

# **A Uniquely Destructive Injustice: US Nuclear Testing on Indigenous Lands – an Environmental Justice and GIS Analysis**

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**Abstract:** Both of the United States' major nuclear test sites, the Nevada Test Site (NTS), and the Marshall Islands, are territories of, and inhabited by, indigenous peoples. Because of the connection both the Western Shoshone and the Marshallese have to their traditional homelands, and the traditional ecological knowledge that comes with it, nuclear testing has disrupted their health, environment and livelihoods. Nuclear testing is a uniquely destructive injustice because of the physical and emotional intergenerational trauma caused by changing the very genes of indigenous people exposed to fallout, as well as turning local environments dangerously radioactive. The detonation of the world's most dangerous weapons on indigenous lands for decades also makes nuclear testing a uniquely destructive injustice. With such destruction present in these indigenous communities, we need to ask how this injustice was able to occur, and what are ways that we can seek to remedy this injustice? Two theoretical lenses, discourse and environmental justice, were used to examine why, and how the U.S. was able to test nuclear weapons on indigenous lands. Geographic information sciences were mobilized to produce original counter maps that visualize the exposure of indigenous people to radioactive fallout while contributing to a new discourse with maps that elevate indigenous epistemologies and respect the cultural and environmental significance of that which they depict. Data largely hidden from the public through classification and secrecy of the U.S. military complex were also summarized in tables and graphs for the first time, through much detective work, to show the sheer scale and damage of the testing program in a way that is digestible to the general public. The counter maps, tables and graphs contribute to representational justice in their emphasis of the harm nuclear testing caused to indigenous communities in particular. Put together, this thesis un-erases the history of indigenous communities and nuclear testing using declassified content repurposed with indigenous epistemologies to reframe the story of nuclear testing to one of a uniquely destructive injustice.

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## Abbreviations and Units

- AEC – Atomic Energy Commission
- COFA – Compact of Free Association: agreement governing policy and actions between the US government and the Marshall Islands
- CTBT – Comprehensive Nuclear Test Ban Treaty
- DOC – Department of Commerce
- DOD – Department of Defense
- DOE – Department of Energy
- D/M/ft<sup>2</sup> – Disintegrations per minute per square foot: measures the amount of radiation in the environment
- GIS – Geographic Information Systems
- IAEA – International Atomic Energy Agency
- ICRP – International Commission on Radiological Protection
- ICC – Indian Claims Commission
- Mt – megatons
- mR – micro-Roentgens: measures the amount of radiation absorbed by the body
- mR/hr – micro-Roentgens per hour: measure the amount of radiation in the environment
- NCAC – Native Community Action Council
- NTS – Nevada Test Site
- R – Roentgens: measure the amount of radiation absorbed by the body
- R/hr – Roentgens per hour: measures the amount of radiation in the environment

## I. Introduction

### 1.1 The Injustice of Castle Bravo

“The greatest irony of our atmospheric nuclear testing program is that the only victims of the United States arms since WWII have been our own people”

- U.S. Congressional investigators of the Atomic Energy Commission<sup>1</sup>

On March 1<sup>st</sup>, 1954, the United States conducted its largest nuclear test, and the largest injustice of its nuclear testing program: Castle Bravo. Several researchers warned that wind conditions meant radioactive fallout from Bravo would travel to inhabited atolls of the Marshall

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<sup>1</sup>As quoted in: Kuletz, Valerie. "Invisible spaces, violent places: Cold War nuclear and militarized landscapes." *Violent environments* (2001): 237-260.

Islands, but military commanders deliberately chose to detonate the bomb anyway.<sup>2,3</sup> For smaller tests, the military had evacuated downwind communities, but suspiciously did not evacuate communities for the largest detonation to date.<sup>4</sup> The military instructed US government weather forecasters once the fallout cloud began to travel downwind and to not eat or drink anything that could be contaminated, but the Marshallese communities were not granted the same warning.<sup>5</sup> A military vessel off of Rongelap Atoll was even evacuated in face of the approaching fallout cloud<sup>6</sup>, yet no one warned the Rongelapese. Within hours after the test, Rongelap Atoll was covered in a thin layer of white, radioactive dust, but no one knew it was dangerous. Children played in the radioactive “snow” and ate it.<sup>7</sup>

The Rongelapese were exposed to near fatal amounts of radiation, but the US still waited three days before evacuating them to safety.<sup>8,9</sup> Evacuation, however, is a loose term: the Rongelapese were told to jump into the ocean and swim to a boat without any belongings. During the overnight trip to Kwajalein Atoll, where the US military base was stationed, the Rongelapese weren't given a change of clothes, and were forced to sit in wet, contaminated clothes for hours while their fingernails and hair fell off.<sup>10</sup>

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<sup>2</sup> Barker, Holly M. *Bravo for the Marshallese: regaining control in a post-nuclear, post-colonial world*. Nelson Education, 2012.

<sup>3</sup> Keown, Michelle. "Waves of destruction: Nuclear imperialism and anti-nuclear protest in the indigenous literatures of the Pacific." *Journal of Postcolonial Writing* 54, no. 5 (2018): 585-600.

<sup>4</sup> Ruff, Tilman A. "The humanitarian impact and implications of nuclear test explosions in the Pacific region." *International Review of the Red Cross* 97, no. 899 (2015): 775-813.

<sup>5</sup> Barker, 2012.

<sup>6</sup> *Ibid.*

<sup>7</sup> "1 March 1954 - Castle Bravo." *Comprehensive Nuclear Test Ban Treaty Organization*, n.d. <https://www.ctbto.org/specials/testing-times/1-march-1954-castle-bravo>.

<sup>8</sup> Barker, 2012.

<sup>9</sup> Keju-Johnson, Darlene. "Nuclear Bomb Testing on Human Guinea Pigs." In *Women on War: An International Anthology of Women's Writings from Antiquity to the Present*. Feminist Press at the City University of New York, 2003.

<sup>10</sup> Keju-Johnson, 2003.

The exposure of the Marshallese to radioactive fallout from Castle Bravo was *on purpose*. An analysis of declassified documents by Holly Barker and Barbera Rose Johnston found that Marshall Islanders were purposefully exposed so that researchers could study the effects of fallout on humans.<sup>11</sup> Four months before the Bravo test, the headquarters of the Joint Task Force 7 outlined the research to be conducted alongside the test, including a “Study of Response of Human Beings Exposed to Significant Beta and Gamma Radiation Due to Fallout from High Yield Weapons.”<sup>12</sup> Military officials knew their actions would outrage the general public, so the Marshallese leaders were warned that “If anyone [breathed] a word of this, they’[d] be shot before sunrise.”<sup>13</sup>

## 1.2 Structure and Purpose of Thesis

As the story of Castle Bravo shows, there is much at stake when it comes to nuclear weapons testing and those living under the danger of radioactive fallout. Nuclear weapons testing is an especially egregious environmental injustice because of the way radiation permanently poisons and persists in the human body and the landscape - and because of its invariable presence on lands occupied or claimed by indigenous peoples.

I first became aware of nuclear testing amidst my involvement in the nuclear non-proliferation field as a youth activist for a world free of nuclear weapons. As I became further immersed in the field, while simultaneously studying environmental justice, I was confronted by the distinct lack of conversation among nuclear security experts about nuclear testing beyond treaty negotiations. In a field whose very existence is predicated on the sacrifice of Western

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<sup>11</sup> Barker, 2012.

<sup>12</sup> Ibid.

<sup>13</sup> Davis, Sasha. *The empires' edge: Militarization, resistance, and transcending hegemony in the Pacific*. Vol. 21. University of Georgia Press, 2015.

Shoshone and Marshallese communities, the lack of awareness on the truly destructive nature of the United States' testing program had on indigenous communities is alarming.

Centering a narrative of the United States nuclear weapons complex as one of incredible injustice towards indigenous people while prioritizing indigenous epistemology and language is especially important in changing the conversation in the nuclear security field, while also providing recognition to the indigenous communities who suffered at the hands of nuclear testing. With such destruction present in these indigenous communities, we need to ask how this injustice was able to occur, and what are ways that we can seek to remedy this injustice? Using discourse and environmental justice as primary frameworks, this thesis will interrogate how this incredible injustice occurred and why it is uniquely destructive, as well as explore counter mapping as a strategy for remedying this injustice.

For every nuclear test, the military drafted public relations plans aimed at keeping the public in the dark about the harms of radiation.<sup>14</sup> The military also classified research and studies that showed the harmful effects of radiation,<sup>15</sup> effectively hiding the injustice occurring in downwind indigenous communities. When information on exposure was released or declassified, it was often in forms inaccessible to the general public, or required hours of examining documents in public databases before finding information relevant to exposed communities. This thesis's creation of counter maps that visualize often secret information, as well as tables and graphs which summarize data circulated in inaccessible military documents is incredibly important as a step towards publicizing and, in some ways, remedying this injustice through representational justice.

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<sup>14</sup> Johnston, Barbara Rose. "Half-Lives and Half-Truths." Santa Fe, NM: School for (2007).

<sup>15</sup> Ibid.

I will start by outlining the key context of why nuclear weapons were tested in the first place, how these tests produced radioactive fallout, and how this fallout harms the human body. This context is key to understand why nuclear testing is particularly destructive. Then I'll dive into the historical context of nuclear testing in *Newe Segobia* (Western Shoshone land) and the Marshall Islands, where I develop a narrative defined by injustice towards indigenous people. Then, I will interrogate the power structures that allowed this injustice to occur, primarily through theoretical literatures pertaining to discourse and environmental justice. Implications of discourse and environmental justice for cartography and GIS will then be discussed, with a specific focus on indigenous counter mapping efforts. Then, I will introduce a GIS and cartographic analysis that repurposes declassified maps of radioactive fallout as counter-maps, highlighting the profound cultural and environmental costs of nuclear tests on indigenous lands and the problematic depictions of indigenous lands in military maps that were used to rationalize these outcomes. Tables and graphs that summarize key information for exposed communities, gathered from hours of investigating military documents will also be presented. I will conclude with how nuclear colonialism is manifesting itself in modern environmental injustices in *Newe Segobia* and the Marshall Islands, and end with guidance on a way forward.

### **1.3 Context: Nuclear Weapons and Testing**

In order to understand the destructive nature of nuclear weapons, it is first important to understand the scope of nuclear weapons testing, and why they were tested in the first place. Tests of nuclear weapons have occurred at over 60 locations worldwide, almost all on the land of indigenous or minority communities, and all far away from the centers of power that decide on

these sites of destruction.<sup>16</sup> The United States conducted its nuclear testing programs in the Marshall Islands from 1946 to 1958, and at the Nevada Test Site (NTS) from 1951 to 1992. The NTS is located in the traditional homelands of the Western Shoshone, known as *Newe Segobia*.

In the context of the Cold War, the United States tested increasingly powerful nuclear weapons in the hopes of winning the arms race with the Soviet Union. In political terms, the US tested nuclear weapons for national security. Although nuclear tests were detonated in the name of national security, the Marshallese and Western Shoshone communities experienced a very real nuclear war as a result of the US testing program that was simultaneously invisible to the general public.

In 1945, the US tested the first nuclear weapons at the Trinity Test Site in New Mexico. However, the first thermonuclear weapon was detonated at Enewetak Atoll in the Marshall Islands in 1952. The physics behind the power of detonations, and the health effects on humans from radiation was not widely understood, necessitating continual detonations of nuclear weapons to improve and better understand their power and scope. Although the US was eventually able to move towards underground nuclear tests, which limited the amount of radioactive particles and gas released into the air, all of the tests conducted in the Marshall Islands, and many of the early tests conducted at the Nevada Test Site, were atmospheric nuclear tests. Atmospheric tests – nuclear weapons detonated above ground – are the most likely to spread radioactive fallout because of the inability to regulate the spread of particles and gases released from the nuclear explosion. As a result, fallout from the US tests in the Pacific blanketed the Marshallese while fallout from the Nevada Test Site fell over Western Shoshone and Southern Paiute communities.

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<sup>16</sup> United Nations conference to negotiate a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination. 2 June 2017



Atmospheric nuclear tests stopped in 1963 due to the passing of the Limited Test Ban Treaty, which banned all nuclear tests in the atmosphere, underwater or outer space. In September of 1996, the United Nations General Assembly, with the US as a signatory, passed the Comprehensive Nuclear Test Ban Treaty (CTBT), which banned all nuclear tests. However, the US has subsequently refused to ratify the treaty, so the CTBT has not entered into force, leaving the option open for the United States to begin testing nuclear weapons at any point.

