

**Université de Lorraine, ERUDI, Master Mondes Anglophones
UE 803 – Civilisation**

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Subject:

To what extent were the “Three Plagues” of Native Americans in the 1950s—termination, relocation, and the development of US nuclear activities—part of a deliberate strategy of the United States government to solve, once and for all, their “Indian problem”?

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INTRODUCTION

Since the arrival of the Europeans in America, Native Americans have suffered an appalling history of invasions, military conflicts and broken Treaties, which led most of the surviving tribes to be progressively removed to reservations in the Southwest, often located on arid lands (Appendix 1, p. 20). In the 1930s, Franklin D. Roosevelt's "Indian New Deal" attempted to correct the mistakes of the past, the Indian Reorganization Act of 1934 being "the centrepiece of the reversal of public policy known as tribal restoration¹". World War II, however, saw the end of its federal funding, and in the 1950s, while Indians had to face new government policies of rapid assimilation through termination and relocation, the reservation lands were then coveted by governments and energy companies for the resources contained in their soil: coal, oil, and especially a mineral resource fundamental for military and public purposes: uranium. From the Cold War and the race for nuclear armament up to today's protests over the final repository of nuclear waste at Yucca Mountain, Native Americans have borne a disproportionate burden from US nuclear activities compared to the general population. Uranium mining and milling, atomic bomb testing and radioactive waste disposal have caused serious health issues among Indian Nations in the Southwest as well as disastrous environmental consequences on their lands².

In this essay, I preferred to investigate the three disasters faced by Native Americans during the 1950s—which may have fostered the Indians' fight for their rights in the following decades—rather than study the "Red Power" movement itself, and to assess if they belonged to a deliberate strategy of the US government to solve once for all the "Indian problem". While doing my research, it has been quite difficult to find objective sources: American history books, though giving much detail on the "Termination Era", did not provide information on nuclear activities in Indian reservations. Marienstras's book about Indian resistance in the US, though giving precious information about the exploitation of mineral resources in Indian reservations, showed the same bias as several articles and videos created by pro-Indian journalists and found on the Internet, which tend to victimize the Natives without describing some of the compensations offered or actions carried out by the government. Even if Gregory's academic paper "Better Dead than Red" also demonstrates a definite pro-Indian point of view, I am greatly indebted to it for pointing me towards interesting directions for my research.

¹ David Mauk and John Oakland, *American Civilization -- An Introduction*, p. 91

² Andreas Knudsen, 'Native American Bear the Nuclear Burden'.

I. NATIVE AMERICANS IN CONTEXT—UP TO THE 1950s

I.1 Historical context

During the colonial period, British settlers came in much greater numbers than other Europeans and primarily sought land, rather than trading partners or mineral riches—as did the French, for example. Relations between the Natives and the English were marked by distrust, resentment, and disastrous wars. According to Mauk and Oakland³, “a predictable sequence of events set the pattern for almost 300 years of contact”: when conflicts caused by trade disagreements or white settlements escalated to war, most of the time the Natives were defeated militarily and the settlers negotiated treaties based on a policy of forced separation to free territory for colonial settlement and to end violence. The natives were moved to distant lands (“reservations”), and colonial authorities promised to protect the rights of reservation Natives. Then colonists would squat on reservation land when it was no longer distant from colonial settlement, and colonial authorities would rarely act to limit settlement. Native Americans resented and resisted attempts to assimilate them. Thus, one cycle of violent conflict followed another, and Native Americans were continually pushed further west (see Appendix 1, p.20). “In outline, with the substitution of US for British authorities, this general sequence of developments continued into the early 1900s”⁴ and was later evoked as “The Trail of Broken Treaties” by Indian activists in the 1960s, an expression echoing the terrible “Trail of Tears” of 1838, when a quarter of the Cherokees “escorted” by federal troops and state militia to Indian Territory died of cold and lack of food.

Poverty and disease were the most prominent characteristics of US Indians in the early 20th century, at which time the Native American population was at its lowest ebb, less than a quarter of million people—a figure to be compared with the probable range of pre-European-contact North American population, which was between two and five million⁵. While the Indian population of the US increased only slightly between 1890 and 1950, it soared between 1950 and 1990, to reach in the 2020 Census 3.7 million people (self-identified as American Indian and Alaska Native alone), thus representing 2.9 % of the U.S. population⁶. According to Wilcomb E. Washburn (p. 403),

³ Mauk and Oakland, *American Civilization -- An Introduction*, p. 85

⁴ *Ibid*, p. 86

⁵ Wilcomb E. Washburn, ‘The Native American Renaissance, 1960 to 1995’, pp. 403 and 427.

⁶ <https://indiancountrytoday.com/news/2020-census-native-population-increased-by-86-5-percent#>

Even though the birth rate of the US Indian population is nearly twice that of the US as a whole, the largest portion of the Indian population growth in recent years has come from increased self-identification on the part of those who previously had not identified themselves as Indian or who, prior to the policy of racial self-identification established in 1960, had been identified by census-takers as other than Indian. Self-identification in the 1960s, 1970s, 1980s and 1990s was affected by ethnic pride and by the benefits increasingly accruing to identified Indians through programs administered by government, foundations, and educational institutions.

The larger Indian populations are located in the South and the West of the United States (Appendices 2 & 3, pp. 21 & 22).

In the 1920s started a policy of “tribal independence”, which, in a nutshell, consisted in granting Indian Nations some independence and self-management through the creation of tribal governments and the setting of Indian Courts under federal supervision and trusteeship⁷. In 1934, the Indian Reorganization Act (IRA) repealed allotment, which had been introduced by the Dawes Act of 1887, then blamed in the 1930s for the extreme poor health, poverty and low educational levels of Native Americans. The IRA also supported the return of considerable “surplus” land and allotment farms to communal ownership and provided federal funds for further adding to tribal lands. Each tribe could accept or—as the Navajo Nation did—reject the Act through a referendum. Despite the scepticism of tribal leaders, “long used to manipulation and coercion by Bureau of Indian Affairs bureaucrats”⁸, the Indian New Deal made effective progress towards providing social services, an economic base and self-government on reservations, until funding ended at the start of WWII.

I.2 The Natives in post-WWII America

After WWII, the United States began a new era. Though they had fought together a common enemy (the German Nazis), the US and the USSR, becoming rival superpowers, started a conflict which would last through the following four decades, until the collapse of the Soviet Union at the end of the 1980s. The Cold War brought about the race of nuclear armament, the fear of the Soviets, and with it, the hate of communism, fostered by powerful politicians such as Senator McCarthy and the FBI’s Director, Edgard Hoover. David Treuer⁹ describes the federal government’s change of priorities regarding the Native Americans, as follows:

⁷ 803-Civilisation class notes, File 9.

⁸ Wilcomb E. Washburn, ‘The Native American Renaissance, 1960 to 1995’, p. 406

⁹ David Treuer, *The Heartbeat of Wounded Knee – Native America from 1890 to the Present*, p. 251.

After the necessary excesses of FDR's New Deal, the country was shifting toward smaller government. It had a staggering number of expenditures as a result of the Second World War, including a lot of money spent for reconstruction of a Europe it had helped bomb. It was also becoming more industrial, more urban. At the same time, the newly powerful United States saw its own civil, social and political institutions as the only effective model in the world and was deeply suspicious of manifestations of collectivity (such as tribes) because of the rising threat of communism: the citizen was king, the commune was suspect. And tribes were communal if nothing else.

Indeed, during the Cold War, Indians, be it through many Western movies or propaganda leaflets against the Soviets, were portrayed as the "savage enemies of American progress": James P. Gregory Jr, in his academic paper "Better Dead than Red"¹⁰, gives us two striking examples:

In *Operation Survival!* a comic from 1957 that tells of two children who are trapped by a flood and forced to hold up in a bomb shelter, there is an image of settlers in their covered wagons fighting off mounted Indian attackers. The top of the page reads "Since time began there have always been dangers to threaten men and men have always sought ways to protect themselves." The caption beside the image of the settlers reads "Western settlers banded together to repel Indian attacks" ... Another publication, from the Philadelphia Inquirer, has an image of a family sitting around listening to the story of America. Above them is a mural of the obstacles Americans have faced. The second image is of a settler in front of his burning house firing a gun at a horde of attacking Indians that are waving tomahawks and bows. In the article it reads: "An Indian war party, armed with tomahawks, scalping knives, and fire arrows, was just as terrible to your great-grandmother's generation as the threat of atomic warfare is to ours."

II. THE TERMINATION ERA

Believing that Indian economic problems stemmed from the continued existence of tribalism, i.e., that the reservation and trust relationship were holding Indians back economically, leaders of both political parties decided to "terminate" the federal trust responsibility for Indian tribes¹¹. By 1953, advocates of rapid assimilation again constituted a majority at the Congress and pushed through three new programs.

