threat to the young nation’s west. That is, the United States was very concerned that a European power would conquer and control the lands west of the Appalachian Mountains and subsequently west of the Mississippi River.

In the 20th Century, the military’s claims on economic and natural resources grew exponentially – as did the lands that were damaged by military activities (Jacob 1992; Shulman 1992). As the United States ascended to a position of international military hegemony, the inexorability of military expansion was driven by geopolitical competition and arms races – not the voraciousness of capitalism. As it fought two global wars, the United States built and maintained a military force of unmatched potency. The expanse of lands controlled by the military and the intensity of the land use (i.e., the
destructiveness of materials stored and deployed on these lands) increased sharply. For example, in 1940 as the nation began to mobilize for World War II, President Roosevelt created with the stroke of his pen the single largest gunnery range in the world (Loomis 1993). Originally known as the Las Vegas Bomber and Gunnery Range, now known as Nellis Range, this gunnery range measured 3.5 million acres.

This history of military expansion illustrates the idea that different ethnic groups experience different types of environmental inequality (Getches and Pellow 2002). Native Americans as a byproduct of the treadmill of militarism experience the impacts of extraction of natural resources while also the testing and storage of the weapons those natural resources built. In a strange paradox then, Native Americans experience both the front end (extraction) and the back end (weapons testing, storage) of these environmental hazards (Pellow 2000). Further exhibiting the uniqueness of the Native American experience with respect to the military is the fact that Native Americans are the only minority population affected by environmental inequality in the United States with a claim of sovereignty. Though the history of this tribal sovereignty is inconsistent (Fredericks III 1999) it can largely be described as one of “dependent sovereignty” (Krakoff 2002). This adds another layer to our conception of how environmental inequality affects Native Americans as on many occasions coercion superceded legal treaties in the spatial distribution of Native Americans.

Political sociology has great potential to contribute to the study of environmental justice. In some instances and for some types of environmental degradation and risk, the role of the state – especially its geopolitical and military activities – are of profound importance. But this potential has yet to be realized. Ironically, because the challenge
has been to show that militarism is not derivative of capitalism, political sociologists have emphasized positive-sum dynamics and have downplayed the manifest destructiveness of war (for a recent review and criticism see Hooks and Rice forthcoming). Wars have not only continued to be destructive, but the wars of the 20th Century have been unprecedented in their ferocity and lethality (Tilly 1990). State theory, especially approaches that emphasize the state’s geopolitical activities, enrich and extend environmental sociology. But the study of war must examine the destructiveness of war and the unevenness of “sacrifices” for national security.

Methods and Processes

Relying on qualitative methods, Kuletz (2001) makes a compelling case that much of the western United States is the site of environmental violence, i.e., “nuclear colonialism.” But qualitative methods cannot determine if these dynamics are unique to nuclear weapons and the Desert Southwest. Our research examines the degree to which the U.S. military poses a pervasive danger to Native Americans. Specifically, we examine the degree to which the U.S. military systematically located ordnance and toxic materials in proximity to Native American lands. We have at our disposal several measures of environmental risk, and we conduct several analyses of the dangers that military bases pose for Native American peoples (see below for details).

In the study of environmental justice, many scholars have turned to qualitative methods due to dissatisfaction with quantitative studies that document a non-random distribution of toxic facilities – without providing a viable narrative and without advancing a satisfactory account of causal processes that generate this patterning (Szasz
and Meuser’s 1997; see also Abbott 1990; Orum, Feagin, and Sjoberg 1991).

Nevertheless, it is a mistake to pit qualitative versus quantitative methods as mutually exclusive and competing alternatives. Concerning the environmental risks to which Native Americans are exposed, Kuletz (1998, 2001) provides detailed, contextual evidence of the nuclear weapons complex. We ask a different question: Is there a statistically significant relationship, on a national scale, between the location of Native American lands and unexploded ordnance? We expect to find that a disproportionate number of the most dangerous military facilities are located near Native American lands.