#### **1.4 Context: Radioactive Fallout and Exposure**

Nuclear weapons testing is particularly destructive because of the resulting proliferation of nuclear fallout. Every person born since 1951 has been exposed to radiation from radioactive fallout as a result of nuclear weapons testing.<sup>18</sup> Radioactive fallout is a result of nuclear weapon detonation, when radioactive particles and gases proliferate into the atmosphere. Depending on the weather and power of the weapon detonated, these radioactive particles and gases travel before falling to the earth as fallout.<sup>19</sup> Generally, the more powerful the nuclear weapon, measured in megatons (Mt), the larger the amount of fallout produced. Some particles in fallout remain for a short period of time, while others can last decades, depending on the half-life of the atoms distributed by the fallout.

There are multiple ways to be exposed to radioactive fallout. Pathways refer to the different ways in which the human body is exposed to various toxins. The pathways for fallout include skin contact with fallout particles in the air or from fallout particles on the ground, eating or drinking anything with radioactive fallout on or in it, or breathing radioactive material in the

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<sup>18</sup> “Radioactive Fallout from Global Weapons Testing.” Centers for Disease Control and Prevention, January 6, 2014. [https://www.cdc.gov/nceh/radiation/fallout/rf-gwt\\_home.htm](https://www.cdc.gov/nceh/radiation/fallout/rf-gwt_home.htm).

<sup>19</sup> Ibid.

air.<sup>20</sup> External exposure is when the source of radioactivity is outside your body while internal exposure is when radioactive material enters the body through ingestion or inhalation.<sup>21</sup> The health risks associated with exposure to radiation depend on the type of radiation: alpha, beta, gamma or x-ray. Nuclear weapons mostly emit gamma radiation, the hardest to shield the human body from as they can pass through surfaces and protective layers.

Increasing radiation exposure increases the chance of getting cancer and other radiation related illnesses. As the exposure increases, the risk increases.<sup>22</sup> Exposure to very high levels of radiation from nuclear weapons detonation can cause acute radiation syndrome, and other negative health effects such as skin burns.<sup>23</sup> When a person is exposed to radiation, radioactive particles can interact with DNA directly, causing damage by breaking bonds in the DNA itself, or through the creation of free radicals: unstable oxygen molecules that can damage cells and organs.<sup>24</sup> Once a cell is damaged by radiation, it can either be repaired and keep its normal function, be altered with the potential to become cancerous, or it can die threatening organ failure.<sup>25</sup> The way in which radiation can literally change the DNA of those it comes in contact with, as well as cause continuous harm through its permeation in the landscape for decades is part of what makes nuclear testing a uniquely destructive injustice.

Doses of radiation are measured in millisieverts or roentgens, which measure the amount of radiation absorbed by the body,<sup>26</sup> and can be calculated from a single exposure event or from

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<sup>20</sup> “Radioactive Fallout from Global Weapons Testing.” 2014.

<sup>21</sup> “Radiation Health Effects.” United States Environmental Protection Agency, n.d..

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> “How Radiation Affects Your Body.” Centers for Disease Control and Prevention, December 7, 2015. <https://www.cdc.gov/nceh/radiation/dose.html#how>.

<sup>25</sup> Ibid.

<sup>26</sup> “Radiation and Your Health: Measuring Radiation.” Centers for Disease Control and Prevention, December 7, 2015. <https://www.cdc.gov/nceh/radiation/measuring.html>.

accumulated exposures,<sup>27</sup> as is often the case with downwind communities of nuclear testing. Ambient levels of radiation, or how much radiation is in the environment, is measured in sieverts/hour or roentgens/hour.<sup>28</sup>

The Marshall Islands experienced acute exposure to radioactive fallout after Castle Bravo, resulting in beta burns, hair loss, flulike system, radioactive urine and cell damage in the blood and bone marrow.<sup>29</sup> Those who were born in, or later moved to, contaminated areas in the Marshall Islands also developed cancers.<sup>30</sup> Because you cannot see, feel or taste exposure to radiation, exposure to fallout not only affects you physically, but also mentally through anxiety of developing future health effects.<sup>31</sup>

## **Historical Context**

### **2.1 Law and Policy Enabling Injustice**

To set the stage for an analysis of discourse and environmental justice, we first need to go into the weeds of how law and policy enabled the injustice of nuclear testing. I'll start with a case study of the Western Shoshone and internal colonialism, and then transition to the second case study of the Marshall Islands and American imperialism. This historical context shows the systems of power that were set up to allow the United States to make decisions that prioritized its national security over the well-being of indigenous communities.

#### ***2.1.1 Western Shoshone and Internal Colonialism***

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<sup>27</sup> "Radiation Health Effects." n.d.

<sup>28</sup> "Radiation and Your Health: Measuring Radiation." 2015.

<sup>29</sup> Johnston, 2007.

<sup>30</sup> Ibid.

<sup>31</sup> Voyles, Traci Brynne. *Wastelanding: Legacies of uranium mining in Navajo country*. U of Minnesota Press, 2015.

Western Shoshone land stretches over 60 million acres, including 2/3 of the state of Nevada, spanning into Western Utah, Idaho and Southern California, with landscapes from mountains and canyons to deserts. The Western Shoshone have been associated with these lands for over 12,000 years.<sup>34</sup> They call their land *Newe Segobia*, meaning “Peoples’ Earth Mother” in Shoshone.<sup>35</sup> Shoshone creation stories say that Newe, or the Shoshone, were placed on the earth with the responsibility to care for it now and for future generations of humans and all life through song and prayer.<sup>36</sup> Believing that the earth is a female being, where the Creator, or “Apa” holds title to the land, the Western Shoshone do not own the land, in fact no person owns the land, but only has the responsibility to take care of it.<sup>37</sup> Property ownership for the Western Shoshone is instead a right to access.

The Treaty of Ruby Valley, agreed upon in 1863, granted the president the authority to establish a reservation for the Western Shoshone, but the US never exercised that right, and did not create any reservations for the Western Shoshone.<sup>38</sup> The treaty also guaranteed compensation to the Western Shoshone for the use of land and resources in their territory.<sup>39</sup> Part of the compensation was cattle in order to encourage a move to a pastoral instead of a nomadic lifestyle.<sup>40</sup>

The treaty additionally allowed the US to build military bases for the purpose of ensuring the safety of travelers and travel related infrastructure,<sup>41</sup> but *not* for national security. Most

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<sup>34</sup> Kuletz, 2001.

<sup>35</sup> Fishel, Julie Ann. "United States called to task on indigenous rights: the Western Shoshone struggle and success at the international level." *American Indian Law Review* 31, no. 2 (2006): 619-650.

<sup>36</sup> *Ibid.*

<sup>37</sup> *Ibid.*

<sup>38</sup> O'Connell, John D. "Constructive Conquest in the Courts: A Legal History of the Western Shoshone Lands Struggle—1861 to 1991." *Natural Resources Journal* (2002): 765-799.

<sup>39</sup> Johnson, Taylor N. "'The most bombed nation on Earth': Western Shoshone resistance to the Nevada National Security Site." *Atlantic Journal of Communication* 26, no. 4 (2018): 224-239

<sup>40</sup> O'Connell, 2002.

<sup>41</sup> O'Connell, 2002.

importantly, however, is that the treaty included no cession of land by the Shoshone, or cession of the right to decision making about the land.<sup>42</sup>

Federal Indian Law is based on the outdated doctrine of discovery, where the arrival of Europeans overrides indigenous peoples' natural rights to occupancy. The doctrine of discovery has in turn led to the additional doctrines of plenary power and trusteeship.<sup>43</sup> In *Lone Wolf v. Hitchcock*, Congress was given plenary power over indigenous lands, establishing a paternalistic relationship between tribes and the US government, where indigenous communities became wards of the state, and thus subject to federal decisions, effectively eroding the sovereignty of indigenous people.<sup>44</sup> The doctrine of plenary power means that the US can unilaterally dissolve treaties entered into with indigenous nations, as it assumes superiority of the US government to make decisions on behalf of indigenous people.<sup>45</sup>

In 1941, part of *Newe Segobia* was designated by President Franklin D. Roosevelt as the Las Vegas Bombing and Gunnery Range. Nine years later, part of the gunnery range was turned into a nuclear weapons test site. However, the NTS was not officially confiscated from the Western Shoshone until 1951, when President Truman forcibly relocated 100 Native American families.<sup>46</sup>

Around the same time, in 1946, the Indian Claims Commission (ICC) was created to partially compensate indigenous people for lost lands and resources. It is no coincidence that a claim supposedly on behalf of all the Western Shoshone people, was brought to the court in 1951, the same time that the NTS was officially established on Western Shoshone land. The

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<sup>42</sup> Fishel, 2006.

<sup>43</sup> Ibid.

<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

Shoshone attempted to stop the ICC proceedings as most of their lands had not been taken at that time, and were still actively being used by Western Shoshone.<sup>47</sup> Despite trying to fire the attorneys claiming to represent them, the ICC allowed the case to continue despite the clients' formal withdrawal of counsel.<sup>48</sup> The ICC ruled that Shoshone title had been extinguished through "gradual encroachment," a ruling that then barred Shoshone from asserting their right to title in any US courts.<sup>49</sup> Notably, this theory of gradual encroachment was only ever used in the Western Shoshone case, suggesting that this legal argument was drafted for the specific purpose of extinguishing Western Shoshone land rights.<sup>50</sup>

The Treaty of Ruby Valley was never officially abrogated by the US government acting on the doctrine of plenary power, so it remained in full force until the payment from the ICC claim, which has still never been accepted by the Western Shoshone.<sup>51</sup> In 1979, the US government paid the Secretary of the Interior for the land the Western Shoshone supposedly lost through gradual encroachment, and because the Shoshone never accepted the money, it sits in the Treasury Department.<sup>52</sup> The Shoshone refused the money because of their opposition to nuclear testing, and in 2004, the US forcibly distributed the money under the Western Shoshone Distribution Act of 2004.<sup>53</sup> Here, the government used its power in full force: the judicial branch first ruled on gradual encroachment, then the executive branch allocated funds to the Treasury Department, and finally, the legislative branch to forcibly distributed the funds, all for the purpose of subverting the rights of the Western Shoshone to their lands.

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<sup>47</sup> Ibid.

<sup>48</sup> Ibid.

<sup>49</sup> Ibid.

<sup>50</sup> Ibid,

<sup>51</sup> O'Connell, 2002.

<sup>52</sup> Fishel, 2006.

<sup>53</sup> Johnson, 2018.

These actions were not without resistance. Mary and Carrie Dann “trespassed” on the land base at the center of the ICC proceedings in 1974, resulting in the Department of the Interior suing the two sisters. The 9<sup>th</sup> circuit court of appeals agreed with the Dannels that the US had not proven extinguishment of Western Shoshone title.<sup>54</sup> However, the US government skirted this ruling by waiting for the ICC to pay the Department of the Interior, who accepted the payment for “extinguished” lands on behalf of the Western Shoshone.<sup>55</sup> In 1985, the US Supreme Court confirmed that the interior could accept this payment on behalf of the Western Shoshone, which then barred the Western Shoshone from asserting their title to land in the US courts again.<sup>56</sup> As a result of these policy and legal actions, the US now claims almost 90% of Western Shoshone lands.<sup>57</sup>

The NTS was used for nuclear weapons testing until 1992 when the US ceased nuclear weapons testing in response to the Comprehensive Test Ban Treaty. Since 1951, there have been around 900 nuclear tests for both Great Britain and the US at the NTS,<sup>58</sup> 105 of which were above ground, and all of which were conducted on land that belongs to the Western Shoshone.<sup>59</sup> Since 1963, all of the tests were conducted underground, but the tests still leaked radiation into the atmosphere.<sup>60</sup> From 1951, to 1992, 220 of the above and below ground nuclear tests released radioactive plumes, a majority of which traveled east over Native American reservations.<sup>61</sup> In

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<sup>54</sup> Fishel, 2006

<sup>55</sup> Ibid.

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

<sup>58</sup> Quigley, Dianne, Virginia Sanchez, D. Handy, Robert Goble, and P. George. "Participatory research strategies in nuclear risk management for native communities." *Journal of health communication* 5, no. 4 (2000): 305-331.

<sup>59</sup> Johansen, Bruce. "The Most Bombed Nation on Earth." In *Environmental Racism in the United States and Canada: Seeking Justice and Sustainability*. ABC-CLIO, 2020.

<sup>60</sup> Solnit, Rebecca. *Savage Dreams: A Journey into the Landscape Wars of the American West*. Berkeley: University of California Press, 2000.

<sup>61</sup> Quigley et al, 2000.

this increasingly militarized landscape, Western Shoshone and other native communities were treated as invaluable in order to exploit what was viewed as a useless landscape.