The first aimed to settle Native American claims against the US by offering **financial compensation** for lost lands and treaty violations. When President Truman signed the Indian Claims Commission act into law in 1946, he declared that it would allow Indians to reach a "final settlement" of all their claims so that they could "take their place without handicap or special advantage in the economic life of the nation and share fully in its progress"¹².

¹⁰ "Better Dead than Red": The Treatment of Native Americans in the Southwest during the Cold War'

¹¹ Wilcomb E. Washburn, 'The Native American Renaissance, 1960 to 1995', p. 428

¹² Frederick E. Hoxie, 'The Reservation Period, 1880-1960', p. 240

The tribunal awarded a total of more than \$ 818 million to the Native groups with a major decision to make: how to spend money awarded them. Individual awards ranged from \$ 2,500 to the Poncas to over \$ 29,000,000 to the Indians of California. None of these funds could be distributed, however, until the Bureau of Indian Affairs approved a disbursement plan. Unfortunately, the terminationist atmosphere of the 1950s frequently poisoned negotiations between Native groups and the Indian Office¹³.

Once claims were resolved, the new Eisenhower administration proposed **termination**, i.e., dissolving the tribe/reservation as a legal entity and making Native Americans ordinary citizens of local and State governments, through the passage of two pieces of law in 1953. First, House Concurrent Resolution 108 stated simply that it was “the sense of Congress” that a group of Indian tribes named in the Act should be “freed from federal supervision” at an early date (Appendix 4, p. 23). Second, Public Law 280 unilaterally turned civil and criminal jurisdiction on most Indian reservations in California, Minnesota, Nebraska, and Wisconsin over to the states, thus abolishing the reservation police and court systems which had operated throughout the 20th century. According to David Treuer¹⁴,

Tribes in states not covered by Public Law 280 continued to administer civil and criminal matters in tribal and federal courts. Tribes within the six states covered by the law were not offered any chance to vote on, amend, or ultimately reject the legislation. The states that ultimately followed along and adopted some of the provisions of Public Law 280 were Nevada, South Dakota, Florida, Idaho, Montana, North Dakota, Arizona, Iowa, and Utah. Even narrowly defined and implemented, the law put most tribes under state control and oversight... And although the act had been put forward as a piece of law-and-order legislation, the states almost universally interpreted and implemented it as a regulatory directive as well. They levied taxes, administered schools, stepped into health care and licensing, and curtailed treaty rights by extending the jurisdiction of game wardens and overseeing licensing for harvesting game, edibles, and the like. This illegal overstepping would not be completely rectified by the Supreme Court until the 1980s. Tribes are still in the process of defining (and limiting) the excesses of Public Law 280.

During the remainder of the 1950s, termination was a theme running through a wide variety of new laws and administrative initiatives. Most prominent among these were termination laws passed in 1954 setting out the procedures for abolishing federal protection for the Klamaths of Oregon, the Menominees of Wisconsin, and a group of similar tribes in Utah, Oregon and Texas.¹⁵ The results of the termination legislation of this period (1953-1968) proved disastrous to the tribes involved. “Thrown headlong into the competitive world of American economic life without the supervision to which they had for so long been accustomed, the tribes proved unable to sustain themselves or their members.”¹⁶

¹³ Ibid, p. 248

¹⁴ David Treuer, *The Heartbeat of Wounded Knee – Native America from 1890 to the Present*, p. 256

¹⁵ Frederick E. Hoxie, ‘The Reservation Period, 1880-1960’, p. 241

¹⁶ Wilcomb E. Washburn, ‘The Native American Renaissance, 1960 to 1995’, p. 429

The Menominees were the most notorious victims of this process: not only were they coerced into accepting termination, but they also watched as hundreds of thousands of dollars received from their claims' cases were spent to facilitate their own termination.¹⁷

When Congress passed the Menominee Termination Act in 1954, the Menominee had cash assets of more than \$ 10 million (not counting the settlement). By 1964 they had only \$ 300,000. The tribe was so cash-strapped that the white-controlled MEI¹⁸ Board voted to sell lake lots for summer homes (rather than log the land) in an effort to increase the tax base. Tribal members, told simply that they were voting on an "economic plan", voted for the development; when it had been approved, MEI created a huge artificial lake and sold thousands of lake lots, diminishing what land and small amount of tribal control remained.¹⁹

With the support of pan-Indian organizations such as the National Congress of American Indians, the aid of friendly non-Indian anthropologists, and the work of a charismatic leader, Ada Deer, the Menominees managed to reverse the termination legislation of 1954 and regain, though with diminished resources, the trust status given up at that time. The Menominee Restoration Act of 1973 achieved this purpose²⁰.

The Klamath case seems more ambiguous: the desire of many individual Klamath members to obtain per capita payments from the sale of their rich timberlands resulted in apparent Klamath agreement of the process. Although federal officials were given many examples of the disastrous potentials of termination²¹, they ignored nearly every one of them. Neither did the wasteful dissipation of the timber payments in the purchase of consumer goods invalidate the correctness of the policy.²² However, in 1986, the Klamath Tribes regained Federal restoration (though without a land base) and termination was revoked through passage of P.L. 99-398, signed by President Reagan²³.

By the time the policy was renounced by President Nixon in 1970, more than a hundred reservations—most of them in California and Oregon—had been terminated and "the Indians who had belonged to them were, technically, Indians no longer"²⁴. Over 13,000 tribal members and 445,000 hectares of Indian real estate had been freed of federal control. While these losses represented a tiny fraction of the Indian estate and population, they were large enough to inject a new fear of federal authorities into the life of every native community in the country.²⁵

¹⁷ Frederick E. Hoxie, 'The Reservation Period, 1880-1960', p. 248

¹⁸ Menominee Enterprises Inc., a private business.

¹⁹ David Treuer, *The Heartbeat of Wounded Knee – Native America from 1890 to the Present*, p. 267.

²⁰ Wilcomb E. Washburn, 'The Native American Renaissance, 1960 to 1995', p. 429

²¹ Hood, Susan. 'Termination of the Klamath Indian Tribe of Oregon.'

²² Wilcomb E. Washburn, 'The Native American Renaissance, 1960 to 1995', p. 429

²³ <https://klamathtribes.org/>

²⁴ David Treuer, *The Heartbeat of Wounded Knee – Native America from 1890 to the Present*, p. 277.

²⁵ Frederick E. Hoxie, 'The Reservation Period, 1880-1960', pp. 241-242.

Through the third policy, called **relocation**, the government intended to complete the process of assimilation by helping former members of the tribes find work as industrial workers in cities. The first post-war “relocations” were of Navajos (Appendix 6, p. 25), forced to leave their reservation because of deteriorating economic conditions:

In the Southwest, the Navajo-Hopi Law funded a jobs-training program for Navajo and Hopi Indians of New-Mexico and Arizona and provided money to relocate them to Denver, Salt Lake, and Los Angeles. The program was expanded by the Department of the Interior in 1951 to include other tribes and other cities in Oklahoma, Arizona, and New-Mexico and expanded again in the years to come to yet more Indians and yet more cities: Cleveland, San Francisco, St Louis, San Jose, Seattle, Tulsa, and Minneapolis. The piecemeal legislation, budget lines, and policies coalesced into Public Law 959, passed in 1956. (*See Appendix 5, p. 24*) ...

Indian agents on reservations across the country hawked the benefits of urban living with the same fervor with which land speculators enticed city dwellers to come west and homestead a century before. Flyers and posters were made. Attractive brochures were handed out. And many Indians signed up²⁶.

Though numerous American Indians made the move to cities, many struggled to adjust to life in a metropolis and faced unemployment, low-end jobs, discrimination, homesickness, and the loss of the traditional cultural supports.

People who had been in America before America existed, whose homeland the wide country had once been, were now homeless immigrants headed to cities across the country, like the immigrants from China, Germany, Ireland, and England before them. They ran into many of the same difficulties: segregation in crowded ghettos or enclaves, lack of access to education, and lack of access to capital as redlining prevented them from joining the millions of Americans who were enjoying homeownership and admission to the middle class²⁷.

Those who returned to the reservation often found they did not “fit in” with those who had stayed behind. The relocation program has had long-term effects: if 8% of American Indians lived in cities at the beginning of the relocation program, the 2000 Census noted that American Indian urban population had risen to approximately 64%²⁸.

Together, these various laws and policies toward Native Americans—which remained in force until 1968—roll backed the gains in self-governance that they achieved during the New Deal. They brought about social, cultural, and economic disruption for many members of the “terminated tribes”, increasing welfare dependency and social alienation rather than producing self-sufficiency and social integration. However, things began to change for Native Americans during the 1960s as the Civil Rights Movement swept the nation: the increase in the population of Native Americans and the problems brought about by termination and relocation triggered a wave of Indian activism in the 1960s and 1970s.