Should our expectations be met, these findings would complement qualitative studies and set the stage for additional studies that examine multiple viewpoints, historical processes, and the transformation of environmental inequality over time.

We concentrate on unexploded ordnance because it is very likely that those residing near a military base would find these materials to be dangerous and noxious. Throughout the 20th Century, local growth coalitions often mounted campaigns to attract and retain military installations (see Markusen et al. 1991). In a number of instances, these facilities left a toxic legacy. The environmental legacy is typically due to problems related to the storage of petroleum products, chemicals used to maintain military equipment (e.g., solvent sprayed on wings of aircraft to prevent icing), and other problems that were unanticipated by nearby residents (Shulman 1992). These are the dynamics anticipated by Pellow (2000) when he reminds us that exposure to environmental risks cannot be understood in terms of a simple perpetrator-victim scenario. Rather, even if some nearby residents resisted, a number of local stakeholders enthusiastically recruited military installations (Markusen et al. 1991).
Unexploded ordnance is found when land has been used for artillery and bombing ranges and for military exercises using live ammunition. Without imposing current environmental concerns on stakeholders acting decades ago, it is reasonable to assume that noise from explosions and the immediate physical danger of live ammunition would make these military installations unattractive – even if nearby residents were unaware of the long-term dangers posed by chemicals leached by unexploded ordnance.⁴

DATA AND METHODS

The environmental dangers of military installations have been documented (Jacob 1992; Renner 1991; Shulman 1992; Siegel, Cohen and Goldman 1991) – our contribution is to investigate the linkages between these dangers and environmental inequality. Many quantitative analyses have demonstrated that the poor as well as racial and ethnic minorities experience a disproportionate exposure to toxic facilities and materials (see Szasz and Meuser 1997; Mohai and Bryant 1992 for comprehensive reviews). While extensive, the extant literature tends to focus on urban areas and the minority populations concentrated in them. As a consequence, we were unable to identify any studies of

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⁴ In future research, we will pursue historical research into local awareness of the dangers posed when live ammunition was used and the degree to which this contributed to local resistance to the construction and maintenance of military bases. As part of this archival research, we will also examine the degree to which military planners deliberately selected areas on or near to Native American lands to locate dangerous and unwanted military bases and missions. For now, we are making the defensible assumption that people did not want the land near to them used for target practice.
environmental justice that provides a comprehensive examination of Native American lands and the dangers posed by national security installations.

Due to national security restrictions, it is difficult to gain full information about the environmental dangers posed by military bases that are open and functioning (see Jacob 1992; Kuletz 1998; Shulman 1992). However, for closed bases that are being returned to civilian use, the Department of Defense is required to provide full disclosure and undertake remediation. Beginning in the 1980s and accelerating in the 1990s, the United States has closed hundreds of military bases and returned them to civilian purposes (these bases are referred to as Formerly Used Defense Sites, hereafter FUDS). The Army Corps of Engineers, the agency charged with preparing them for civilian use, made available to us comprehensive data on each facility -- including the environmental dangers they pose -- closed over the past quarter of a century. At our request, the Army Corps of Engineers also generated a report providing information on the proximity of Native American lands to each FUDS installation.

Because many military bases and a large portion of Native American lands are located in rural areas, our unit of analysis must be one that allows investigation of both metropolitan and non-metropolitan areas. As is the case with many prominent studies of regional processes, this study uses data for the approximately 3100 counties in the contiguous 48 states (Hooks and Bloomquist 1992; Lobao 1990; Lobao, Rulli and Brown 1992).

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4 We are grateful to the Army Corps of Engineers, especially to Grady May, for cooperation and assistance that went beyond the letter of the law. The assistance in acquiring data and in explaining the reporting and data available through the Army Corps of Engineers was invaluable.
1999; Tolbert, Lyson, and Irwin 1998). Counties provide comprehensive national coverage, spanning both metropolitan and non-metropolitan populations. They offer advantages for comparative, cross-time analyses, because their boundaries, unlike cities and labor markets, are highly stable. Because counties are smaller than states, they are less likely to obscure within-areal differences and the resulting loss of information.