Native communities that surround the NTS include the Moapa reservation to the southeast, the Pahrump Paiute Tribe and the Las Vegas Paiute Colony to the south, the Duckwater Shoshone and Yomba Shoshone to the northwest, the Timbisha Shoshone to the west, and the Goshute reservation to the northeast, which does not even include the historic use of the land by many different sects of the Mojave and Great Basin Native Americans.<sup>62</sup> Altogether, the area downwind from the NTS consist of mostly Native Americans and Mormons, both marginalized communities in the US.<sup>63</sup>

Decisions were specifically made on who would be exposed to radioactive fallout. The Atomic Energy Commission policy was to not test when the wind was blowing south, towards Las Vegas and Los Alamos.<sup>64,65</sup> Tests occurred when wind was blowing east, however, towards Native American and Mormon populations.<sup>66</sup> Deliberate decisions to expose communities viewed as undesirable to the U.S. military makes nuclear testing a uniquely destructive injustice. Exposing communities to the most dangerous weapons the world has to offer is perhaps the most powerful injustice of all.

Not only did nuclear weapons testing leave its destruction upon Western Shoshone lands, but also the entire process of nuclear weapons, from cradle to grave, produced injustice on Western Shoshone lands. For more than 40 years, Western Shoshone were exposed to low doses of radiation from uranium mining, milling, and conversion, in addition to nuclear weapons

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<sup>62</sup> Kuletz, 2016

<sup>63</sup> Jacobs, Robert. "Nuclear conquistadors: military colonialism in nuclear test site selection during the Cold War." (2013).

<sup>64</sup> Ibid

<sup>65</sup> Kuletz, 2016.

<sup>66</sup> Jacobs, 2013.



testing.<sup>67</sup> Multiple destructive processes for the end goal of nuclear weapons operated simultaneously in *Newe Segobia*. Now, Native American communities have experienced poor health and an excess of diseases within themselves, as well as the local plant and animal communities.<sup>68</sup> Nuclear weapons have destroyed Western Shoshone land and community on many fronts. Radiation effects from nuclear tests continue to cause harm from more than 40 years of exposure. Community members who were exposed as children now experience twice the thyroid cancer risk of non-native people.<sup>69</sup> The Marshall Islands also experienced a similar pattern of the United States using law and policy to enable its power in the region, setting the stage for nuclear weapons testing and physical and emotional harms to local indigenous communities.

### ***2.1.2 Marshall Islands and American Imperialism***

The Marshall Islands are two archipelagic island chains of 29 atolls and over a thousand islands.<sup>70</sup> People have lived on these islands for over 4000 years.<sup>71</sup> Before the nuclear tests, the United States was already setting the stage to control the Marshall Islands. But before the United States arrived, the Marshallese had experienced colonization for almost a century already. Missionaries arrived in the Marshall Islands in the 1850s, and began converting some of the Marshallese to Christianity.<sup>72</sup> Spain claimed the islands as their own in 1874, followed by Germany from 1885-1914, Japan from 1919-1944 and then the United States from 1944 –

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<sup>67</sup> Quigley et al., 2000.

<sup>68</sup> Ibid.

<sup>69</sup> George, Patricia, and Abel Russ. "Nuclear Testing and Native Peoples: Tribal research uncovers unexpected exposures." *Race, Poverty & the Environment* 11, no. 2 (2004): 38-40.

<sup>70</sup> IAEA. "Radiological Conditions at Bikini Atoll: Prospects for Resettlement." (1998).

<sup>71</sup> Ibid.

<sup>72</sup> Jacobs, 2013.

1986.<sup>73</sup> Ruling under the Japanese military administration was ended with two years of warfare in which the United States took control of the islands, but in the process, one out of ten Marshallese were killed.<sup>74</sup>

The United States would later take advantage of converted Marshallese by using coded language to convince the Bikini people to leave their atoll in the 1940s. When a navy official from the US government traveled to Bikini Atoll in 1946, he told Chief Juda of the Bikini people that the US needed to borrow their island to test “bombs for the good of mankind, and to end all world wars.”<sup>76</sup> There was a significant language barrier between the military official and the Chief, but because of the missionaries, the Chief recognized the use of “mankind,” so he agreed to temporarily leave the island with the assumption that it was for God.<sup>77</sup> Knowing about the presence of missionaries on the island, the military used coded language from the Bible to convince Bikinians to give up their land.<sup>78</sup> Navy officials also did not communicate the permanence required in leaving Bikini Atoll, telling the Bikinians that they only needed the island temporarily.<sup>79</sup>

Although leaving Bikini is often viewed as a choice, when the navy official arrived to ask permission from Chief Juda, there were already thousands of soldiers, along with airplanes and ships in the Bikini lagoon.<sup>80</sup> The physical presence of the military infrastructure surrounding the atoll cannot be ignored. By preemptively placing war infrastructure around Bikini island, the military treated the Bikini people as an afterthought, as one last step towards their goals of experimental destruction.

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<sup>73</sup> Johnstone, Ian. “Marshall Islands - a Brief History.” RNZ, August 5, 2011..

<sup>74</sup> Johnstone, 2011.

<sup>76</sup> Keju-Johnson, 2003.

<sup>77</sup> Ibid.

<sup>78</sup> Jacobs, 2013.

<sup>79</sup> Keju-Johnson, 2003.

<sup>80</sup> Ibid.

Nuclear testing would occur on the Marshall Islands from 1946 until 1962. Test Able, conducted in July, 1946, was the first test at Bikini Atoll, with a yield of 23 kilotons. The military ordered marines to decontaminate ships placed close to the center of the test explosion. When the marines became sick, the military soon realized the harmful effects of radioactive fallout on humans.<sup>81</sup> As a result, the military knew the damage radiation could cause on humans, losing the plausible deniability of not knowing the harms of nuclear fallout, yet they proceeded with more tests that would expose the Marshallese population to such harms. Again, we see the uniquely destructive nature of nuclear testing, in its deliberate exposure of indigenous communities to radiation.

After the US had detonated 2 bombs at Bikini Atoll in 1946, the UN gave the US authority to administer the islands as a Strategic Trusteeship, giving the US the responsibility for the health and economic advancement of the Marshallese people.<sup>82,83</sup> Soon after, in two different resolutions, the UN explicitly authorized nuclear testing in the Marshall Islands, even when it was against the wishes of the Marshallese people, making this the only instance where the UN explicitly authorized nuclear weapons testing.<sup>84</sup> The policy of the UN enabled injustice, fueled in part by the global power of the United States in the post WWII era.

Castle Bravo, conducted in March, 1954, almost 8 years after the first test at Bikini Atoll and the establishment of the US's trusteeship of the Marshall Islands, took the inaccuracies of the military's science to a deadly level. The test was 15Mt, 2.5 times higher than expected, making it the largest nuclear weapons test conducted by the US. Declassified studies of the Marshallese

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<sup>81</sup> "1 July 1946 - 'Test Able', Bikini Atoll." Comprehensive Nuclear Test Ban Treaty Organization, n.d. <https://www.ctbto.org/?id=3339>.

<sup>82</sup> Ruff, 2015.

<sup>83</sup> Johnstone, 2011.

<sup>84</sup> Ruff, 2015.

showed acute exposure to radiation after Castle Bravo, resulting in loss of hair, flu-like symptoms, beta burns and changes in blood and bone marrow at the cellular level.<sup>85</sup> The Marshallese also suffered from long term effects such as cancer, reproductive problems, metabolic disorders, growth impairment and immune-deficiency diseases.<sup>86</sup> Exposure expanded beyond just acute exposure to include anyone with prolonged interaction with contaminated areas, even years after the nuclear tests themselves.<sup>87</sup> Decades later Bikini Atoll is still uninhabitable, even after several clean-up efforts.<sup>88</sup> Nuclear testing constitutes a particularly destructive injustice because of the long half-lives of radioactive materials on several atolls in the Marshall Islands decades after the nuclear tests were conducted.

The U.S. military also exerted physical and emotional control on the Marshallese by controlling information and conducting non-consensual medical experiments in Project 4.1. The project included 530 Marshallese, including children, who did not give informed consent.<sup>89</sup> Doctors took bone marrow, blood and urine samples without translators,<sup>90</sup> and some of the survivors were given more doses of radiation and had experimental surgery performed on them.<sup>91</sup> Instead of treating these survivors of radioactive fallout, the doctors did not even give patients medications or painkillers for radiation burns that went down to the bone.<sup>92</sup> When children tried to escape the experiments, the US government bribed local police to catch the children.<sup>93</sup> Most of the children in the project have developed one or more thyroid diseases,<sup>94</sup> along with the

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<sup>85</sup> Ibid.

<sup>86</sup> Johnston, 2007.

<sup>87</sup> Ibid.

<sup>88</sup> "1 July 1946 - 'Test Able', Bikini Atoll." n.d.

<sup>89</sup> Ruff, 2015.

<sup>90</sup> Barker, 2012.

<sup>91</sup> Ruff, 2015.

<sup>92</sup> Barker, 2012.

<sup>93</sup> Ibid.

<sup>94</sup> Ruff, 2015.

emotional scarring of being unwilling test subjects for a foreign power. Again, the purposeful exposure of Marshallese communities makes nuclear testing a uniquely destructive injustice.

The U.S. government took steps to obscure and manipulate data to obfuscate the harms of radiation in the environment. In order to minimize the perceived harm from radiation, scientists chose a “control” group that also lived in a highly contaminated environment. As Barker found in her 2012 analysis, this was purposeful manipulation of data by setting the baseline for “unexposed” populations at higher rates of radiation related illnesses than would be seen with a truly unexposed population.<sup>95</sup> Since the control group exhibited the same illnesses as the exposed group, the US government could maintain that the consequences of radiation were the norm.<sup>96</sup> The US had the power to produce “objective” scientific knowledge in order to deny the lived experiences of the Marshallese - that of extreme prevalence of radiation related illnesses. Not only was there a deliberate exposure of Marshallese people to radiation, but also a deliberate attempt to cover it up, again making this a particularly destructive injustice.

Incredible harm was also caused in the continuous relocations of the Bikini people throughout the time of nuclear testing by the U.S. military. Beyond just relocations, the lack of trust and consistency in different authority’s declarations that atolls were safe for settlement also perpetrated harm. The Bikinians were first relocated to Rongerik Atoll, before being relocated again to Rongelap Atoll, for two years.<sup>97</sup> In August 1968, President Linden B. Johnson announced that Bikini Atoll could be resettled, and in 1970, three Bikinian families and 50 Marshallese workers returned to the atoll.<sup>98</sup> This announcement was made despite warnings by the Atomic Energy Commission (AEC) in 1952 that Bikinians could never safely return to the

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<sup>95</sup> Barker, 2012.

<sup>96</sup> Ibid.

<sup>97</sup> IAEA. "Radiological Conditions at Bikini Atoll: Prospects for Resettlement." (1998).

<sup>98</sup> Barker, 2012.

atoll.<sup>99</sup> Instead, the resettlement of Bikini was used as an opportunity to study the effects of ingesting plutonium through environmental exposure.<sup>100</sup> Bikinians, after resettling, did not fully trust the government's message of safety, so they consulted the International Atomic Energy Agency (IAEA). In 1978, the IAEA found a tenfold increase in the body content of radionuclide cesium in residents of Bikini Atoll.<sup>101</sup> The result was yet another relocation to Kili Island, and then to Ejit Island at Majuro Atoll.<sup>102</sup>

The policies established by the United States once it decided to grant the Marshall Islands independence in 1979 was structured in a way to minimize the responsibility of the United States for the damage left behind by its nuclear testing program. The Compact of Free Association (COFA) came to be the main agreement governing policy and actions between the US government and the Marshall Islands by 1983.

Although the COFA has some features of independence, like an independent Marshallese embassy, UN recognition, and control over domestic policy, the COFA still links the Marshall Islands to the US. The US provides half the operating budget of the Marshallese government, and also promises the US strategic denial, which means the US military is the only one allowed in Marshallese waters.<sup>103</sup> The Marshallese thus have no rights to stop the US from any activity that it deems necessary for its national security.<sup>104</sup> The agreement also provides some funds for the US's use of Kwajalein, and a limited fund for the legacy of nuclear weapons testing. While the COFA grants the Marshall Islands independence, it still allows the US to retain control over what it valued about the Marshall Islands in the first place, not the people or their culture, but its

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<sup>99</sup> Ibid.

<sup>100</sup> Ibid.

<sup>101</sup> IAEA, 1998.

<sup>102</sup> Davis, 2015.

<sup>103</sup> Ibid.

<sup>104</sup> "The Movement for Environmental Justice in the Pacific Islands." 2002.

strategic military location. The COFA creates a continued relationship of dependency,<sup>105,106</sup> making it American imperialism under a new name.

The language of the COFA promises that the US will take responsibility for all past, present and future damage from the nuclear testing program, but US laws limit who can receive assistance from the US government, resulting in the exclusion of thousands of people from their right to compensation.<sup>107</sup> In addition, the US only gave the Marshallese a \$150 million one-time settlement for all past, present and future consequences for the testing program, despite not providing all the information they had on the existing damages.<sup>108</sup> The result is that because a payment was made, it terminated the rights of Marshallese communities to make any additional claims in US courts.<sup>109</sup> Similar to the Western Shoshone, who lost their right to claim title to their lands in the US court because of a non-consensual payment to the Department of the Interior, the Marshallese lost their right to claim compensation in the US courts because of the COFA.