²⁶ David Treuer, *The Heartbeat of Wounded Knee – Native America from 1890 to the Present*, p. 268

²⁷ David Treuer, *The Heartbeat of Wounded Knee – Native America from 1890 to the Present*, p. 277

²⁸ <https://www.archives.gov/education/lessons/indian-relocation.html>

III. US NUCLEAR ACTIVITIES AND NATIVE AMERICANS

III.1. Energy resources on Indian reservations

Energy resources located on Reservations have been the main contentious issue between Indian Nations and the big, private energy companies supported by the BIA and the US federal government: 30% of low-sulfur coal, 30% of oil, 20% of natural gas and 90% of uranium are on Reservation lands.²⁹ From oil exploitation in Oklahoma at the beginning of the 20th century, to the extraction of uranium on Navajo lands from the late 1940s to the 1980s, these mineral resources were coveted by powerful, white interests. Often driven by poverty, many Native tribes have signed concession agreements with private energy companies for generating incomes. Critics maintain that some tribal governments are controlled by energy companies, intent upon exploiting the mineral resources of the reservations at the cheapest cost. For example, in 1975, Indian tribes received \$ 2,663,798 royalties for a production of 1,000,298 tons of uranium ore (2,842 tons of metal), i.e., around 60 cents for a pound of metal when its market value was \$30 the pound. In other words, the Natives only received 2% of the price of the uranium metal extracted from their lands. For the coal, the royalties' level was fixed by the Department of the Interior around 10% of its production value, independently of the profits made by the energy companies. No wonder that tribe leaders, supported by the American Indian Movement (AIM) and the International Indian Treaty Council, have since claimed to calculate the royalties' level in accordance with the ore market value and the energy price³⁰.

Charges that tribal government are corrupt and mere "puppets" of an insensitive federal government bureaucracy are also frequently made, and the dispute within the Navajo Nation over tribal governance in the 1980s illustrates many of the conflicts and misunderstandings that becloud US Indian policy³¹.

²⁹ Elise Marienstras, *La résistance indienne aux Etats-Unis*, p. 226 (translated by me)

³⁰ Elise Marienstras, *La résistance indienne aux Etats-Unis*, pp. 233-234 (translated by me)

³¹ Wilcomb E. Washburn, 'The Native American Renaissance, 1960 to 1995', p. 409

III.2. Uranium mining on Navajo Nation's lands

Faced with widespread poverty after the 1930s, the Navajo leadership lobbied for approval of a special rehabilitation act which was approved by Congress in 1950. In addition to promising more federal aid, the new law granted the Navajo council the power to allocate revenue from mineral development to Indian needs. When the provision was written, the Navajos earned under \$500,000 per year from their mineral wealth; by the 1960s, income from this source averaged more than \$14 million annually. This increase amplified both the authority and the ambition of the council. During the 1950s, Navajo leaders developed their own Court system, took control of their police force, developed a community power authority, and began a newspaper³². Such a dramatic change was brought about by the developing nuclear industry.

In the early 1940s, the US developed top-secret plans to build an atomic bomb, thus needed a steady, domestic source of a radioactive substance—uranium. From World War II through the Cold War, the US encouraged uranium mining to build up domestic nuclear power. By the 1950s, there was a uranium boom in the Southwest. The Navajo Nation encompassing portions of Arizona, New Mexico, and Utah, where vast deposits of uranium were discovered, their reservation became a key area for uranium mining, and Navajo Nation was quickly swept into mining industry (Appendix 6, p. 26). The US government hired private mining companies that, often, leased lands without fair compensation, but the Tribal government, however, let them in because they offered the prospect of economic growth and jobs for residents. Unfair compensation for the extraction of uranium on their lands, however, is not the single injustice faced by Navajo Nation: it has also had devastating effects on Natives' health and on their environment.

More than 1000 mines were established by leases in the reservation. From 1944 to 1986, an estimated 3,000 to 5,000 Navajo people worked in the uranium mines on their land. Other work was scarce on and near the reservation, and many Navajo men traveled miles to work in the mines, sometimes taking their families with them. Between 1944 and 1989, 3.9 million tons of uranium ore were mined from the mountains and plains³³. Most of the mining jobs for Native Americans were on the frontlines: building the mines, blasting, digging, and transporting the yellow uranium ore. They did not know at the time that decades earlier, studies had already

³² Frederick E. Hoxie, 'The Reservation Period, 1880-1960', pp. 249

³³ https://en.wikipedia.org/wiki/Uranium_mining_and_the_Navajo_people

linked uranium mining to lung cancer, and that the importance of protecting mine workers from radioactivity was well documented, recommending fans as a means of providing them with fresh air. Yet many Navajo workers say that they had little protective gear, no ventilation in the mines, and no warning of how hazardous uranium could be to their health. By the 1960s, cases of lung cancer started appearing among mine workers and residents in Navajo Nation, where the disease had been non-existent.

Meanwhile, during the federal government's study of the long-term health effects from radiation poisoning—which started in 1951—the US Public Health Service was conducting a massive human medical experiment on approximately 4000 Navajo uranium miners without asking their informed consent. Neither the miners nor their families were warned of the risks from nuclear radiation and contamination as USPHS continued their experiment. In 1955, USPHS took active control of Native American medical health services from the Bureau of Indian Affairs, and the experiments on nuclear radiation continued. In 1962 it published the first report to show a statistical correlation between cancer and uranium mining, but for decades, industry and the government failed to regulate or improve conditions or inform workers of the dangers. In 1969, the federal government finally regulated the standard amount of radon in mines and the Environmental Protection Agency was established in 1970 but environmental regulation could not repair the damage already suffered. Private companies resisted regulation through lobbying Congress and state legislatures. In 1990, the United States Congress finally passed the Radiation Exposure Compensation Act (RECA), granting reparations for those affected by the radiation³⁴, but often, it proved to be extremely difficult for widows of Native American uranium miners to receive their compensation of \$ 100,000, because they did not have the standard marriage licenses required to establish a legal connection to the deceased (in 1999, revisions were published in the Federal Register to assist in making award claims)³⁵.

Furthermore, uranium mining has also devastated Navajo's natural environment. In the area of Red Water Pond Road, near Church Rock (New Mexico), where United Nuclear Corporation (UNC) exploited a mine and a mill, the company stored its toxic uranium waste in a pond which held several hundred million gallons of radioactive tailings. On 16 July 1979, the dam on the pond broke, letting out over one thousand tons of uranium tailings and one hundred million gallons of wastewater into the Rio Puerco, a creek that was often used as a source of drinking water for locals and livestock. (Appendix 7, p. 27) A government report showed

³⁴ https://en.wikipedia.org/wiki/Uranium_mining_and_the_Navajo_people

³⁵ https://en.wikipedia.org/wiki/Radiation_Exposure_Compensation_Act

radioactivity levels in the Puerco at one thousand times what is allowed in drinking water, but at the time of the spill, newspapers characterized the area as “sparsely populated” and that the spill presented “no immediate health hazard” (Appendix 7, p. 27). Many Navajo residents, in a community of about a hundred, said they were not warned about using the river, or about the spill, until several days later. Although the Company was aware of some defaults into the dam the year before the spill, it evaded responsibility after the spill, as well as the Environmental Protection Agency (EPA). Contrary to another nuclear accident which happened in Pennsylvania, at the nuclear plant of Three Mile Island four months before, the “largest radioactive spill in US history” was overlooked and the residents barely compensated (Appendix 7, p. 28). Eventually, the EPA and the mining company, now owned by General Electric, committed to a clean-up plan, but it could take many more years than expected to clear the radioactive waste at the mine (until 2027). Concerning the Puerco, the state and federal government trucked in water to the reservation for nearly two years but ended the program in 1981; they never presented a clean-up plan for the water. Farmers have had little choice but to resume use of the river for watering livestock and crops. In the meantime, the EPA wanted the residents of Red Water Pond Road to move to the nearby city of Gallup, which means they would have to live outside Navajo Nation and adjust to an entirely different way of life³⁶. History repeats itself: more than 50 years after their forced “relocation” to Denver and other big cities, Navajo members would have to be relocated in a city. Again.