**Dependent Measures**

Based on reports provided by the Army Corps of Engineers, we developed two dependent measures: 1) the count of sites with unexploded ordnance deemed to be extremely dangerous, and 2) the count of sites thought to pose little or no danger. Given our unit of analysis, these dependent measures refer to a count of sites in a county. Because the highly skewed distribution of count data violates the assumptions of ordinary least squares, we employ negative binomial regression (Allison 1999; Long and Freese 2001). To determine the dangerousness of sites with unexploded ordnance, we make use of the risk assessment code (RAC) – a rating assigned by Army Corp of Engineer investigators. The RAC score is based on two factors: hazard severity and hazard probability. The value assigned to the “hazard severity” is based on the types and quantities of materials and the inspector’s assessment of the “worst credible event” that could occur (U.S. Army Corps of Engineers 2000: B-1):

- **Catastrophic:** The worst-case scenario is possible if nuclear, chemical or biological ordnance are found.
• **Critical**: Small quantities of nuclear, chemical and biological ordnance or large quantities of high-powered conventional ordnance are likely to yield a hazard severity score in this range.

• **Marginal**: Materials that might yield this assessment include practice grenades and land-mines, flares, and other materials that pose an intermediate danger.

• **Negligible**: This rating is given if only less volatile explosives (e.g., small arms ammunition) are found.

• **None**: This rating is assigned only if none of the more dangerous materials are found (U.S. Army Corps of Engineers 2000: Appendix B).

The RAC score also assesses the probability that a hazard will harm people or ecosystems (i.e., the likelihood that an explosion will occur or that dangerous materials will be released into the environment). The degree to which the FUDS site is readily accessible to the public also influences this score. The hazard probability estimate is sensitive to the proximity of buildings, especially public buildings (e.g., schools and hospitals) (U.S. Army Corps of Engineers 2000: Appendix B). Given the low population density characteristic of Native American lands, sites in close proximity to Native American lands are likely to receive a relatively low score on this measure: “DoDs cleanup programs embrace a relative framework … and often do not consider tribal-unique factors, such as subsistence consumption, ceremonial use of certain plants and animals, and the low population densities that exist on many reservations. As a consequence, DoD sites on Indian lands often receive low relative-risk scores, which means that cleanup at these sites may be deferred for many years” (U.S. Department of Defense 2001b). Because the methodology employed by the Department of Defense understates the threat
posed by ordnance in and near Native American lands, our dependent measures are quite conservative.

Inspectors combine information on the hazard severity and hazard probability to generate a RAC score (from 1 to 5). This score determines the priority given to environmental containment and restoration. A score of one (1) calls on the U.S. Government to “expedite” the intervention or risk a catastrophe. Scores of 2 and 3 maintain a sense of urgency and call upon the U.S. Government to take steps to control and remediate the site. A RAC score of 4 indicates that remediation is required, but the sense of urgency is diminished relative to lower scores; a RAC score of 5 indicates that no further action is needed (U.S. Army Corps of Engineers 2000: B-8). To create a count of sites with unexploded ordnance deemed extremely dangerous, we summed the total number of sites with a RAC score of 3 or less. The Army Corps of Engineers places a priority on assessing those sites thought to pose an immediate danger; given limitations of time and staffing, there is often a lengthy delay in completing an assessment at less dangerous sites. On the assumption that those sites for which the RAC assessment is incomplete are among the least dangerous, we have included them when developing a count of sites thought to be less dangerous, i.e., we summed the count of sites with a RAC-score of 4 or 5 and those sites for which the assessment is incomplete.