The Marshallese agreed to the COFA despite the fact that the US did not fully disclose its knowledge on the full damages caused by radiation. For example, the agreement only promised to provide compensation for people in the 14 northernmost atolls of the Marshall Islands, which included atolls such as Bikini, Rongelap, Enewetak and Utirik Atolls.<sup>110 111</sup> Based on witness testimonies, and the experiences of the Marshallese community, the effects of radiation clearly went beyond these designated 14 atolls. A policy of limiting compensation to some atolls and not

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<sup>105</sup> Gard, A. Rowan. "Looking for light on the dark side of the American dream—Exploring the painful legacy of nuclear colonialism in paradise." *International Journal of Research in Sociology and Anthropology* 3, no. 4 (2017): 32-42.

<sup>106</sup> "The Movement for Environmental Justice in the Pacific Islands." 2002

<sup>107</sup> Barker, 2012.

<sup>108</sup> Ibid.

<sup>109</sup> Ibid.

<sup>110</sup> IAEA. (1998).

<sup>111</sup> Barker, 2012.

others also ignored the Marshallese culture of migration, where there was often movement between islands.<sup>112</sup> In a Nuclear Claims Tribunal, people from every single atoll in the Marshall Islands successfully demonstrated the existence of radiation related illnesses.

The US government's complete control over all the scientific and medical information from the testing program allowed it to strategically agree to some forms of compensation and not others in the COFA.<sup>113</sup> The DOE had the power to confine the discussion of radiation exposure to the 14 atolls listed in the COFA. By doing so, the US was able to diminish its responsibility for exposures, and to ignore the needs of communities beyond the identified areas of exposure.<sup>114</sup> Decades after the COFA was established, President Clinton created a White House Advisory Committee on Human Radiation Experiments in 1994. As a result, thousands of declassified documents were released that prove that the US knew radiation exposure went beyond the 14 designated atolls, and extended to atolls previously considered unexposed such as Ailuk, Likiep, Wotho, Mejit and Kwajalein atolls.<sup>115</sup> Again, there are deliberate actions taken by the U.S. government to limit its responsibility for the harms it caused through nuclear testing. Nuclear testing is a uniquely destructive injustice not only in the scope of the harm caused, but the way in which the United States has leveraged its power to create law and policy that limit its responsibility for remedying the harm its caused.

## 2.2 Nuclear Colonialism

“I think that if it were not for the United States and their desire to be stronger than Russia, we, the people of Rongelap, would not have to turn our heads in shame for fear of being considered freaks of nature” – Aruko Bobo, 1994, Rongelap Atoll<sup>116</sup>

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<sup>112</sup> Ibid.

<sup>113</sup> Ibid.

<sup>114</sup> Ibid.

<sup>115</sup> Ibid.

<sup>116</sup> As quoted in: Barker, 2012.



As Aruko Bobo points out, the sacrifice of the health and safety of the Rongelapese people is in part because of the United States' desire to triumph over Russia in the Cold War. In order to achieve this goal, the United States practiced nuclear colonialism. Nuclear colonialism is inclusive of nuclear weapons testing, requiring an explanation of its scope and power to gain the full historical context needed to understand how nuclear testing was allowed to occur.

Holly Barker articulates nuclear colonialism as the system in which nuclear weapons production disproportionately harms indigenous people.<sup>117</sup> Nuclear colonialism elaborates upon how power simultaneously operates in colonialism and in the production of nuclear weapons through access to military power and technology. Sasha Davis uses nuclear colonialism to expand upon the idea that colonization and militarization are mutually reinforcing systems,<sup>118</sup> while Johnson goes further to explain how colonization and nuclearization are mutually supportive systems.<sup>119</sup> In this way, as Davis explains, places are colonized because they are good locations for military bases, and military bases are placed in colonies because they are already politically controlled spaces.<sup>120</sup> Nuclear colonialism must also be extended to consider colonies internal to the United States, where indigenous sovereignty is ignored, and settler colonialism reigns.

The entire development of nuclear weapons relies heavily on indigenous lands and resources, such as uranium mining on Navajo Land, and nuclear testing on Western Shoshone and Marshallese land. One instance is the US's decision to move above ground nuclear tests overseas, after discovering the full extent of the harms of radioactive contamination from

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<sup>117</sup> Endres, Danielle. "From wasteland to waste site: the role of discourse in nuclear power's environmental injustices." *Local Environment* 14, no. 10 (2009): 917-937.

<sup>118</sup> Davis, 2015.

<sup>119</sup> Johnson, 2018.

<sup>120</sup> Davis, 2015.

Hiroshima and Nagasaki.<sup>121</sup> The Marshall Islands was chosen because of its distance from geographies the US considered to be important,<sup>122,123</sup> and because there was already a history of US military presence in the region. Horacio Rivera, a member of the Naval Office of Special Weapons even specified that the test site “had to be away from population centers of the US... and yet in an area controlled by the US.”<sup>124</sup> Colonization had to precede this kind of distinction - one of people and land that mattered, and ones that could be sacrificed. The US enacts this kind of destruction in the name of establishing peace, but what this really means is treating specific, often colonized, people and places as sacrifice zones.

The US maintains multiple military bases in the Pacific, including Kwajalein Atoll in the Marshall Islands. Through its military power and presence in the region from WWII, the US had access to the Marshall Islands and the resources to poison the island with nuclear bombs. The US was also able to minimize international scrutiny by testing on lands where they had colonial jurisdiction<sup>125</sup>, allowing them to hide injustice from the public while exercising nuclear colonialism.

Nuclear colonialism also manifests in the policies of imperial powers, specifically in the standards used for their own people, as compared to colonized ones. For example, Britain set the max radiation dose limit for “primitive” peoples in the Pacific to fifteen times higher than that permitted by the International Commission on Radiological Protection (ICRP).<sup>126</sup> In this case, a colonial power devalued the safety, and by extension, life, of Pacifica people like the Marshallese.

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<sup>121</sup> Ibid.

<sup>122</sup> Ibid.

<sup>123</sup> Jacobs, 2013.

<sup>124</sup> Ibid.

<sup>125</sup> Keown, Michelle. "Waves of destruction: Nuclear imperialism and anti-nuclear protest in the indigenous literatures of the Pacific." *Journal of Postcolonial Writing* 54, no. 5 (2018): 585-600.

<sup>126</sup> Ruff, 2015.

In the Marshall Islands, the colonialism at work can still be physically seen in the landscape through Kwajalein Military Base. Kwajalein Atoll consists of over a hundred connected islands, and has close to 20,000 inhabitants, most of them military contractors as the military has forced Marshallese people off of most of the islands in the atoll.<sup>127</sup> Today the base is used as a target for testing ballistic missiles, continuing to assert the US's military presence in the area through the sounds of missiles flashing overhead. When the Marshallese fly home, into Kwajalein, they must wait for a bus with bars on the windows to drive them to a dock, where a boat takes them to Ebeye, the capital of the Marshall Islands.<sup>128</sup> Kwajalein atoll is sectioned off from the Marshallese, where access is only allowed for day jobs of menial labor.<sup>129</sup> The base serves as a rich community in the mid-Pacific, with green lawns and white picket fences<sup>130</sup>, where the Marshallese can only gain access through buses with jail-like windows.

The historical context behind nuclear weapons testing in *Newe Segobia* and the Marshall Islands, as well as the all-enveloping system of nuclear colonialism begins to help us understand how nuclear testing was able to occur. The theoretical frameworks of discourse and environmental justice are necessary in order to really interrogate the process of deciding to test nuclear weapons on indigenous lands, and to examine strategies for resistance.

## **Guiding Frameworks**

### **3.1 Discursive Formations**

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<sup>127</sup> Davis, 2015.

<sup>128</sup> Ibid.

<sup>129</sup> Ibid.

<sup>130</sup> Ibid.

Discourse is a process by which knowledge and meaning are produced through social interactions and systems. Moreover, discourse is a practice shaped by power.<sup>131</sup> Different people, organizations and institutions interpret places, creating discourses about them, and then affect how images of those places are reproduced. As Davis explains, discourse is both a spatial and social process.<sup>132</sup> Further, Davis emphasizes how discourse shapes how and where violence occurs through conversations about the land and the people that inhabit them.<sup>133</sup>

Nuclear testing on indigenous lands can be traced back to a discursive process where those in power constructed knowledge about landscapes that allowed them to exert power over these landscapes and the people and resources within them. Colonial violence, in this way, is fueled by ideas about people and landscapes.<sup>134</sup> Foucault's theory of discourse helps examine how indigenous lands were turned into nuclear test sites, or sacrifice zones. The US government created areas of environmental privilege, and environmental racism by using the discursive process to render spaces and people as marginal and worthless.<sup>135</sup> By erasing the lives of people on these lands, the US was able to hide the importance of these spaces as indigenous communities, and instead reconstitute the space for national security.<sup>136</sup>

The US government's discourse rendered spaces and places as sacrifice zones and the people who lived there as sacrificial. In the discourse surrounding nuclear test sites, the word to watch is *wasteland*. Wasteland has become a strong suggestion of places and people that are "less than."<sup>137</sup> Once an area is labeled as a wasteland, and power is operated to portray and

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<sup>131</sup> Foucault, Michel, and Anthony M. Nazzaro. "History, discourse and discontinuity." *Salmagundi* 20 (1972): 225-248.

<sup>132</sup> Davis, 2015.

<sup>133</sup> Voyles, 2015.

<sup>134</sup> *Ibid.*

<sup>135</sup> *Ibid.*

<sup>136</sup> Davis, 2015.

<sup>137</sup> Voyles, 2015.

discuss it as such, it seems almost natural to locate the world's most destructive processes, like nuclear testing or high level nuclear waste storage in them.<sup>138</sup> Traci Brynne Voles describes this process as one of “Wastelanding,” a feat of discourse based magic where racialized lands are portrayed as unimportant, uninhabited and worthless, and then extracted for all their resources.<sup>139</sup> However, these lands remain important for the communities that continue to inhabit them.

This level of discourse creates a kind of self-fulfilling prophecy, where places are labeled as wastelands, and then, through polluting and extractive industries and processes, are physically made into hazardous and toxic spaces. And in the case of nuclear testing, these processes poison the land with dangerous radioactivity for thousands of years. For Voles, wastelanding physically manifests the discursive.<sup>140</sup>

A discursive process of rendering places and the people that inhabit them as wastelands, sacrifice zones or useless was at work in both *Newe Segobia* and the Marshall Islands when locating nuclear testing. For *Newe Segobia* a discourse around desert landscapes was mobilized, while for the Marshall Islands, a discourse of islands as remote and perfect isolates was used. Both of these discursive processes aided the United States in its nuclear testing program, and its perpetration of this uniquely destructive injustice.

### ***3.1.1 Discourse of the Desert***

Nuclear testing on Western Shoshone land can be traced back to discourse around Native American lands in the west, and the discourse surrounding deserts. Discourse surrounding the Great Basin region as a wasteland started as early as the 1860s, coinciding with settler

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<sup>138</sup> Endres, 2009.

<sup>139</sup> Voles, 2015.

<sup>140</sup> Ibid.

colonialism in the west. When William Tecumseh Sherman reached Navajo Country in 1868, he described it as “utterly unfit for white civilization.”<sup>141</sup> This social construction of desert landscapes of the southwest as without worth was key in the colonization of Diné as well as other southwestern and Great Basin tribes.<sup>142</sup>

Deserts themselves are specifically targeted for destructive, extractive industries because white Euro-American thought labels them as useless.<sup>143</sup> Within this is the assumption that non-white lands are valueless.<sup>144</sup> As Taylor Johnson points out, there is a consistent pattern of the settler government using rhetoric to erase indigenous peoples and nations from the desert in order to justify taking the land.<sup>145</sup> Johnson further explains that by erasing the cultures and communities in desert spaces, the government constructs these spaces as natural sacrifice zones, where the only legitimate use is for the military.<sup>146</sup>

Not only did settler colonialism erase indigenous peoples from the desert, but settler colonialism also relegated indigenous peoples to the past in order to protect the power of the colony in the present. By colonizing lands, settlers are portrayed as making useless land useful through resource exploitation, and in the process reconstructing the land as belonging to the settler.<sup>147</sup> Doing so takes away the right of indigenous people to occupancy and sovereignty, as well as dehumanizes their existence. The US government used this very strategy when they established the Nevada Test Site. US government officials refer to the NTS as “the territory described in the Treaty of Ruby Valley,” indicating the treaty was something of the past.<sup>148</sup>

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<sup>141</sup> Ibid.

<sup>142</sup> Ibid.

<sup>143</sup> Ibid.