In the 1980s, as demands for nuclear energy declined, the mines were shut down. Today, there are more than 500 abandoned sites, many surrounded by massive piles of uranium waste. For decades, residents have been fighting to get them removed. These abandoned mines remain highly radioactive and continue to leach toxic and radioactive sludge into tribal water sources used by livestock and residents, contaminating them with uranium, arsenic, lead, vanadium, and manganese. In a report prepared in 2008 for the EPA, about the quality of drinking water sources on Navajo lands, the testing laboratory concluded that, among the water samples collected from 48 non-municipal water sources within the Navajo Nation, “a significant portion of the water sources were found to contain metals and/or radioactive parameter analytes that exceeded site-specific action levels determined by the U.S.”³⁷ Another study in 2016 found that 27% of Navajos have high levels of uranium in their urine, a percentage that is more than five

³⁶ More detail on this video: https://www.youtube.com/watch?v=ETPogv1zq08&ab_channel=Vox

³⁷ <https://www.epa.gov/sites/default/files/2016-06/documents/2008-08-28-navajo-drinking-water-source-sampling.pdf>

times higher than that of the US population as a whole³⁸. As in Church Rock, these radioactive contaminations have been overlooked because of low population density and the remoteness of the waste sites. Another tribe, however, managed to get greater public attention to their case: in January 2012, the Havasupai, having their sole source of drinking water threatened by Uranium mines in the Grand Canyon area, obtained a 20-year ban of uranium mining activity.³⁹

III.3. Nuclear activities on Shoshone lands

During the Cold War, the government needed a place to test nuclear devices and their effects, as well as a few decades later, they sought a place to store nuclear waste and used nuclear fuel, still highly radioactive. In both cases, a remote swath of “unpopulated” desert land northwest of Las Vegas, Nevada, seemed to offer the perfect solution to the federal government, who completely disregarded the fact that they do not own these lands. Indeed, the 1863 Ruby Valley Treaty recognized Shoshone sovereignty on “Newe Sogobia”. Though this Treaty permitted non-Natives resource extraction with royalties paid to the Western Shoshone, it did not transfer ownership rights and is still in effect (Appendix 1, p. 20). Once again, the United States has failed to uphold this treaty: from the early 1900s, federal departments began referring to Newe Sogobia as “public lands” without any legal grounding and have taken land from the reservation. US authorities—in the form of the Bureau of Land Management, Forest Service, Park Service, Fish and Wildlife, Atomic Energy Commission, Department of Defense, Department of Transportation, etc., control now approximately 90 % of the Shoshone land⁴⁰ (Appendix 9, p. 29). Western Shoshone have received no royalties despite extensive resource extraction and exploitation of their lands. In 1979 the US government presented the Western Shoshone with a \$26 million settlement for Newe Sogobia, but they rejected the offer. To this day, the Department of Interior has been working to coerce the Western Shoshone into signing⁴¹.

Formerly known as the Nevada Proving Ground, the Nevada Test Site (NTS)—covering approximately 3,500 km² of desert and mountainous terrain—was established after WWII for

³⁸ <https://www.npr.org/sections/health-shots/2016/04/10/473547227/for-the-navajo-nation-uranium-minings-deadly-legacy-lingers>

³⁹ <https://indiancountrytoday.com/archive/20-year-ban-on-new-uranium-mining-claims-in-grand-canyon-holds-up-in-court>

⁴⁰ Andreas Knuden, ‘Native Americans Bear the Nuclear Burden’

⁴¹ <https://nuclearprinceton.princeton.edu/western-shoshone>

atmospheric atomic testing. On 27 January 1951, the government detonated its first nuclear bomb on the site, resulting in a tremendous explosion, the flash from which was seen as far away as San Francisco. The government continued to conduct atmospheric tests for six more years at the Nevada site. During the 1950s, the mushroom clouds from the 100 atmospheric tests could be seen from the city of Las Vegas, where they even became tourist attractions.

Though the NTS location was partly chosen because its climate, remoteness, the low population density in the area minimized risk to public safety, substantial amounts of radiation were released from nuclear weapons tests and this radiation traveled long distances. Hence remoteness and low population density did not mean there were no significant exposures.⁴² Fallout from the NTS was deemed responsible for increases in radiation-related illnesses in downwind locations, especially in St. George, Utah, located 217 km east of the site (Appendix 10, p. 30). As early as 1953, the city began experiencing severe fallout in the wake of on-site detonations. From the mid-1950s to the 1980s, disproportionately high rates of cancers—including thyroid cancer, leukemia, lymphoma, and others—affected these “downwinders.”⁴³ Meanwhile, the government studied the effects on humans by stationing ground troops as close as 2,500 yards from ground zero and moving them even closer shortly after the detonation (Appendix 8, p. 29). By 1957, though, the effects of radioactivity on the soldiers and the surrounding population led the government to begin testing bombs underground, and by 1962, all atmospheric testing had ceased, though a further 921 nuclear tests were carried out underground at the NTS until 1992⁴⁴.

Faced with public concerns and lawsuits, the Department of Energy (DOE) began in 1979 its estimates of radiation doses from nuclear weapons testing at NTS. If this was the first of DOE’s major dose reconstructions (estimates of the radiation exposures that people may have received from living downwind of nuclear production and testing), the importance of public involvement in obtaining information, in reviewing the models, in interpreting results, and in developing public confidence in the results was not recognized. Native Americans residing in a broad region downwind from the Nevada Test Site during the 1950s and 1960s received significant radiation exposures from nuclear weapons testing (Appendix 10, p. 30). Because of differences in diet, activities, and housing, their radiation exposures are only very imperfectly represented in DOE’s dose reconstructions. There are important missing pathways,

⁴² Frohberg, Eric and al. ‘The Assessment of Radiation Exposures in Native American Communities from Nuclear Weapons Testing in Nevada’.

⁴³ <https://www.britannica.com/place/Nevada-Test-Site>

⁴⁴ <https://www.history.com/this-day-in-history/first-atomic-detonation-at-the-nevada-test-site>

including exposures to radioactive iodine from eating small game. In 2000, exposures from drinking milk and eating vegetables had not been properly estimated for these communities yet, but scientists demonstrated that such a reconstruction was feasible.⁴⁵

As for the uranium miners, the federal government has provided for the monetary compensation of people (who contracted cancer and a number of other specified diseases as a direct result of their exposure to atmospheric nuclear testing undertaken by the United States during the Cold War) through the Radiation Exposure Compensation Act of 1990. The legislation grants \$50,000 in compensation to each qualifying NTS downwinder and \$75,000 for workers participating in atmospheric nuclear weapons tests. In all cases there are additional requirements which must be satisfied (proof of exposure, establishment of duration of employment, establishment of certain medical conditions, etc.)⁴⁶, conditions that once again proved quite difficult to be reached for the Native Americans.

Ian Zabarte, Principal Man for the Western Bands of the Shoshone Nation of Indians, testifies:

As a Shoshone, we always had horses. My grandfather always told me, “Stop kicking up dust.” Now I understand that it was because of the radioactive fallout.

To hide the impacts from nuclear weapons testing, Congress defined Shoshone Indian ponies as “wild horses.” There is no such thing as a wild horse. They are feral horses, but the Wild Horse and Burrow Acts of 1971 gave the Bureau of Land Management the affirmative act to take Shoshone livestock while blaming the Shoshone ranchers for destruction of the range caused by nuclear weapons testing. My livelihood was taken, and the Shoshone economy destroyed by the BLM. On the land, radioactive fallout destroyed the delicate high desert flora and fauna, creating huge vulnerabilities where noxious and invasive plant species took hold...

What is needed now are hearings on and support for the extension and funding of the Radiation Exposure Compensation Act of 2019. The Shoshone people need DNA testing and funding for tribal community health education on radiation basics and information on appropriate protective behavior to mitigate radiation exposure.⁴⁷

If nuclear weapon testing at the NTS has left the Shoshone what Zabarte calls “a dark legacy of radiation exposure to Americans downwind from the battlefield of Cold War”, the tribe has been fighting another yearslong battle against the project of storing nuclear waste at Yucca Mountain permanently.

After producing electricity in nuclear power plants, the radioactive spent fuel rods accumulate as a toxic byproduct: the US having currently no permanent plan for storage of nuclear waste, spent fuel rods are stored on-site at nuclear power plants in temporary storage units, awaiting a permanent solution. Questions of how to dispose of and properly store this

⁴⁵ Frohberg, ‘The Assessment of Radiation Exposures in Native American Communities...’

⁴⁶ https://en.wikipedia.org/wiki/Radiation_Exposure_Compensation_Act

⁴⁷ Ian Zabarte, ‘Nevada Views: Nuclear tests and the Shoshone People’

nuclear waste permanently is a question that the global community has been asking for more than a half-century. Nuclear waste is particularly difficult because it persists for tens of thousands of years. If not adequately contained and protected, this waste will be released into the environment, having deadly impacts on environmental and human health. Over three decades the US spent nearly \$7 billion to find a solution to permanent nuclear storage. Their solution: bury it deep underground in Yucca Mountain in Nevada. As one of the most geographically studied sites in the world, chosen in part for its remote location, many were confident that the Yucca Mountain area was the solution to permanent nuclear waste storage. However, in the determination, research, and investigation of this site, researchers and governmental officials failed to adequately consult and respect tribal perspectives and concerns: Yucca Mountain is an integral part of the traditional homelands of the Western Shoshone and Paiute Indians, who have rejected this project for years.⁴⁸ In a newspaper article, Ian Zabarte expresses his point of view⁴⁹:

Nothing in the Nuclear Waste Policy Act of 1982, as amended in 1987, considered the fact of Shoshone ownership of the proposed Yucca Mountain high-level nuclear waste repository. Almost \$15 billion was spent to characterize the site, giving it the label as, “the most studied piece of real estate in the world.” The Nuclear Regulatory Commission admitted in the licensing proceedings that the Department of Energy has not proven ownership. Nevada took hundreds of millions of dollars for characterization studies from the federal government in grants equal to taxes from Shoshone property and gave nothing to the Shoshone. A clear case of taxation without representation to defraud the Shoshone people of our property interests.