Even a site assigned a RAC score indicating little danger (i.e., a score of 5) was not guaranteed to be safe. For instance, when we asked an Army Corps of Engineers contact if he would drive a bulldozer over a site at which unexploded ordnance had been found but it was now thought to pose little danger, his answer was an emphatic no. He went on to relate incidents in which children were killed and maimed when playing on such sites.
Native American Lands

To assess the threat of unexploded ordnance to Native American lands and people we developed a measure of the acres owned by Native American tribes (U.S. Department of the Interior 1997). Native Americans control land in 332 counties, ranging from 4 acres to nearly 5 million acres. To avoid heteroskedasticity, we employed the natural log of acres owned by Native Americans.

Control Variables

We employed several variables to control for other factors that may influence the location of unexploded ordnance: the number of military installations created during several historical periods (pre-Civil War [1776-1850], Civil War era [1851-1875], late-18th Century [1876-1900], World War I era [1901-1925], World War II era [1926-1950], and Cold War era [1951-1975]), total population in 1940 (natural log), farm population in 1940 (percentage), and total area in 1940 (square miles, natural log).

Past research suggests that the factors emphasized by the dominant sociological traditions (social ecology and critical approaches in the Marxist and Weberian tradition) provide only a poor account of the location of military facilities (Hooks 1994b). Instead military installations have been located according to the strategic and logistic requirements identified by defense planners (Markusen et al. 1991). As such, we have identified where military facilities were built over the course of U.S. history. We expect to find that the most dangerous unexploded ordnance is found at military installations established during the 20th Century. The ordnance materials used in the 20th Century are
qualitatively more dangerous and were produced in far greater quantity. That is, in the course of mobilizing for World War I, World War II and the Cold War, the United States produced vast quantities of highly potent conventional weapons. Moreover, the United States has led the world in the production of esoteric and extraordinarily toxic nuclear, biological and chemical weapons (commonly referred to as weapons of mass destruction). At facilities established in the 20th Century with the express purpose of storing and testing these extremely lethal ordnance, a portion of this ordnance remained when the base was decommissioned.

We expect to find that total population and total area are positively associated with the presence of unexploded ordnance. Total population controls for the tendency for facilities that stored and transported ordnance to be located in urban centers. In many instances, facilities located in urban areas manufactured ordnance and related goods, in other instances these facilities were part of military installations (shipyards and arsenals) that were assigned responsibility to store and distribute ordnance. Because a large quantity of ordnance passed through facilities located in the more populated counties, it is likely that some ordnance materials would remain after these facilities were closed. We anticipate finding that the total area in a county is positively associated with the presence of unexploded ordnance. In part, large counties have more space and are therefore at greater risk. But it is also the case that larger counties tend to be in western states and many of these counties have a low population density – both characteristics of areas that attracted a disproportionate share of military base expansion. We include farm population (percentage) to identify counties in which agricultural production is an important element of the regional economy. Agricultural regions are less likely to attract
military investments than either urban areas or rural areas that do not support agricultural activities. Farmers and their elected representatives can mount effective resistance to displacement for military purposes. As noted earlier, rural areas unfit for agriculture are seen to be not “much good for anything but gunnery practice” (quoted in Kuletz 2001: 251). Thus, agricultural land reduces the likelihood of a military base (and unexploded ordnance) being located in a county because the U.S. military is less likely to select such an area and because local resistance to such land-use is likely to be higher.

The siting of a military facility in a county is influenced by the larger region in which it is located. We employed the Bureau of Economic Analysis (BEA) economic area to control for the larger context. BEA economic areas are clusters of counties: "Each area [encompasses] the place-of-work and place-of-residence of its labor force" (U.S. Department of Commerce 1977: 1). That is, based on commuting and trade patterns, the Department of Commerce identifies the metropolitan counties and surrounding hinterland of regions throughout the United States. The Department of Commerce has identified one hundred eighty one economic areas in the contiguous U.S. states. The nesting of counties in larger areas creates a data set that is unbalanced due to different number of counties within each area (Nielsen and Alderson 1997). This variability in the data introduces potential heterogeneity bias, where unmeasured variables that are county-invariant within a state may bias the effects of covariates of interest. We follow Lobao, Rulli, and Brown (1999) in modeling the area-specific intercepts as fixed effects, by inclusion of 180 economic areas (given a total of 181).
RESULTS

To provide a context for multivariate analyses, we present summary data on the presence of toxic waste and unexploded ordnance in U.S. counties.