<sup>144</sup> Ibid.

<sup>145</sup> Johnson, 2018.

<sup>146</sup> Ibid.

<sup>147</sup> Voyles, 2015.

<sup>148</sup> Johnson, 2018.

Settler colonialism is a potent form of physical discourse that set the stage for nuclear testing on Western Shoshone lands through relegating indigenous people to the past, and their land as useless or as belonging to the settler.

The dehumanization of indigenous people by federal policy was enacted by the Atomic Energy Commission as well, who described the native communities downwind of the test site as “a low-use segment of the population.”<sup>149</sup> Because these lands were currently occupied by Western Shoshone communities, the US government assumed that these lands were inherently valueless when deciding where to locate the NTS. The military then explicitly stated these assumptions in their internal memos. As I discuss later, while the US government is constructing the landscape as a wasteland, there is also a different discourse, that of the Native American elders and communities who discuss the landscape as sacred homeland.<sup>150</sup>

By framing decisions around nuclear testing in the lens of national security, the US government created a discourse around a lack of options, as well as a sense of urgency. However, American national security comes at the expense of the Western Shoshone nation<sup>151</sup> as their sacred lands are subjected to the effects of nuclear detonation. Although national security is framed as a universal benefit<sup>152</sup>, what we don’t see is the people and lands that are sacrificed in order to attain it. Producing a narrative of national security, the U.S. government was able to erase the presence and cultural history of the Western Shoshone. Similarly in the Marshall Islands, the U.S. created a discourse around the islands as isolates, as insignificant, again erasing the people of the Marshall Islands in favor of a narrative of national security and technological superiority.

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<sup>149</sup> Jacobs, 2013.

<sup>150</sup> Kuletz, 2016.

<sup>151</sup> Johnson, 2018.

<sup>152</sup> Ibid.

### *3.1.2 Discourse of the Island Isolate*

The power of discourse enacted by the U.S. military also extends to the Marshall Islands, and the injustices of the U.S. nuclear testing program there. Hau'ofa discusses how the idea of Pacific Islands as "islands in a far sea" contributed to the decisions made by Great Britain, France and the U.S. to test nuclear weapons in Oceania.<sup>153</sup> The prevailing view of Pacific islands as insignificant pieces of land in a large sea creates a context of these places and the people that inhabit them as useless. States that measure success as economic progress, like the United States, view small island states as too small, isolated and resource poor to be successful without the help of wealthy nations.<sup>154</sup> US Navy officials even described Bikini Atoll as "one of the most remote places on the earth."<sup>155</sup> In the mind of the United States, the Marshall Islands was automatically constructed as a subjugated nation because of its physical landscape, leading to the construction of the Marshall Islands as a perfect nuclear test laboratory.

Images of the Marshall Islands distributed to the public showed aerial images from above and far away, devoid of humans.<sup>156</sup> Rather than show the Marshallese people and their culture to the general public, the US military chose to emphasize a view of a tiny land mass in a vast ocean. By using their power to distribute and produce knowledge, the US military reconstructed the Marshall Islands as an empty, isolated landmass. This myth of the island isolate was central to the AEC's decision to test nuclear weapons in the Marshall Islands. Not only did the U.S. military view the island as the perfect biological isolate to test nuclear weapons, but also as

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<sup>153</sup> Hau'Ofa, Epeli. "Our sea of islands." *The Contemporary Pacific* (1994): 148-161.

<sup>154</sup> *Ibid.*

<sup>155</sup> As quoted in: Jacobs, 2013.

<sup>156</sup> DeLoughrey, Elizabeth M. "The myth of isolates: ecosystem ecologies in the nuclear Pacific." *cultural geographies* 20, no. 2 (2013): 167-184.



containing perfect human isolates as test subjects.<sup>157</sup> A 1957 memo from Brookhaven National Lab researcher Dr. Robert Conrad stated that the “habitation of these people on the island will afford most valuable ecological radiation data on human beings.”<sup>158</sup> While to the general public, the Marshall Islands was constructed as deserted, the insiders of nuclear testing constructed the Marshall Islands in their minds as a sacrificial place, with sacrificial people, to test out their most dangerous technologies. The Marshall Islands was thus produced within the military infrastructure as a place inhabited by people the state was all too willing to sacrifice.<sup>159</sup>

The US constructed Bikini Atoll as a deserted island, despite the presence of the Bikinian people on the island for generations.<sup>160</sup> Secretary of State Henry Kissinger is said to have stated about the Marshall Islands: “There’s only 90,000 people out there. Who gives a damn?”<sup>161</sup> The US military even sent camera crews to Bikini Atoll to document the “primitive” life of the Bikinians in order to delegitimize their existence.<sup>162</sup> Bikini Atoll was not found as an ideal, empty, remote site to test the most destructive weapons on the planet, it was turned into one through discourse.<sup>163</sup> The US military’s access to power allowed them to successfully construct Bikini Atoll as the perfect laboratory, to decide whose lives mattered, and then use their power in discourse to erase the history of the Bikini people.

The American public came to know the Marshall Islands from a discourse entirely based on nuclear weapons testing, one that showed bare islands being blown up, broadcasting a message of American technological superiority and power. Bikini bathing suits were even named after Bikini Atoll and its association with nuclear testing - because a scantily clad woman

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<sup>157</sup> Ibid.

<sup>158</sup> As quoted in DeLoughrey, 2013.

<sup>159</sup> Davis, 2015.

<sup>160</sup> Ibid.

<sup>161</sup> As quoted in: “The Movement for Environmental Justice in the Pacific Islands.” 2002.

<sup>162</sup> Davis, 2015.

<sup>163</sup> Ibid.

provides the same shock, awe and power as an atomic bomb.<sup>164</sup> Not until later, with declassified documents, and accounts from the Marshallese and community activists that we see the true story of nuclear testing on the Marshall Islands, and the gross injustices that occurred there.

### **3.2 Environmental Justice**

Along with a theory of discourse, environmental justice helps to interrogate how this injustice occurred. Environmental injustices are an outcome of uneven distributions of power, where the forces of capitalism and systemic racism combine to disproportionately harm the health and environment of marginalized communities. Paul Mohai and colleagues credit these disparities as both economic and sociopolitical, with the need for specific place based analyses to determine the root causes of all environmental injustices.<sup>165</sup> More broadly, Pellow discusses how our society produces symbols and ideas that link the domination of people of color and indigenous peoples to the domination of ecosystems.<sup>166</sup> In the process, environmental injustice disrupts human-environment relationships, and rids communities of their human right to a clean environment. Schlosberg proposes a solution to environmental injustices that requires equity in distribution of environmental risks and benefits, recognition of the communities harmed, and participation in decision making structures to prevent future injustices.<sup>167</sup>

A major part of this thesis is to provide representational justice to recognize the harm caused to the Western Shoshone and Marshallese communities through centering the narrative of nuclear testing as one of incredible harm, as well as in its production of counter maps and tables

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<sup>164</sup> Ibid.

<sup>165</sup> Mohai, Paul, David Pellow, and J. Timmons Roberts. "Environmental justice." *Annual review of environment and resources* 34 (2009): 405-430.

<sup>166</sup> Pellow, David Naguib. "'We Didn't Get the First 500 Years Right, So Let's Work on the Next 500 Years': A Call for Transformative Analysis and Action." *Environmental Justice* 2, no. 1 (2009): 3-6.

<sup>167</sup> Schlosberg, David. "Reconceiving environmental justice: global movements and political theories." *Environmental politics* 13, no. 3 (2004): 517-540.

that emphasize the impact of nuclear testing on indigenous communities. Environmental justice also explains how nuclear testing is particularly destructive for indigenous communities.

Nuclear testing constitutes an environmental injustice and an act of environmental racism. Bullard defines environmental racism as a policy or practice that differentially affects individuals or communities, based on race.<sup>168</sup> Marginalized communities are already more likely to host toxic industries than non-marginalized communities,<sup>169</sup> and native communities bear a disproportionate burden of toxic industries, in addition to limited access to financial and educational resources to understand and prevent contamination.<sup>170</sup> Communities who experienced nuclear testing represent an environmental injustice because of the disproportionate impact they bear from these activities. These communities are chosen specifically by states because lack of resources those communities possess to fully understand and combat the contamination caused by this injustice. Environmental justice and environmental privilege are inherently related, especially in the realm of nuclear testing. Our national security, a privilege, is built off of our nuclear weapons capability, which is built on the backs of indigenous life and land. Environmental racism is practiced through the proximity of military and nuclear regions to native communities.<sup>171</sup>

Environmental racism is also enacted differently among marginalized communities - showing how designations of space and place determine environmental injustice. The United States values the bodies within its borders more than people outside them, creating disparities between the effects of nuclear testing on the Western Shoshone in comparison to the Marshallese. When comparing compensation from the harms of U.S. testing between Nevada

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<sup>168</sup> Bullard, Robert D. "Dismantling environmental racism in the USA." *Local Environment* 4, no. 1 (1999): 5-19.

<sup>169</sup> Endres, 2009..

<sup>170</sup> Quigley et al., 2000

<sup>171</sup> Kuletz, 2016.

and the Marshall Islands, the Marshallese have been compensated at a much lower rate despite facing higher levels of exposure and contamination.<sup>172</sup> Testing at the Marshall Islands was also one-hundred times more powerful, with a total yield of 152.8Mt, whereas the NTS had a total yield of 1.05Mt.<sup>173</sup> For the Marshall Islands, this is the equivalent of 1.6 Hiroshima bombs each day over 12 years.<sup>174</sup> The discrepancy highlights the hierarchy of colonialism. Since the Western Shoshone were still considered to be Americans, their health and safety were valued more. This discrepancy is especially on display in the explicit policy of only testing low yield nuclear weapons at the NTS, while no such restrictions existed on the Marshall Islands.<sup>175</sup>

The discrepancy between treatment of those around the NTS and the Marshallese was used to pacify the American public as well. In an AEC publication distributed to households living downwind from the NTS, they described the tests at the NTS as insignificant, especially compared to the high yield or hydrogen bombs being tested elsewhere.<sup>176</sup>

Nuclear testing is also an environmental injustice because of the unique way that the radioactivity and fallout affected both the Western Shoshone and Marshallese communities. Marshallese communities were resettled numerous times, and throughout this resettlement, were continuously exposed to contaminated lands. In addition, the US government hired Marshallese workers to remove top soil and debris from ground zero atolls in the 1970s and 1980s without proper protections from the radioactive plutonium particles released into the air.<sup>177</sup> Moreover, these workers and their families are exempt from compensation.<sup>178</sup> Native Americans living

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<sup>172</sup> Gard, A. Rowan. "Looking for light on the dark side of the American dream—Exploring the painful legacy of nuclear colonialism in paradise." *International Journal of Research in Sociology and Anthropology* 3, no. 4 (2017): 32-42

<sup>173</sup> Ruff, 2015.

<sup>174</sup> Ibid.

<sup>175</sup> Jacobs, 2013.

<sup>176</sup> Ibid.

<sup>177</sup> Barker, 2012.

<sup>178</sup> Ibid.

downwind from the NTS in the 1950s and 1960s also received significant radiation exposures from nuclear weapons testing.<sup>179</sup> Nuclear testing is a uniquely destructive injustice because of its persistent harm on the very bodies of indigenous peoples, but also their land and the air they breathe.

The environmental injustice of radioactive exposure was worsened through inaccurate dose reconstructions that protected the US military, and ignored indigenous ways of life. Most of the research on the health impacts of nuclear testing used research tools that did not take into account indigenous lifestyles and diets.<sup>180</sup> As a result, radiation exposures calculated for Native Americans living downwind of the NTS are not accurately represented in DOE dose reconstructions.<sup>181</sup> The surveys used to create these dose reconstructions did not even include Native Americans.<sup>182</sup> Studies that have attempted to include native subsistence diets, by looking at estimated doses from eating rabbits, have resulted in dose estimates above DOE estimates for all pathways combined in the area of Duckwater, Nevada.<sup>183</sup>

For the Marshallese, this environmental injustice also extends to food justice. Because of the military base on Kwajalein Atoll, most of the Marshallese population lives on Ebeye. With 12,000 people living on 1/10<sup>th</sup> of a square mile, overcrowding and poverty has led to outbreaks of cholera and measles.<sup>184</sup> Most of the imported food that can survive the long ocean voyage to Ebeye are canned, and water is unreliable, leading to a diet of spam, corned beef and soda. Despite issues of food access on Ebeye, the military base on Kwajalein has heavily subsidized,

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<sup>179</sup> Frohberg, Eric, Robert Goble, Virginia Sanchez, and Dianne Quigley. "The assessment of radiation exposures in Native American communities from nuclear weapons testing in Nevada." *Risk Analysis* 20, no. 1 (2000): 101-112.

<sup>180</sup> United Nations conference to negotiate a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination. 2 June 2017

<sup>181</sup> Frohberg et al., 2000.