Zabarte says bluntly that he’ll never stop fighting against licensing Yucca Mountain as the nation’s repository for nuclear waste: “They need to just take Yucca Mountain off the table.” However, if Yucca Mountain was defunded by the Obama administration in 2010, there have been multiple attempts in Congress to revive the project since.⁵⁰

It seems unfair, unethical and insidious to dump this long-lived nuclear waste, produced by non-Natives, on the homeland of communities that had no part in the creation of this waste, thus privileging human settlements that are densely populated and highly developed, as well as whiteness. The plan to bury waste in the area of Yucca Mountain violates the treaty-based federal trust responsibility toward tribes, which requires the federal government to protect tribes from harm perpetrated by non-Indian individuals and governments⁵¹. Groups like Honor the Earth, founded by author and activist Winona LaDuke to promote cooperation between Native

⁴⁸ <https://nuclearprinceton.princeton.edu/yucca-mountain>

⁴⁹ Ian Zabarte, ‘Nevada Views: Nuclear tests and the Shoshone People’

⁵⁰ Sadler, John. ‘Native American tribe claims nuclear waste can’t be stored on its land’

⁵¹ <https://nuclearprinceton.princeton.edu/yucca-mountain>

Americans and environmentalists, are trying to persuade tribes that availing their land to nuclear power and other toxic industries is not worth the potential long-term damage to the health of their citizens. Honor the Earth helped convince the Goshutes to turn down a lucrative deal to store waste on their land and is working with dozens of other tribes to try to do the same. However, some continue to host nuclear and other toxic waste on their sovereign reservations—which are not subject to the same environmental and health standards as U.S. land—in order to generate revenues. Bayley Lopez of the Nuclear Age Peace Foundation cites example after example of the government and private companies taking advantage of the “overwhelming poverty on native reservations by offering them millions of dollars to host nuclear waste storage sites.”⁵²

CONCLUSION

If the programs of termination and relocation were parts of the unfair, though deliberate and open, strategy of the 1950s’ federal government to end the Natives’ community way of life and force their assimilation into the United States’ white, capitalist and consumerist society—deemed as the only effective model in the world, the way in which the government has taken the control, or allowed private interests to take control, of some Natives’ lands to exploit their mineral resources—of strategic importance for the US army or general economy—has proven to be much more insidious.

Indeed, either the federal government ignored a signed Treaty and used some lands that it did not own without the consent of their sovereign tribe, as with the nuclear bomb testing on Western Shoshones’ lands, or it let private companies exploit mineral resources at the expense of the Natives’ health and environment, as with the Navajo Nation’s case. Not only didn’t the Navajos receive a fair compensation by the mining companies for the extracted uranium, but the Native uranium miners were also exploited by these private companies to the detriment of their health and safety: energy companies ignored basic safety rules (already known at that time) to earn more money, the federal government surveyed long-term effects of radiation

⁵² <https://www.scientificamerican.com/article/earth-talk-reservations-about-toxic-waste/>

poisoning on miners without asking their formal consent, and neither interests warned the Natives against the hazards of mining a radioactive substance. If Indian lives were regarded as inferior by White, political and economic interests in the 1950s, Native activists, supported by environmentalists, still have to fight today against companies which offer millions of dollars to tribes to dump their nuclear and other toxic waste on reservation land. French people, however, cannot boast their government had a more human or ethical approach towards the Algerian population when, developing its own nuclear arsenal in the early 1960s, it carried out atmospheric nuclear tests in the Sahara Desert, near Reggane.⁵³ Nor can other European nations deny that they, too, offer millions of euros to dump their toxic waste in the poorest nations of the world.

To finish this essay on a more positive note, it is worthwhile to underline that, out of the three plagues faced by the American Natives in the 1950s, and especially out of the forced relocation, a small but powerful urban middle-class was born and has fostered charismatic lawyers and activists, who started to fight for recovering Natives' rights in the following decades. "We're not good at dying" concludes Ian Zabarte in one of his interviews.⁵⁴

⁵³ See the video 'Essais nucléaires en Algérie : 61 ans après, les plaies toujours à vif à Reggane'

⁵⁴ Sadler, John. 'Native American tribe claims nuclear waste can't be stored on its land'.

II. RESOURCES

1) Books and articles:

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Zabarte, Ian. 'Nevada Views: Nuclear tests and the Shoshone People', *Las Vegas Review-Journal*, June 27, 2020. <https://www.reviewjournal.com/opinion/nevada-views-nuclear-tests-and-the-shoshone-people-2063105/>, accessed on 30.03.2022

2) Videos:

How the US poisoned Navajo Nation, *Vox Missing Chapter*.

https://www.youtube.com/watch?v=ETPogv1zq08&ab_channel=Vox

Atomic Test in Nevada (1955):

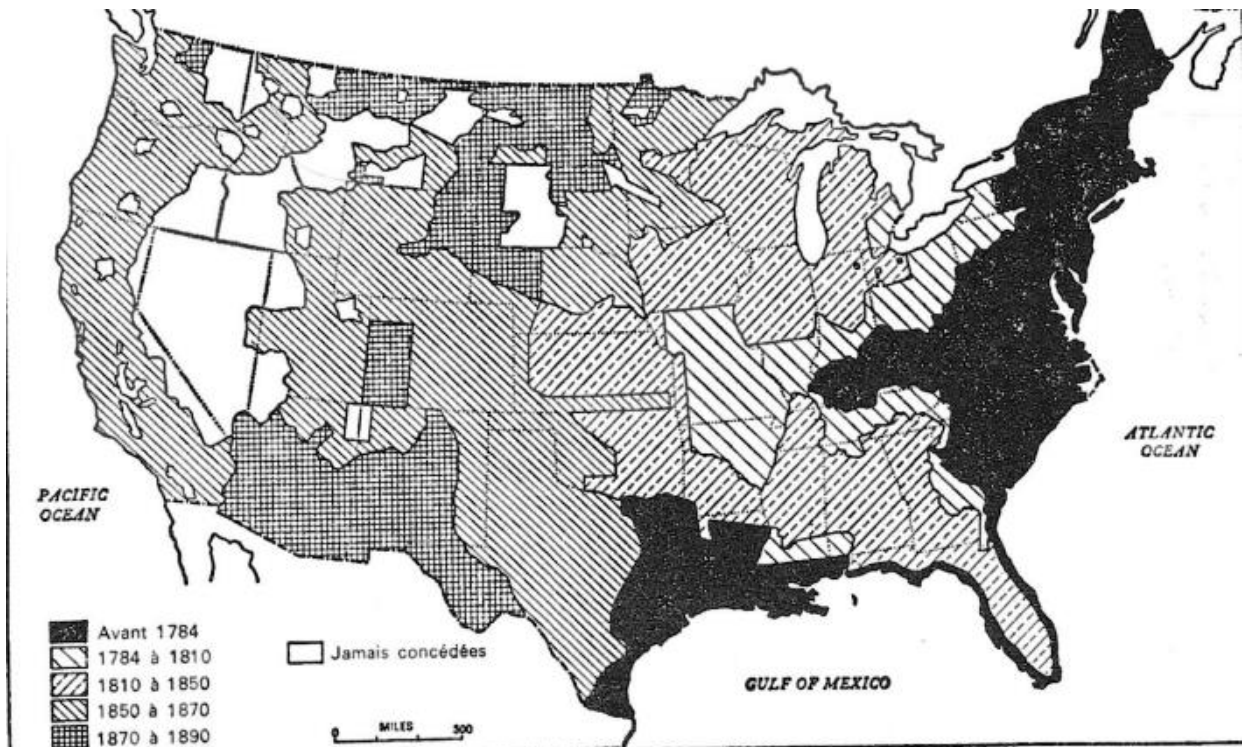
https://www.youtube.com/watch?v=DXg2P9dx-GM&ab_channel=BritishPath%C3%A9