Table 3, about here

Table 3 demarcates four groups of counties. Among counties without Native American lands, urban and rural counties are identified. As population in 1940 is employed in the ensuing multivariate analyses, this variable is used to distinguish between urban and rural counties. Among counties in which Native American own land, a distinction is made between those in which Native American are modest (i.e., fewer than 23,500 acres) and those counties in which the holdings are sizeable (greater than or equal to 23,500 acres).

Urban Counties without Tribal Lands. Arguably, these counties are most likely to absorb the toxic residue of the treadmill of production. And Table 3 lends support to this supposition. That is, twenty-one percent (21%) of these counties house one, and another twenty-six percent (26%) of these counties house multiple non-federal National Priority List (NPL) sites. This represents a far higher exposure to these toxic sites than any other group of counties. Urban counties are also likely to contain unexploded ordnance considered less dangerous: fifteen percent (15%) house one site and forty-six percent (46%) house multiple sites. In addition, one (10%) or more (5%) sites with unexploded ordnance considered to be extremely dangerous are also found in these urban counties. This represents a relatively high rate of exposure. For the most part, the
unexploded ordnance found in these counties – whether more or less dangerous – was a consequence of military storage and transport being concentrated in these urban counties.

Rural Counties without Tribal Lands. The majority of counties (2350) are rural counties with no tribal lands. While these counties face some exposure to the treadmill of production (mining, landfills, and manufacturing), the rate of exposure is lower than any other group of counties. Similarly, unexploded ordnance is found in these counties, but the rate of exposure among these counties is the lowest of the groups included in Table 3.

Counties in which Native Americans Own Fewer than 23,500 Acres. In a report entitled *A Quiet Crisis*, the U.S. Commission on Civil Rights (2003) calls attention to poorly documented but troubling trends among Native Americans. While the primary focus of this report is on systematic underfunding of federal programs devoted to social welfare, health and education – Table 3 suggests that this quiet crisis extends to the exposure to environmental risk as well. When compared to urban counties, these counties are less likely to house NPL sites or unexploded ordnance. However, when compared to rural counties without Native American lands, the rate of each type of exposure is dramatically higher. Thus, Table 3 lends support to the studies that have called attention to this type of environmental exposure (see Akwesasne Task Force on the Environmental Research Advisory Committee 1997; Churchill 2002; Gedicks 1993; Grinde and Johansen 1995; LaDuke 1999; Sachs 1996; Small 1994).

Counties in which Native Americans Own More than 23,500 Acres. As with the preceding group of counties, counties in which Native Americans own a large number of acres display a heightened exposure to each type of environmental risk. Whereas exposure to NPL sites is intermediate (i.e., greater than rural counties without tribal lands
and less than urban counties), the exposure to unexploded ordnance is unambiguously high. When considering the less dangerous unexploded ordnance, twenty-two percent (22%) house one site and thirty-seven percent (37%) contain multiple sites. The exposure to extremely dangerous unexploded ordnance is the highest of any group of counties. Eight percent (8%) of these counties contain one such site, and another eight percent (8%) percent are home to multiple sites with extremely dangerous unexploded ordnance.

To focus on the treadmill of militarism, Table 4 presents analyses of the association between unexploded ordnance and Native American lands.⁶

Table 4, about here

Table 4 presents models for two dependent measures: the count of extremely dangerous sites and the count of sites deemed less dangerous. For the most part, the control variables played a similar role in both estimations. Farm population (negative) and founding of bases during World War II and the Cold War (positive) played a significant role in both estimations. Total population and total area achieved statistical significance.