<sup>182</sup> Ibid.

<sup>183</sup> Ibid.

<sup>184</sup> Davis, 2015.

fresh food, but only for the high paid American workers.<sup>185</sup> Marshallese workers on the base are not even allowed to buy this food in order to protect the high market price of goods on Ebeye.<sup>186</sup> The complicity of the government in creating a market where access to food is limited is a government endorsement of injustice.

Nuclear testing is a particularly destructive environmental injustice not only in its unequitable distribution of the harms of radiation and the subsequent relocations of indigenous communities from their land, but also in its disruption of the unique relationship between the Western Shoshone and the Marshallese to their land.

### ***3.2.1 Traditional Ecological Knowledge and the Power of Knowledge Production***

Nuclear weapons testing is an environmental injustice because of the uniquely destructive way it interrupts the relationship between indigenous people and the land. Many of these relationships are embodied in traditional ecological knowledge. Berkes et al. defines traditional ecological knowledge “as a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.”<sup>187</sup> Traditional ecological knowledge is a practice of knowledge that is predicated on an intimate and sustained human relationship with the environment. When nuclear tests permanently poison sacred landscapes, they prevent traditional ecological knowledge from being practiced. In this way, the knowledge of how nuclear weapons work and their power of destruction were valued over traditional ways of knowing and being. Nuclear weapon

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<sup>185</sup> Ibid.

<sup>186</sup> Ibid.

<sup>187</sup> Berkes et al., 2000.

detonations not only disrespect but destroy indigenous rights, especially because of the permanent environmental destruction they impose on indigenous life and land.<sup>188</sup>

Unfortunately, areas considered sacred to the Western Shoshone are now off limits because of nuclear weapons testing.<sup>189,190</sup> By limiting access to sacred sites, the US military is disconnecting the Western Shoshone from the knowledge associated with these natural and sacred landscapes, and disrespecting their belief systems which designate the Western Shoshone to be caretakers of the land. For the Western Shoshone, intimate relationships and community go beyond that of humans to plants, animals, mountains and landscapes.<sup>191</sup> Also called *puha*, these relationships are key to the survival and identity of the Western Shoshone.<sup>192</sup> Certain sacred places manifest especially strong connections.<sup>193</sup> Some of these sacred places, such as Yucca Mountain, now lie inside the NTS.<sup>194</sup> Nuclear testing has physically disrupted the relationships and community of the Western Shoshone through its destruction of the physical landscape, but has also caused significant cultural and emotional damage through its destruction of *puha*.

The traditional ecological knowledge of the Marshallese has similarly been disrespected and disrupted because of nuclear testing. The US military had no concept of traditional ecological knowledge, or how some communities and peoples relate to, and connect to, specific places. Not only that, but the military made no effort to understand the Marshallese, their culture, or the difference in cultures and communities between atolls.<sup>195</sup>

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<sup>188</sup> United Nations conference to negotiate a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination. 2 June 2017

<sup>189</sup> Ibid.

<sup>190</sup> Johnson, 2018.

<sup>191</sup> Endres, Danielle. "Animist intersubjectivity as argumentation: Western Shoshone and Southern Paiute arguments against a nuclear waste site at Yucca Mountain." *Argumentation* 27, no. 2 (2013): 183-200.

<sup>192</sup> Van Vlack, Kathleen Ann. "Traditional ecological knowledge and resilience of the Southern Paiute High Chief System." (2007).

<sup>193</sup> Endres, 2013.

<sup>194</sup> Kuletz, 2001.

<sup>195</sup> Davis, 2015.

One of the test sites, Bikini Atoll, was an important place for fishing resources, but was also the location of the Bikinians' ancestors.<sup>196,197</sup> Bikini atoll was not an uninhabited piece of land in a vast ocean, but a cultural landscape inscribed with meanings and the graves of Bikinian ancestors.<sup>198</sup> Instead of respecting the cultural significance of Bikini Atoll, the U.S. military blew part of it up, and contaminated the rest with radiation.

Rongerik Atoll, one of the atolls the Bikinians were relocated to in 1946, had cultural stories that described the unsuitability of Rongerik Atoll for settlement. Bikinian stories portray Rongerik Atoll as a form of hell where a demon named Litobora poisoned the fish, coconuts and pandanus trees,<sup>199</sup> making it too limited in resources to feed anyone who wanted to settle there.<sup>200</sup> The US military relocated the Bikinians there, and then left, leaving the Bikinians on an island 1/6 size of Bikini, without the necessary resources to survive. Darlene Keju, a prominent Marshallese singer, and activist, described how the oceans were the supermarket for Bikinians, so leaving them on Rongerik, where the shorelines were too dangerous to fish on, sentenced them to near starvation.<sup>201</sup>

Two months after the Bikinians were relocated to Rongerik, they requested to move back to Bikini because they were suffering from starvation, and becoming ill from eating radiation contaminated fish,<sup>202</sup> a fate frighteningly similar to the traditional stories about Rongerik. The suffering of the Bikini people was unknown to the military until an anthropologist visited the atoll in 1948, bringing food with him.<sup>203,204</sup> The time it took for the military to notice that the

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<sup>196</sup> Ibid.

<sup>197</sup> Jacobs, 2013.

<sup>198</sup> Davis, 2015.

<sup>199</sup> Ibid.

<sup>200</sup> Keju-Johnson, 2003.

<sup>201</sup> Ibid.

<sup>202</sup> Davis, 2015.

<sup>203</sup> Gard, 2017.

<sup>204</sup> Davis, 2015.



Bikinians were starving shows the lack of attention and consideration paid to the Marshallese people in comparison with the nuclear testing program. Eventually, the Bikini people were moved to a camp next to an airstrip on Kwajalein Atoll, and then a year later moved to Kili island, an island of only 200 acres, effectively destroying their traditional lifestyle and practices.<sup>205</sup>

Issues of starvation continued for years, and occurred on Ailuk Atoll too. A resident, Jalel John, recounted in 1994 that “Pigs also have defective bodies. Some have twisted legs... Sometimes the fieldtrip [supply] ships wouldn’t come for a long time so we had to kill them and eat them. What could we do? We were hungry and we needed something to eat.”<sup>206</sup>

Survivors of the 67 nuclear tests conducted by the U.S. in the Marshall Islands describe a loss of cultural identity and community because of the constant relocations, and ill health of their land and communities.<sup>207</sup> Lani Kramer, a councilwoman for Bikini Atoll, said in 2014 that : “As a result of being displaced we’ve lost our cultural heritage – our traditional customs and skills, which for thousands of years were passed down from generation to generation.”<sup>208</sup> Many Marshallese have also had to have their thyroids removed because of tumors, limiting their ability to sing - an important aspect of their culture.<sup>209,210</sup> Marshallese use oral histories through story and song, and believe the throat is the center of emotions.<sup>211</sup> By poisoning the thyroid, the throat, and the center of emotions, nuclear testing in the Marshall Islands destroyed not only the atolls themselves, but part of the people who call these atolls home.

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<sup>205</sup> Ibid.

<sup>206</sup> Barker, 2012.

<sup>207</sup> Davis, 2015.

<sup>208</sup> United Nations conference to negotiate a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination, 2017

<sup>209</sup> Ibid.

<sup>210</sup> Schwartz, Jessica A. "Matters of empathy and nuclear colonialism: Marshallese voices marked in story, song, and illustration." *Music and Politics* 10, no. 2 (2016).

<sup>211</sup> Ibid.

Nuclear testing also had particularly destructive effects on the traditional ecological knowledge of women in Marshallese communities. Marshallese society is matriarchal, so when women and their lineages are silenced and displaced, the entire social organization and cohesion of the community is put at risk.<sup>212</sup> When the effects of radiation manifest in birth defects, they become especially destructive to matriarchal societies. Women's personal experiences of birth defects, such as babies born with brains outside their bodies, or born resembling "the inside of a giant clam,"<sup>213</sup> and countless deaths of infants, were ignored by military officials.<sup>214</sup>

Traditional ecological knowledge also provides insights to the damages caused by nuclear testing. On Ailuk Atoll, Dikjen Jilon noticed how arrowroot, an important food source, died during nuclear testing, and has never returned.<sup>215</sup> Alion Alik noticed the same occurrence on Likiep Atoll, along with the destruction of breadfruit, coconut trees and pandanus.<sup>216</sup>

In U.S. testimonies of nuclear testing, people are separated into categories of exposed and unexposed, but the Marshallese determine if radiation affected people by the personal experience of individuals,<sup>217</sup> valuing their community over arbitrary designations. Community produced knowledge produces inclusivity, while the military produced knowledge encouraged division and hierarchies.

Nuclear testing is thus not only destructive in the way it disrupts the relationship between life and land for the Marshallese and the Western Shoshone, but also in the government's designation of who was harmed and who was not, negating the very real experiences of many in

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<sup>212</sup> United Nations conference to negotiate a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination, 2017.

<sup>213</sup> Jalel John, 1994 as quoted in Barker, Holly M. *Bravo for the Marshallese: regaining control in a post-nuclear, post-colonial world*. Nelson Education, 2012.

<sup>214</sup> Barker, 2012.

<sup>215</sup> *Ibid.*

<sup>216</sup> *Ibid.*

<sup>217</sup> *Ibid.*

these communities. Further, the government's gate keeping of knowledge on who was exposed and who was not adds incredible importance to this thesis' production of counter maps and tables that reveal the real costs of exposure of indigenous communities. Indigenous communities have also long resisted the government's domination of knowledge production and have found creative ways to subvert the power of the U.S. military complex.

### 3.3 Resistance

Indigenous resistance to nuclear testing is informed by long-standing beliefs in the importance between human beings and their environment.<sup>218</sup> Often times, the very existence of indigenous people in places where people sought to disenfranchise and destroy their communities is resistance. Nuclear powers not only tested in the Marshall Islands, but other Pacific Island states such as French Polynesia, leading to trans-pacific anti-nuclear efforts. The Nuclear Free and Independent Pacific Movement was formed in 1975 as an environmental justice movement specifically aimed at fighting nuclear colonialism.<sup>219</sup> In 1985, the South Pacific Nuclear Free Zone was established with the Treaty of Rarotonga. The Marshall Islands also hosted the first international nuclear justice conference in Majuro in 2017.

The Marshallese are still fighting for just compensation for the harms of nuclear testing, especially as the effects of displacements and health problems continue to hurt their communities.<sup>220</sup> Fortunately, some compensation has been paid to members of four atolls (Rongelap, Utirik, Enewetak, and Bikini), all of which were part of the original group of atolls recognized by the US government to have been exposed. Kathy Jetñil-Kijner, a Marshallese

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<sup>218</sup> Hau'Ofa, Epeli. *We are the ocean: Selected works*. Honolulu: University of Hawaii Press, 2008.

<sup>219</sup> "The Movement for Environmental Justice in the Pacific Islands." 2002.

<sup>220</sup> Keown, 2018.

environmental and nuclear justice activist, has risen to prominence with her poetry and actions on climate and nuclear justice, showing that the newest Marshallese generation has not forgotten the injustice of nuclear testing.

Western Shoshone have similarly come together and formed alliances against nuclear colonialism. The Native Community Action Council (NCAC), is made up of 15 community representatives from the Western Shoshone and Southern Paiute. The council ensures community control for all funded research on the health of these communities, and is also responsible for collecting firsthand observations of the nuclear testing.<sup>221</sup> As a result, the council has yielded more accurate descriptions of exposure, determining that their communities received thyroid doses higher than non-natives in the area because of eating wild game, and drinking milk from cows that ate contaminated grasses.<sup>222</sup>

The Western Shoshone have also been resisting the occupation of the NTS since 1980. One strategy of protest has been to use symbols representative of colonial power against the federal government and the military, such as passports and No Trespassing signs. In the process, the Western Shoshone reappropriate the structures of settler colonialism.<sup>223</sup> This strategy began in 1987, when Western Shoshone leaders started to issue permits for protestors when entering the occupied Western Shoshone land.<sup>224</sup> By issuing their own permits, the Western Shoshone challenge assumptions about borders, and who determines property ownership and rights. The protests also recenter a narrative of the U.S. as a place of sovereign indigenous nations.<sup>225</sup> When protestors get arrested at the NTS, they show the arresting officers their Western Shoshone

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<sup>221</sup> George, Patricia, and Abel Russ. "Nuclear Testing and Native Peoples: Tribal research uncovers unexpected exposures." *Race, Poverty & the Environment* 11, no. 2 (2004): 38-40.

<sup>222</sup> George et al., 2004.

<sup>223</sup> Johnson, 2018.

<sup>224</sup> Ibid.