Essais nucléaires en Algérie : 61 ans après, les plaies toujours à vif à Reggane

https://www.youtube.com/watch?v=zwMKt-5FxBY&ab_channel=SoCh%C3%A2teaux

III. APPENDICES

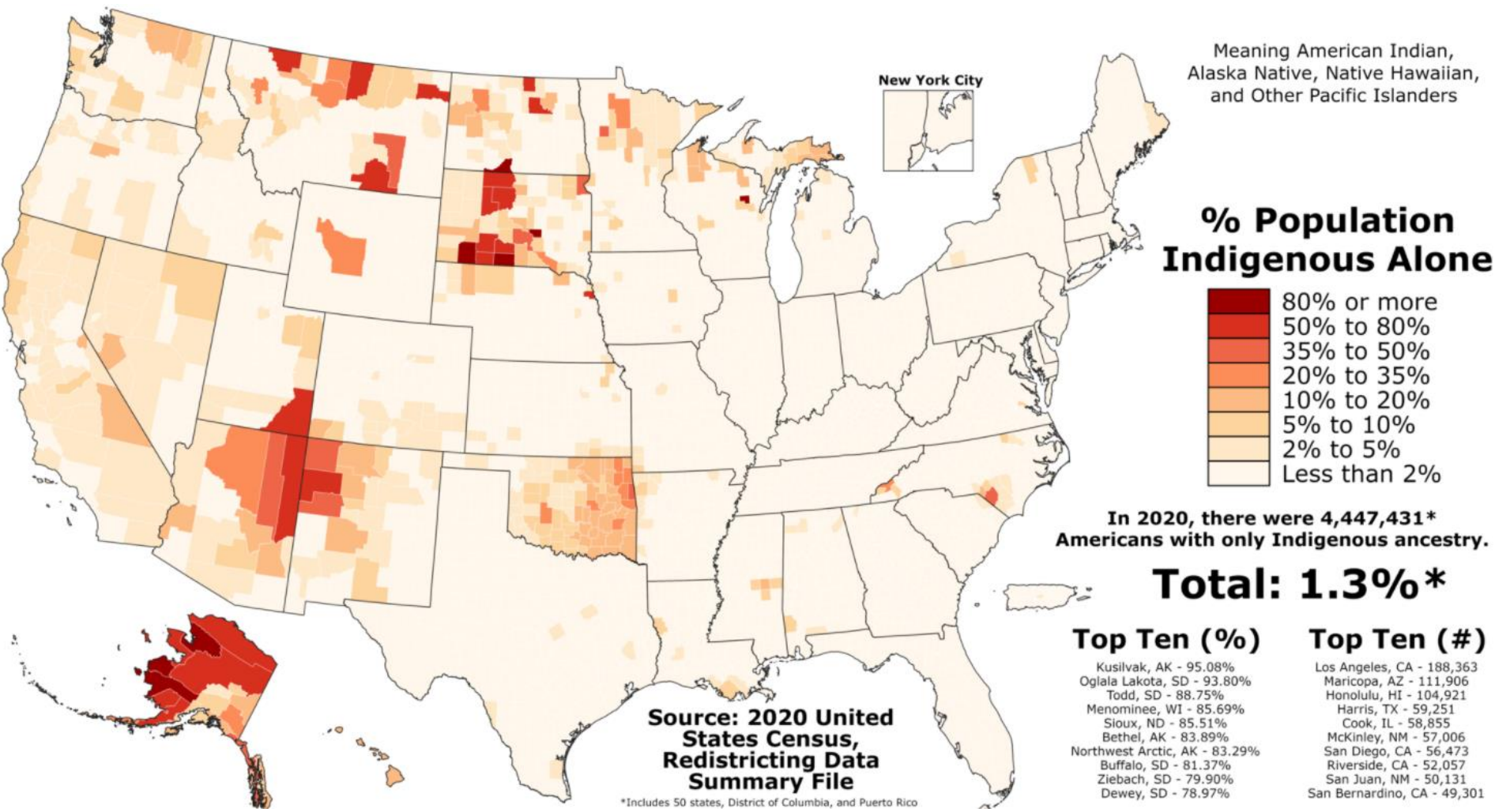
1) Loss of Native Indian lands 1776 – 1890:



Source : Elise Marienstras, *La Résistance Indienne aux Etats-Unis*, p.142

21

3) Proportion of Indigenous Americans in each county of the fifty states, the District of Columbia, and Puerto Rico as of the 2020 United States Census



https://en.wikipedia.org/wiki/List_of_Indian_reservations_in_the_United_States#/media/File:Indigenous_Americans_by_county.png

4) House Concurrent Resolution 108

B132

CONCURRENT RESOLUTIONS—AUG. 1, 1953 [67 STAT.]

August 1, 1953
[H. Con. Res. 108]

INDIANS

Whereas it is the policy of Congress, as rapidly as possible, to make the Indians within the territorial limits of the United States subject to the same laws and entitled to the same privileges and responsibilities as are applicable to other citizens of the United States, to end their status as wards of the United States, and to grant them all of the rights and prerogatives pertaining to American citizenship; and

Whereas the Indians within the territorial limits of the United States should assume their full responsibilities as American citizens: Now, therefore, be it

Freedom from
Federal supervision.

Resolved by the House of Representatives (the Senate concurring), That it is declared to be the sense of Congress that, at the earliest possible time, all of the Indian tribes and the individual members thereof located within the States of California, Florida, New York, and Texas, and all of the following named Indian tribes and individual members thereof, should be freed from Federal supervision and control and from all disabilities and limitations specially applicable to Indians: The Flathead Tribe of Montana, the Klamath Tribe of Oregon, the Menominee Tribe of Wisconsin, the Potawatamie Tribe of Kansas and Nebraska, and those members of the Chippewa Tribe who are on the Turtle Mountain Reservation, North Dakota. It is further declared to be the sense of Congress that, upon the release of such tribes and individual members thereof from such disabilities and limitations, all offices of the Bureau of Indian Affairs in the States of California, Florida, New York, and Texas and all other offices of the Bureau of Indian Affairs whose primary purpose was to serve any Indian tribe or individual Indian freed from Federal supervision should be abolished. It is further declared to be the sense of Congress that the Secretary of the Interior should examine all existing legislation dealing with such Indians, and treaties between the Government of the United States and each such tribe, and report to Congress at the earliest practicable date, but not later than January 1, 1954, his recommendations for such legislation as, in his judgment, may be necessary to accomplish the purposes of this resolution.

Report to Congress.

Passed August 1, 1953.