⁶ Using the count of non-federal National Priority List sites as the dependent measure, we performed analyses comparable to those reported in Tables 4 (see below). We found no significant relationship between Native American land ownership and the count of NPL sites. It is not surprising that no significant relation was found. The zero-order correlation between Native American lands and the count of non-federal NPL sites is 0.03 (results available upon request).
(positive) in the estimation of the less dangerous sites, but these variables were not statistically significant when modeling the count of extremely dangerous sites. We did not find a statistically significant relationship between Native American lands and the count of less dangerous sites. However, net of control variables, Native American lands are positively associated with the count of extremely dangerous sites. The more acres owned by Native Americans, the greater the number of sites. With Native American lands measured as the log of total acres, this finding suggests that with each 100 acres of Native American lands, the count of extremely dangerous sites increases by approximately 6 percent.

The reader is cautioned that six counties are not included in these models because the estimation failed to converge when they were included. These six counties differed from the 3,130 included in the analysis in a number of respects, including the number of sites for which the Army Corps of Engineers provides no information. Recall that the Army Corps of Engineers reports on sites for which assessments are not completed, and these sites are included in the count of the less dangerous sites (see above). Over and above these sites for which the assessment is incomplete, there are a number of sites for which no information is available. The 6 counties excluded from the analysis, reported an extraordinarily large number of sites with missing assessment data (greater than 8 standard deviations above the mean).

The excluded counties are located in two states: California (Imperial, Los Angeles, San Bernardino, and San Diego), and New Mexico (Chaves and Luna). At a minimum, the analyses summarized in Table 4 cannot be generalized to these 6 counties.
The more important question is if the trends in evidence in these counties run counter to the findings presented in Table 4. To address this issue, we prepared Table 5.

Table 5 reveals that the 6 excluded counties are (on average) larger, have a larger population, and a smaller portion of the population are farmers. In addition, three of the six counties (50%) contain Native American lands (compared to 11 percent of the other 3,130 counties) and Native American own far more land in the 6 excluded counties.

The most dramatic contrast concerns the concentration of military facilities—especially those established or expanded in the 20th Century. During World War I, the number of installations created or expanded in the six excluded counties averaged 5.83; during the World War II and Cold War era, the comparable measures for these six counties were 32.5 and 23 respectively. Two of these six counties experienced an expansion of military facilities during World War I—military installations were expanded in five of the six counties in both World War II and the Cold War. Military activity in the remaining 3,130 counties was much lower. On each measure, the average military expansion is far lower. Moreover, only 89 counties of 3,130 counties (approximately 3%) experienced growth in military installations during World War I, 363 counties (or 11 percent) experienced growth, and military installations were created or expanded in 784 (or 25%) of these counties during the Cold War.

These six counties are also home to a large number of dangerous sites. The average number of dangerous sites for the 6 excluded counties was 10.5 – but the average
for the remaining 3,130 counties was 0.12 (i.e., the average for the 6 excluded counties was over 80 times larger). The very high concentration of military facilities on the Pacific Coast and the Desert Southwest has been documented by a number of scholars (see for example, Markusen et al. 1991; Nash 1985; Scott 1993). Given that a high number of dangerous sites and Native American lands are found in these counties, the exclusion of these six counties does not detract from the trends reported in Table 4. On the contrary, even after dropping 6 counties in which dangerous sites and Native American lands are found at levels far above the national average, our research suggests

In addition to the results summarized in Table 3, we conducted a number of additional diagnostic analyses. Because the unit of analysis is spatial, we conducted analyses that used the Land-Deane technique to control for spatial autocorrelation (Land and Deane 1992). These analyses indicated that spatial autocorrelation did not distort these analyses and corroborated the results summarized in Table 4, i.e., the presence of sites considered extremely dangerous are associated with Native American lands. These analyses also provided weak evidence that collectively the 6 excluded counties exerted a strong influence on the estimations. The association between Native American lands and extremely dangerous sites was positive and statistically significant whether or not these counties were included. However, the standard error of the estimates was larger with these 6 counties included. We have reported negative binomial regression in Table 4 because this estimation is the more appropriate when the dependent measure is a count. However, because the findings persist across several estimation strategies, we have greater confidence in the robustness of these findings.
that Native Americans throughout the country experience a disproportionate exposure to
the most dangerous unexploded ordnance.\textsuperscript{8}