<sup>225</sup> Ibid.

passports, thereby asserting Western Shoshone sovereignty by refusing to recognize the authority of U.S. officials.<sup>226</sup>

Western Shoshone have also used international organizations and infrastructure to assert their rights and sovereignty. The Western Shoshone National Council along with several Western Shoshone communities filed a petition with the Inter-American Commission on Human Rights in December, 2002. As a result, the Commission found that the U.S. was violating the human rights of property, due process and equality under the law.<sup>227</sup> Importantly, the Commission also ruled that the U.S. used illegitimate means to claim Western Shoshone lands.<sup>228</sup> The U.S.'s response to the publicity of its human rights violation was to seize over 400 Western Shoshone horses.<sup>229</sup>

Every spring, thousands still gather at the Peace Camp with plans to invade the NTS. Western Shoshone people and their allies ignore fences and signs prohibiting civilians from military land, and continue to walk across their land, visit traditional sites, hunt and gather on ancestral lands.<sup>230</sup>

Both the Marshallese and the Western Shoshone have resisted U.S. nuclear testing and its effects in their communities. The production of counter maps and data tables that center the harm caused to indigenous communities by nuclear testing can also begin to aid in these resistance efforts. Both the theory of discourse and environmental justice have been mobilized by the Western Shoshone and Marshallese communities in resistance efforts, and also both serve as guidance shaping how cartography and GIS can take steps towards remedying injustice.

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<sup>226</sup> Ibid.

<sup>227</sup> Fishel, 2006.

<sup>228</sup> Ibid.

<sup>229</sup> Ibid.

<sup>230</sup> Solnit, 2000.

### 3.4 Implications for Cartography and GIS Analysis

With the power to prove issues of distributive justice as well as provide recognition to communities who have experienced injustice, maps have incredible implications for navigating discourse and issues of environmental justice. John Harley, in the late 1990s, began to theorize the connection between Foucault's theory of discourse and cartography.<sup>231</sup> He discussed how maps are often a "silent arbiter of power" through their use of abstract space organized by coordinates in which social and political structures are hidden.<sup>232</sup> In this way, maps promote specific forms of power and authority.<sup>233</sup>

Maps reflect discourse and discourses reflect power. Maps can therefore be analyzed according to how they ignore or downplay various characteristics of the landscape, and thereby sustain particular patterns of access and control.<sup>234</sup> Maps are especially relevant in the process of colonization, as they often reproduce specific hegemonic forms of knowledge that value the reconstructed colonial landscape.<sup>235</sup> In this way, cartography is a tool of colonial power.<sup>236</sup>

Current maps of nuclear testing are powerful visuals controlled by the state. The state often guards secrets through censoring maps, or keeping entire maps secret.<sup>237</sup> Most of the maps in which I will analyze and discuss later in this paper, were at one point or another classified and

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<sup>231</sup> Harley, John Brian. "Deconstructing the map." *Cartographica: The international journal for geographic information and geovisualization* 26, no. 2 (1989): 1-20.

<sup>232</sup> *Ibid.*

<sup>233</sup> *Ibid.*

<sup>234</sup> Crampton, Jeremy W. "Maps as social constructions: power, communication and visualization." *Progress in human Geography* 25, no. 2 (2001): 235-252.

<sup>235</sup> Hunt, Dallas, and Shaun A. Stevenson. "Decolonizing geographies of power: Indigenous digital counter-mapping practices on Turtle Island." *Settler Colonial Studies* 7, no. 3 (2017): 372-392.

<sup>236</sup> *Ibid.*

<sup>237</sup> Harley, 1989.

kept secret from the general public. They also pose questions of accuracy, with implications on whether maps produced by the government can be trusted.

The movement of counter mapping also has important implications for the indigenous communities harmed by nuclear testing. Nancy Lee Peluso first introduced the concept of countermapping in 1995 to describe the commissioning of maps by a community in Indonesia to contest state maps that undermined the community's access to resources.<sup>238</sup> She defined counter-mapping as project "to appropriate the state's techniques and manner of representation to bolster the legitimacy of customary claims to resources."<sup>239</sup> The idea has subsequently been used for any effort that contests or undermines the power usually present in cartographic processes or maps.<sup>240</sup> Harris and Hazen define counter mapping as an effort that questions the biases of cartography in which the power of mapping is challenged, or mapping is used to upset power relations.<sup>241</sup> Counter mapping is an important strategy for resistance and empowerment of historically marginalized communities.<sup>242</sup>

Indigenous peoples are putting together their own maps to defend their ancestral lands and counter state maps that have controlled territories inhabited by indigenous people.<sup>243</sup> As place names are part of the social construction of space,<sup>244</sup> counter mapping also serves to counter state claims to territory by promoting indigenous place names. The traditional lines and

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<sup>238</sup> Peluso, Nancy Lee. "Whose woods are these? Counter-mapping forest territories in Kalimantan, Indonesia." *Antipode* 27, no. 4 (1995): 383-406.

<sup>239</sup> *Ibid.*

<sup>240</sup> Harris, Leila M., and Helen D. Hazen. "Power of maps:(Counter) mapping for conservation." *ACME: An International Journal for Critical Geographies* 4, no. 1 (2005): 99-130.

<sup>241</sup> *Ibid.*

<sup>242</sup> Pavlovskaya, Marianna. "Theorizing with GIS: a tool for critical geographies?." *Environment and Planning A* 38, no. 11 (2006): 2003-2020.

<sup>243</sup> Chapin, Mac, Zachary Lamb, and Bill Threlkeld. "Mapping indigenous lands." *Annu. Rev. Anthropol.* 34 (2005): 619-638.

<sup>244</sup> Berg, Lawrence D., and Robin A. Kearns. "Naming as norming: 'race', gender, and the identity politics of naming places in Aotearoa/New Zealand." *Environment and Planning D: Society and Space* 14, no. 1 (1996): 99-122.

boundaries delineating spaces on orthodox maps also run counter to the way indigenous communities often access resources and move across the landscape,<sup>245</sup> providing additional ways in which counter maps can produce visuals of indigenous sovereignty. However, there is fine line between countering state mapping practices and inadvertently reproducing the power structures counter maps seek to undermine.<sup>246</sup> Most counter mapping work, including this thesis, is done by non-indigenous people, making it impossible to completely represent indigenous views.<sup>247</sup>

Producing counter maps with the Western Shoshone and Marshallese communities was beyond the scope of this thesis. However, I hope to provide representational justice through my production of counter maps that subvert the state's view of nuclear testing. Both the Western Shoshone and the Marshallese have expressed frustration at the lack of acknowledgement by the U.S. government for all of the harms it has caused in its nuclear testing program. I hope to provide some of this acknowledgement through subverting the U.S. military's own data to summarize the scope of harm caused by its nuclear testing program.

#### **IV. GIS Analysis and Cartographic Representations**

The main result of this thesis are the following counter maps, as well as tables and graphs that showcase the true scope and harm caused by the U.S.'s nuclear program in *Newe Segobia* and the Marshall Islands. First, I'll introduce the methods that went into creating these figures, followed by a cartographic analysis of U.S military maps and their corresponding counter maps of *Newe Segobia*, and then the Marshall Islands. Within each analysis are also tables and graphs

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<sup>245</sup> Bryan, Joe. "Walking the line: Participatory mapping, indigenous rights, and neoliberalism." *Geoforum* 42, no. 1 (2011): 40-50.

<sup>246</sup> *Ibid.*

<sup>247</sup> Chapin et al., 2005.



that summarize data parsed from military documents that complement the counter maps in their goals of representational justice.

#### 4.1 Methodology

Three different maps of estimated exposure were georeferenced in order to visualize indigenous exposure to radioactive fallout while following values introduced by counter-mapping. All maps were first converted to a raster image before being georeferenced in QGIS's raster georeferencer using a polynomial 3 transformation type and nearest neighbor resampling method. In order to georeference Figure 10, a custom coordinate projection was made based on the Transverse Mercator projection using the following parameters:

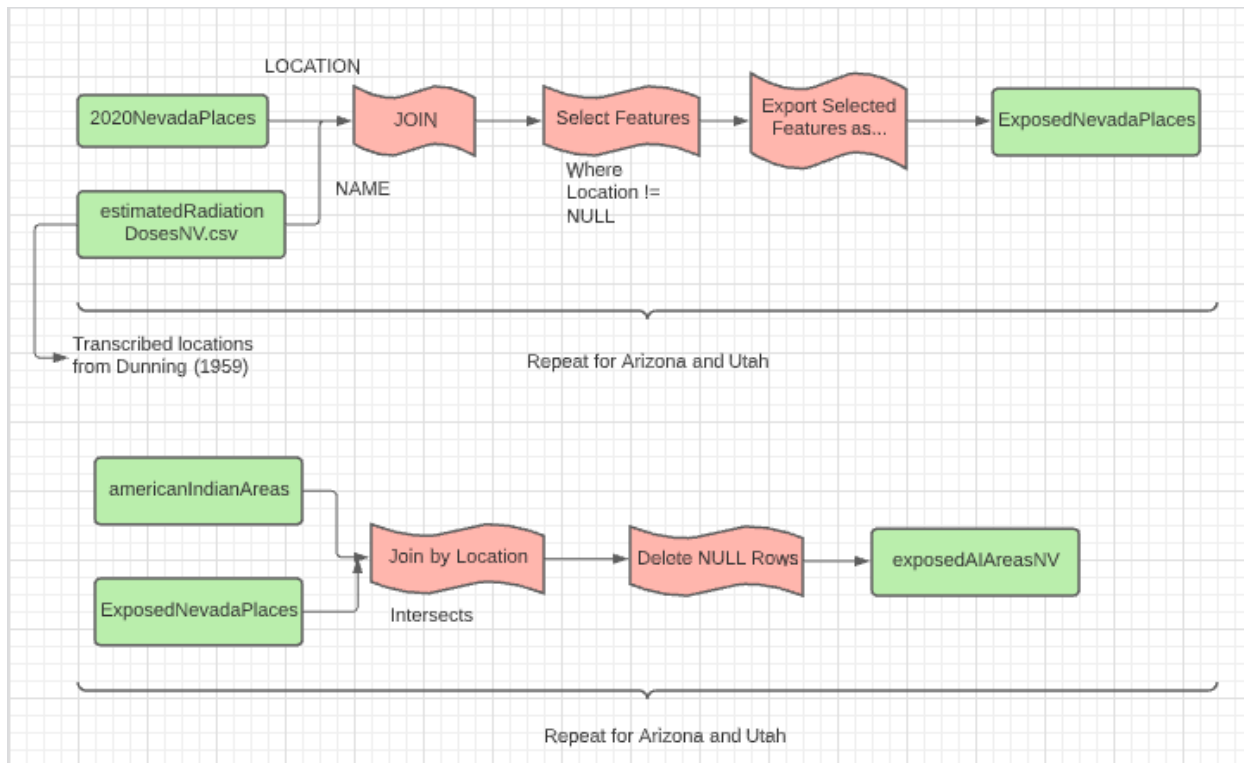
```
+proj=merc +lon_0=180 +k=1 +x_0=0 +y_0=0 +datum=WGS84 +units=m  
+no_defs +type=crs
```

Finding a map of cumulative exposure from the Castle Series for the Marshall Islands, let alone half the world was an unexpected and important discovery (Figure 10). It took many weeks of pouring through declassified documents to find this map, with the hopes that this kind of information was out there - that the exposure of Marshallese communities to radioactive fallout went beyond the 14 atolls acknowledged in the COFA. Although the Marshallese people know exposure went beyond these 14 atolls from personal experience and accounts, finding explicit evidence that the U.S. government knew the true extent of exposure is especially important when seeking recognition for this injustice. Additionally, it was never guaranteed that I would find this information. Declassifying information from the U.S.'s nuclear testing program is not synonymous with public awareness, which makes the visuals and tables in this thesis an important step towards public acknowledgement and awareness of these harms.

After many hours of filtering through countless pages and entries in the Department of Energy's OpenNet documents server, I came across Dunning (1959) - a report written for the Atomic Energy Commission. The report contained many pages of poorly photocopied tables that listed locations in California, Nevada, Arizona and Utah with cumulative exposure estimates for nuclear tests at the NTS. Officially designated census places were joined by name to exposed locations listed in Dunning (1959). Census places determined to be exposed were then joined by location to American Indian Areas in order to determine which American Indian Areas were exposed (see Figure 1). The resulting exposed American Indian Areas are summarized in Figure 5.