<https://www.govinfo.gov/content/pkg/STATUTE-67/pdf/STATUTE-67-PgB132-2.pdf>

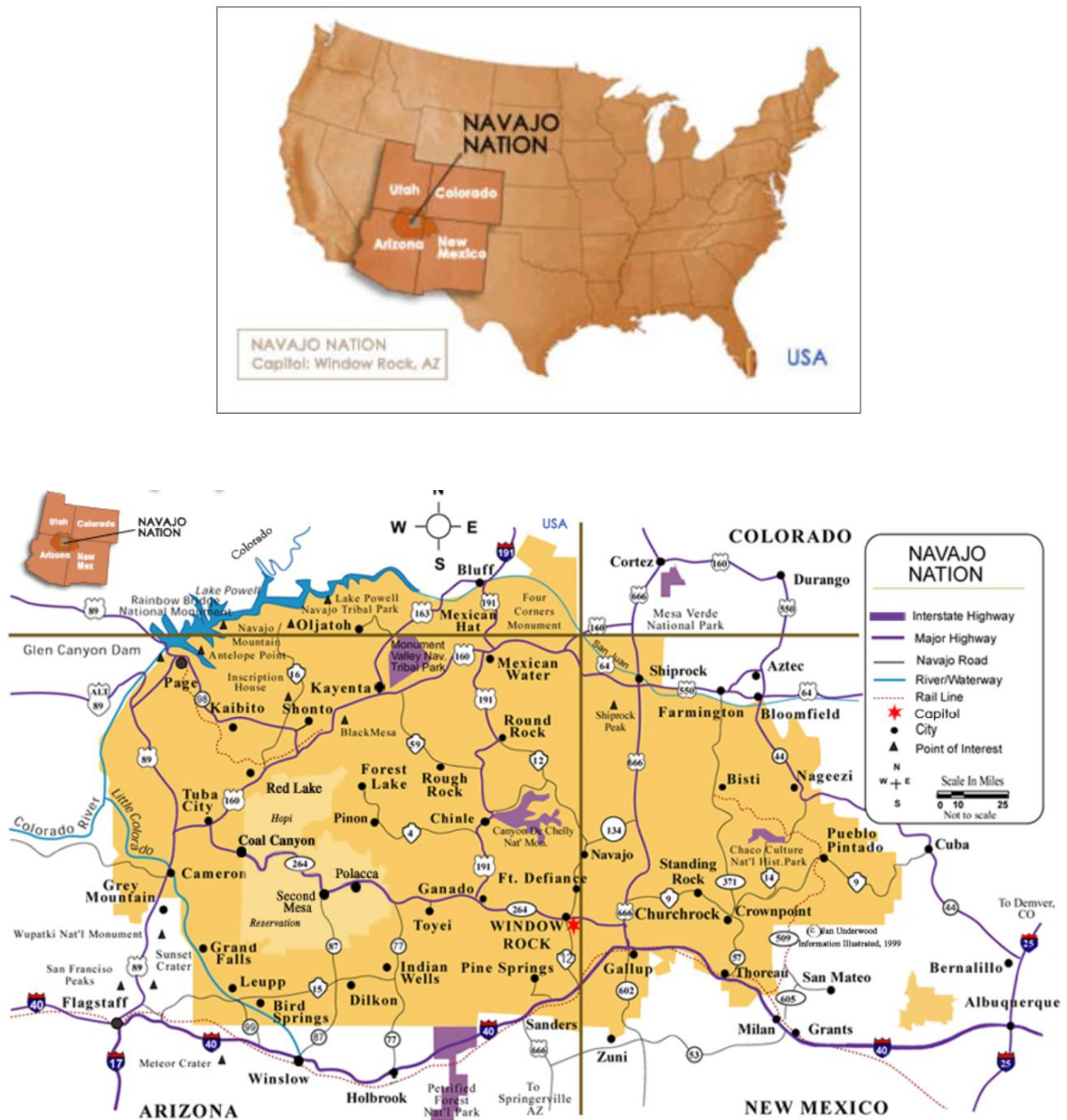
5) Public Law 959

	Public Law 959	CHAPTER 930
August 3, 1956 [S. 3416]	AN ACT Relative to employment for certain adult Indians on or near Indian reservations.	
Indians. Vocational training.	<p><i>Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,</i> That in order to help adult Indians who reside on or near Indian reservations to obtain reasonable and satisfactory employment, the Secretary of the Interior is authorized to undertake a program of vocational training that provides for vocational counseling or guidance, institutional training in any recognized vocation or trade, apprenticeship, and on the job training, for periods that do not exceed twenty-four months, transportation to the place of training, and subsistence during the course of training. The program shall be available primarily to Indians who are not less than eighteen and not more than thirty-five years of age and who reside on or near an Indian reservation, and the program shall be conducted under such rules and regulations as the Secretary may prescribe. For the purposes of this program the Secretary is authorized to enter into contracts or agreements with any Federal, State, or local governmental agency, or with any private school which has a recognized reputation in the field of vocational education and has successfully obtained employment for its graduates in their respective fields of training, or with any corporation or association which has an existing apprenticeship or on-the-job training program which is recognized by industry and labor as leading to skilled employment.</p>	
Appropriation.	<p>SEC. 2. There is authorized to be appropriated for the purposes of this Act the sum of \$3,500,000 for each fiscal year, and not to exceed \$500,000 of such sum shall be available for administrative purposes.</p> <p>Approved August 3, 1956.</p>	

<https://www.govinfo.gov/content/pkg/STATUTE-70/pdf/STATUTE-70-Pg986.pdf>

6) Navajo Nation and uranium mining

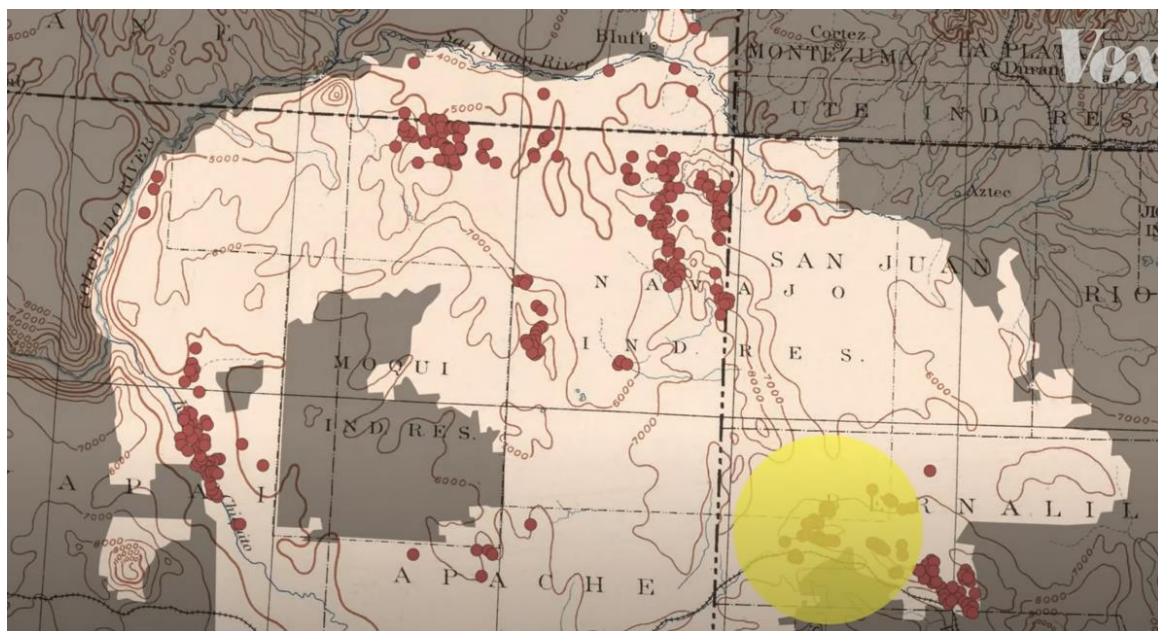
The Navajo Nation covers the corners of three states: Arizona, New Mexico, and Utah. It is the largest reservation in the United States, covering 27,673 square miles.



Source: <http://navajobusiness.com/fastFacts/LocationMap.htm>



Navajo miners work at the Kerr-McGee uranium mine at Cove, Ariz., on May 7, 1953.
 Source: <https://www.npr.org/sections/health-shots/2016/04/10/473547227/for-the-navajo-nation-uranium-minings-deadly-legacy-lingers?t=1648649376088>



“By the 1950s, there were 750 mines in the area employing thousands of people from Navajo Nation”.
 In yellow, the area where the spill happened in 1979. Source: ‘How the US poisoned Navajo Nation’
https://www.youtube.com/watch?v=ETPogv1zq08&ab_channel=Vox

7) The spill at Church Rock and the coverage of the accident in the media

Source: 'How the US poisoned Navajo Nation', *Vox Missing Chapter*:

https://www.youtube.com/watch?v=ETPogv1zq08&ab_channel=Vox



The two reservoirs containing uranium mining waste

The spill coverage in the media, compared to that of the accident in Three Mile Island, which had happened three months before:

Nuke cleanup slow
New Mexico spill debris still being collected

By SANDRA BLAKESLEE
Los Angeles Times Service

Almost two months after it happened, work crews in New Mexico are still cleaning up what is being called the worst spill of radioactive wastes in U.S. history.

The spill occurred July 16 at a uranium mine and mill in Church Rock, N.M., when a muddy mixture of waste material stored behind an earthen dam poured through a 20-foot crack in the dam and gushed into a small stream.

Eleven hundred tons of mine tailings — the radioactive solids that remain after uranium ore is processed — and 100 million gallons of radioactive water escaped during the hour it took workmen to seal the crack. Traces of the spill were later found as far away as 75 miles — across the Arizona border.

The spill occurred in a desert region that is sparsely populated for the most part, and health officials in both states believe it presents no immediate health hazard.

But there is concern that some of the radioactive material might percolate into the earth and contaminate well water, or be absorbed by plants that livestock consume, or be carried by wind.

Authorities also have ordered that signs be posted — in English, Spanish and Navajo — warning people not to go near the contaminated stream, the Rio Puerco. Navajo livestock drink from the stream, but Miller, the federal nuclear official, said the radioactive water is so acidic that "I doubt cattle would drink it."

Engineers are still trying to determine why the dam, owned by United Nuclear Corp. and built only two years ago, developed a crack. One theory is that the subsoil under the dam gave way, creating stress that the dam could not absorb without fracturing.

When the dam failed, the waste material escaped with sufficient force to overrun the steep banks of the stream in some places — leaving behind isolated pools of radioactive water the color of iced tea and patches of radioactive crystalline material the color and shape of yellow ant hills.

State health authorities have ordered United Nuclear to pump these stagnant pools dry and remove any underlying soil that is contaminated.

The patches of crystalline material, left behind when the radioactive water evaporates, also must be removed to prevent the material from being dissolved by rain and re-entering the stream or

Navajos Struggle Alone Against Radiation's Effects

Continued from A-1
levels of that invisible element — radiation are higher than normal in their bodies.

Initial tests have come up with negative results as far as radiation. Results of a second test are forthcoming.

Of concern are levels of two carcinogens in the Puerco — thorium and radium. State officials realize it is a hardship for the Navajos to be without use of the Puerco for so long, but have no projection on when "we can put a stamp of approval" on the water, according to Dr. Tom Buhl.

Navajo paralegals touring the area say about 2,600 head of livestock use the Puerco. Church Rock Navajo Chapter President Ernest Bicente says about 1,700 people live in the river valley.