\textbf{CONCLUSION}

The eastern United States underwent “ethnic cleansing” in the early 19\textsuperscript{th} Century. With
the Cherokee’s “Trail of Tears” as an evocative example, Native Americans were
forcibly removed from ancestral lands and the survivors relocated across the Mississippi
River (Newton 1992; Wilkins 1986). As the United States expanded across the continent,
Native Americans were relocated to reservations -- on lands deemed undesirable by

\textsuperscript{8} Although Table 5 allays concerns that trends in the 6 excluded counties run counter to
trends in the remaining counties, the failure of negative binomial regression to converge
when they are included does raise questions about model specification. To explore this
possibility, we transformed the count variables that serve as dependent measures (log and
square-root transformation) and performed alternative estimations (results available upon
request). These alternative specifications included all counties and generated results that
corroborate those presented and discussed in the text. That is, over several measurement
and estimation regimes, we found that the number of sites with extremely dangerous
unexploded ordnance is positively and significantly related to Native American lands.

We chose to present the negative binomial regression findings in Table 4 because the
dependent measure (count of sites) is more accessible to the reader and because it is
possible to express the coefficients as the percentage change in the count. We consider
this to be a conservative choice because we dropped six counties with an extremely large
concentration of dangerous sites and disproportionate Native American land holdings.
European-Americans. In the 20th Century, the United States fought and won two global wars and prevailed in a sustained Cold War. The vast lands of the western United States were attractive to military planners because of their remoteness and low population density. As such, the United States dramatically expanded its military bases during the 20th Century, bases were built and expanded on and near the lands that had been ceded to Indian nations. Moreover, the U.S. military has developed, tested and deployed weapons of unprecedented toxicity. The toxic residue can be found on the 100s of bases that have been closed in recent decades. Our research suggests that the spatial overlap between the forcible relocation of Native Americans and the expansion of the U.S. military has frequently placed Native Americans in close proximity to extremely dangerous sites.

These substantive findings are important, but this research has also demanded a critical assessment and extension of insights we gained from environmental sociology and political sociology. A number of studies have demonstrated cases in which Native Americans face exposure to environmental risks (Grinde and Johansen 1995; Bullard 1994; Gedicks 1993; Small 1994; Sachs 1996; The Akwesasne Task Force on the Environmental Research Advisory Committee 1997; Marshall 1996; Roberts and Toffolon-Weiss 2001). Our research lends support to these case studies and provides evidence that this exposure is systematic in the realm of military installations. Our research also offers a reminder that research into environmental justice and injustice must look beyond cities and the minorities living within them. Moreover, we challenge the assumption that exposure to environmental dangers is driven solely by capitalism by specifying the scope conditions under which it is most likely to occur. The production, distribution, and testing of ordnance and other toxic materials handled and stored by
national security agencies is driven by geopolitics and arms races – these processes are not primarily capitalist in nature. There are aspects of militarism that are inexorable and expansive – but these are fundamentally geopolitical in character. The logic of arms races and the demands of strategic planning are over-riding factors in determining the distribution of dangerous military facilities and materials. For this reason, the environmental justice literature must consider the contingent interaction between capitalism and militarism. Generally, we embrace and extend the EIF framework by developing a strategy integrating political sociology and environmental sociology. In this case, we show that the parallel history of a policy of state-sponsored coercion coupled with a geopolitically motivated distribution of military facilities exposed Native Americans to a distinct and troubling type of environmental inequality.