Vlassis says the tribe is furnishing water to some of those affected. The tribe is also flying aerial "reconnaissance" every day, Vlassis says, to check on the company's clean-up cooperation.

So far, Vlassis says, the tribe has spent about \$100,000 for these activities, the workings of the task force.



Three Mile Island

\$25 million settlement OK'd for nuke accident

HARRISBURG (AP) — A federal judge has approved the largest damage settlement ever for a nuclear accident — \$25 million for economic and health testing costs created by the 1979 accident at Three Mile Island.

But it may take at least six months before the eligible 20,000 people and businesses will have their claims processed and paid, Elizabeth Honeywell, clerk for U.S. District Judge Sylvia Rambo, said Thursday.

area. The remaining \$20 million will go toward satisfying economic loss claims.

The class action lawsuit was filed by individuals and businesses against the owners of the nuclear plant damaged in the nation's worst commercial nuclear accident in March 1979.

Both sides reached a preliminary agreement in February and Judge Rambo said she approved it because there had been "little negative reaction" from either side about the

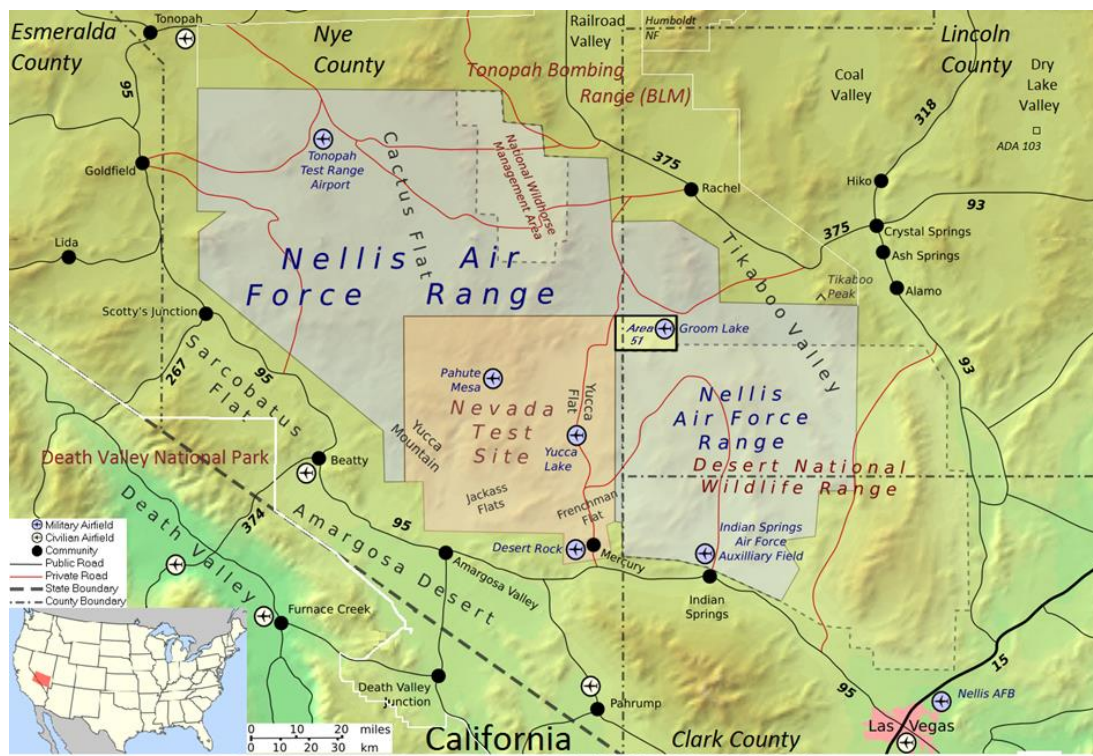
8) Nuclear bombing tests at Nevada Test Site



Photo courtesy of Nevada State Museum

<https://www.reviewjournal.com/opinion/nevada-views-nuclear-tests-and-the-shoshone-people-2063105/>

9) Federal lands on Shoshone and Pauite Nations' lands.



FEDERAL LANDS IN SOUTHERN NEVADA

A map showing Yucca Mountain in southern Nevada, west of the Nevada Test Site

https://upload.wikimedia.org/wikipedia/commons/2/23/Wfm_area51_map_en.png

10) Radiation exposures from nuclear weapons testing at Nevada Test Site

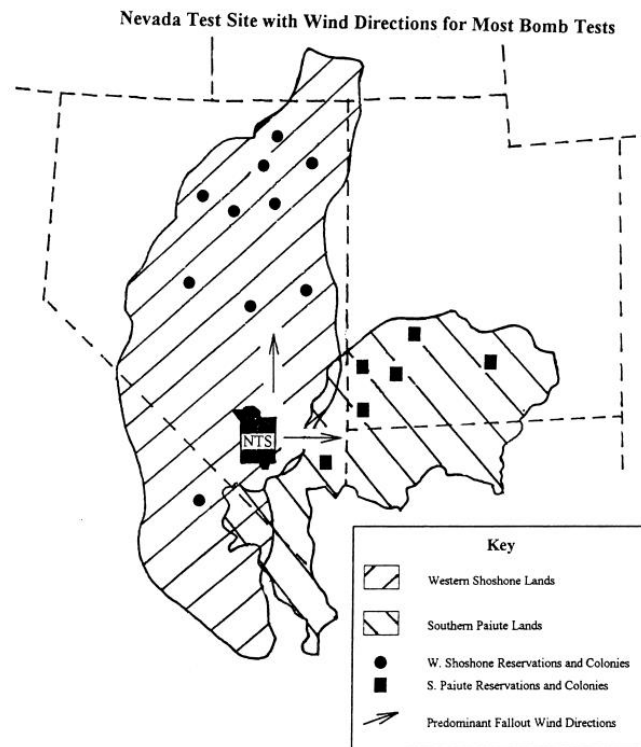


Fig. 1. Traditional lands of the Western Shoshone and Southern Paiutes. The Nevada Test Site is shown in the center; two arrows indicate the most frequent wind directions for nuclear tests, chosen to avoid transport in the direction of major southwestern cities.

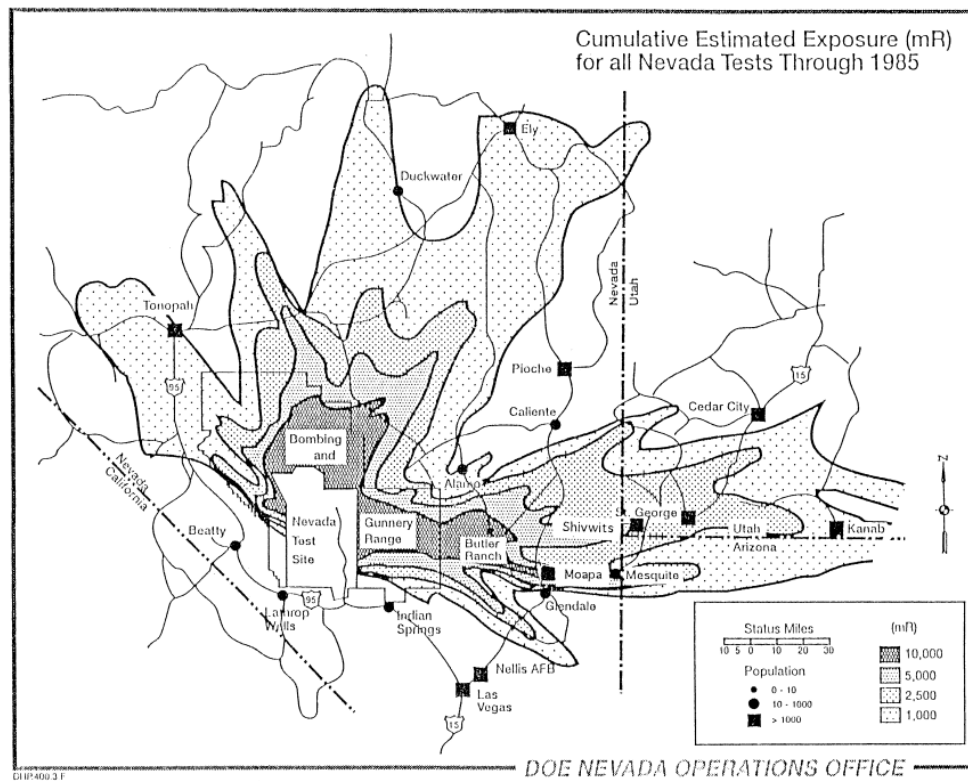


Fig. 2. Spatial distribution of the cumulative external exposures from nuclear weapons testing at the Nevada Test Site through the period of testing (1951–1972) as estimated in the ORERP. The heaviest exposures occur downwind in the directions indicated by the arrows in Fig. 1.

Source: Frohberg, Eric and al. 'The Assessment of Radiation Exposures in Native American Communities from Nuclear Weapons Testing in Nevada', pages 102 & 103