Pellow (2000; see also Szasz and Meuser 2000) argues that environmental inequalities emerge historically and that they do so through the actions of multiple stakeholders. We concur, but the case of Native Americans calls for an important amendment to this argument. Native American resistance to environmental inequality was sharply constrained. Military planners of the 19th and 20th Century may have been overtly racists who deliberately concentrated dangerous military activities on or near Native American lands. It is also possible that the environmental inequality of 20th Century militarism was unintentional (i.e., the location of military bases was determined on the basis of logistic and strategic criteria – not racism). Still, decisions made in the 18th and 19th Centuries (i.e., the systematic removal of Native Americans to lands that European Americans found worthless) point to a history rich in intentionality and racism.
Kuletz (1998, 2001) demonstrates that Native Americans are disproportionately exposed to the nuclear weapons complex. We have shown that this exposure extends beyond nuclear weapons to include unexploded ordnance at sites across the nation. Kuletz (1998) contrasts the cultural framework of military planners to the framework of Native American peoples living on these lands. Future research conducted from the vantagepoint of Native American nations and peoples could examine the cultural conceptions and material consequences of the many military installations established on and near to Native American lands via the treadmill of militarism.
REFERENCES


Gaddy, Armon T., Jr. 1997. “Ellsworth EOD Heads Bomb Range Clearance Team.” *Air Combat News Service* (June 20, 1997), available online at:


Table 1: An Expanded Environmental Inequality Formation Paradigm

<table>
<thead>
<tr>
<th>SPATIAL DISTRIBUTION OF PEOPLE RELATIVE TO ENVIRONMENTAL “BADS”</th>
<th>PRODUCTION OF ENVIRONMENTAL “BADS”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market (choice as constrained by ability to purchase)</strong></td>
<td>Capitalism/commercial</td>
</tr>
<tr>
<td></td>
<td>Treadmill of production</td>
</tr>
<tr>
<td></td>
<td>Militarism/geopolitical</td>
</tr>
<tr>
<td></td>
<td>Military-industrial complex</td>
</tr>
<tr>
<td><strong>Polity (coercion prominent, often on basis of race or ethnicity)</strong></td>
<td>Coercive polity</td>
</tr>
<tr>
<td></td>
<td>Treadmill of militarism</td>
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</table>
Table 2:  Descriptive Statistics and Data Sources

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Measures: Count of Formerly Used Defense Sites (FUDS) and their Environmental Danger</strong></td>
<td></td>
<td></td>
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<tr>
<td>Count of sites with unexploded ordnance rated <em>extremely dangerous</em></td>
<td>Count</td>
<td>0.13</td>
<td>0.74</td>
<td>U.S. Army Corps of Engineers, report prepared for authors</td>
</tr>
<tr>
<td>Count of sites considered <em>less dangerous</em></td>
<td>Count</td>
<td>1.95</td>
<td>7.00</td>
<td>U.S. Army Corps of Engineers, report prepared for authors</td>
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<tr>
<td><strong>Independent Measures: Native American Lands and Control Variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Acres of Native American land</td>
<td>Acres, natural log</td>
<td>0.99</td>
<td>3.06</td>
<td>U.S. Department of the Interior, 1997</td>
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<tr>
<td>Total area, 1940</td>
<td>Acres, natural log</td>
<td>6.49</td>
<td>0.89</td>
<td>U.S. Department of Commerce, 1981</td>
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<td>Total population, 1940 (natural log)</td>
<td>Natural log</td>
<td>4.59</td>
<td>2.35</td>
<td>U.S. Department of Commerce, 1981</td>
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<tr>
<td>Farm population</td>
<td>Percentage of total</td>
<td>0.98</td>
<td>3.05</td>
<td>U.S. Department of Commerce, 1981</td>
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<tr>
<td><strong>Founding or expansion of military bases (count)</strong></td>
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<tr>
<td>Pre-Civil War (1776-1850)</td>
<td>Count</td>
<td>0.05</td>
<td>0.57</td>
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<tr>
<td>Civil War era (1851-1875)</td>
<td>Count</td>
<td>0.03</td>
<td>0.43</td>
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<td>Late 19th Century (1876-1900)</td>
<td>Count</td>
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<td>0.49</td>
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<td>World War I era (1901-1925)</td>
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<td>1.48</td>
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<tr>
<td>World War II era (1926-1950)</td>
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