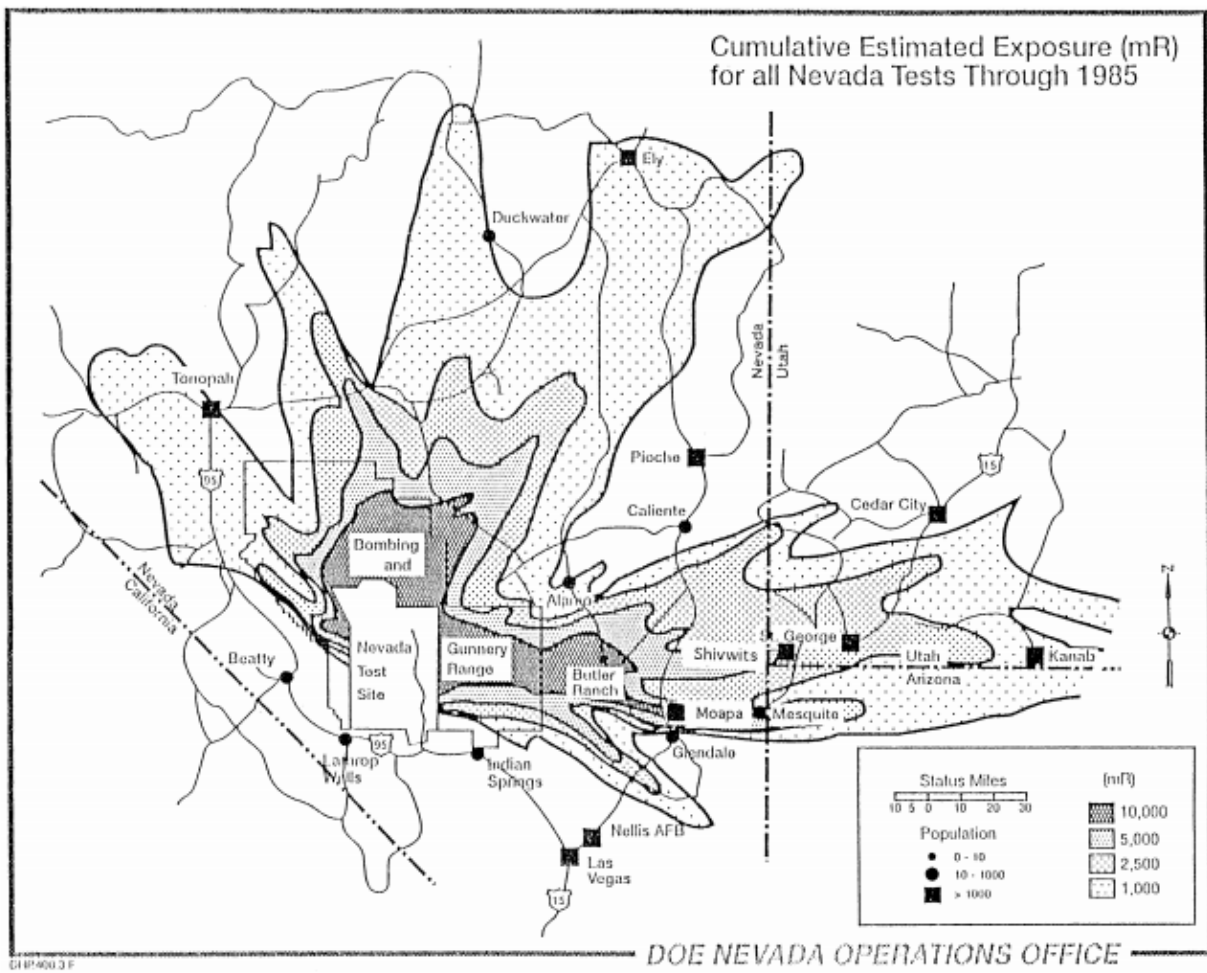
The data tables in Dunning (1959) were summarized in Figure 4. After digitizing the table values in Dunning (1959), the rows were sorted (from lowest to highest) by cumulative exposure. Population was then aggregated into 12 incremental categories of cumulative exposure.

Figure 7 is a compilation of data from two sources, the Department of Energy and Burr et al. (1993). None of the declassified documents I came across included both population and exposure data for the Marshallese population at the time of the tests. Burr et al. (1993) was also the only time I came across atoll specific population data for the time the United States was testing nuclear weapons in the Marshall Islands. The DOE reported some atoll specific information for radiation dose estimates, which was then paired with population data from Burr et al. (1993) to create a table which summarized population and dose data for the four atolls in which data was available.

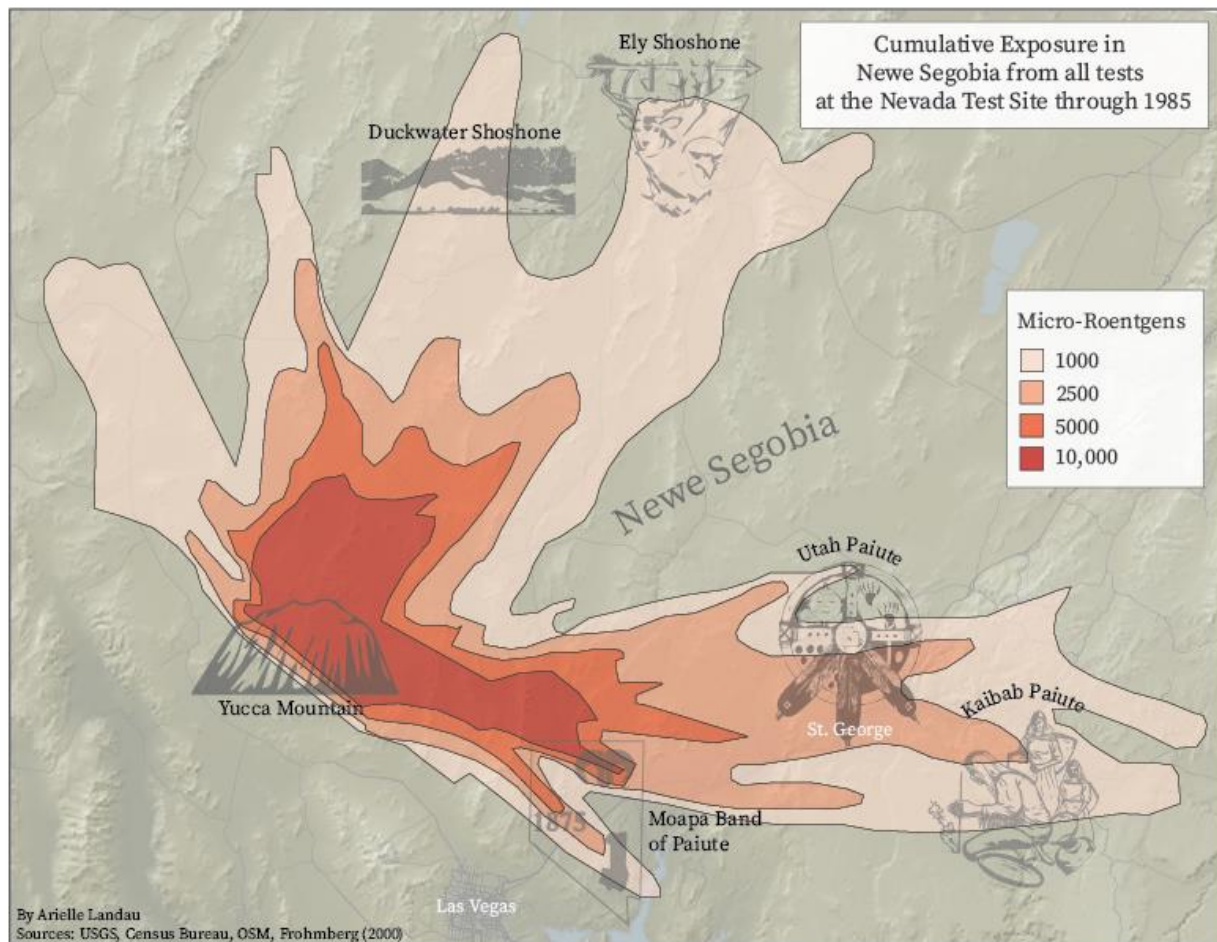


**Figure 1.** Workflow for determining exposed American Indian areas in Nevada, Arizona and Utah from nuclear tests conducted at the Nevada Test Site.

### 4.2 Exposure of American Indian Areas in Newe Segobia



**Figure 2.** Cumulative estimated exposure (mR) for all tests at the Nevada Test Site through 1985, as obtained by Frohberg et al. (2000)



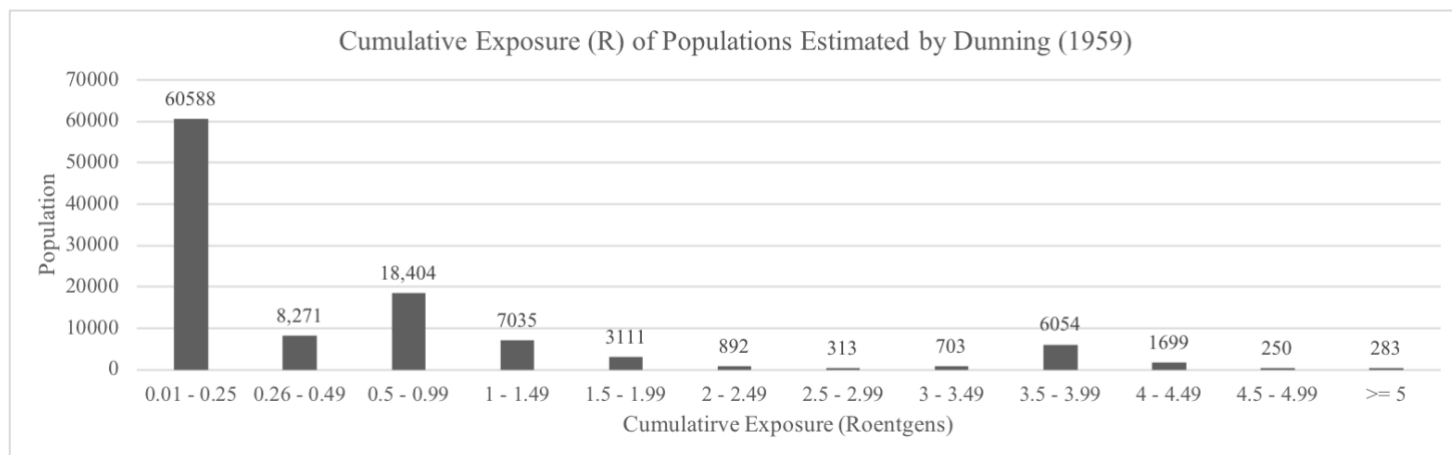
**Figure 3.** Counter map of cumulative estimated exposure (mR) for all tests at the Nevada Test Site through 1985. Symbology for the Shoshone and Paiute tribes were traced from images on each tribe's official website.

The map produced by the Department of Energy to show cumulative exposure from nuclear testing at the Nevada Test Site (Figure 2) follows the normal cartographic standards of delineated boundaries between states. Being in black and white, the important aspects of the map, such as where the radiation isodoses fall, and at what values, fades to the background in comparison to the label of the Nevada Test Site and corresponding bombing and gunnery ranges. Although there are labels for towns and symbology for various population sizes, the general visual of the map does not suggest any kind of cultural and political significance for the areas depicted. There are no symbols of cultural landmarks, or the identities and histories of the people exposed to radiation. The lack of humanity present in the map, especially when it largely covers

*Newe Segobia*, provides opportunity to apply standards of counter-mapping to subjugate the Department of Energy's depiction of radiation exposure from the Nevada Test Site.

To subjugate the claims of territory by the state, the counter-map for *Newe Segobia* (Figure 3) does not include delineated boundaries of Nevada, Utah, Arizona and California, and instead refers to the entire area under its original name: *Newe Segobia*. By using indigenous epistemology, this map subverts the power of the state and instead raises the importance of indigenous sovereignty. Instead of prioritizing town names, this map prioritizes the tribal areas that lie within the radiation isodoses. Tribal areas of the Duckwater Shoshone, Ely Shoshone, Moapa Band of Paiute, Kaibab Paiute and Utah Paiute all lie within areas of radiation according to estimates by the DOE. In order to follow the values of counter-mapping, the symbology used to represent tribal areas is from tribal websites and logos, thus representing tribes the way they chose to represent themselves. Tribal images were layered below the radiation isodoses to imply the seeping of radiation into these communities.

Yucca Mountain is also highlighted on the map as a sacred site for the Western Shoshone. By displaying tribal areas and sacred sites, this map depicts the cultural significance of this space. Figure 2 gives significance to the Nevada Test Site, while Figure 3 gives significance to the people the Nevada Test Site abused. Boundaries of the Nevada Test Site were purposefully excluded in Figure 3 in order to subvert its power on the landscape and prioritize the significance of the area for indigenous peoples and not give more power to the state's coopting of land. The background cartography in Figure 3 is meant to bring life to the landscape poisoned by nuclear testing, as compared to the blank background used in Figure 2. The mountains puncture into the radiation isodoses to depict the seeping of radiation into the physical landscape.



**Figure 4.** Cumulative exposure (Roentgens) of populations from the Nevada Test Site, as estimated by Dunning (1959).

Data tables presented in Dunning (1959)<sup>249</sup> of locations with attributes of population size and cumulative exposure are convoluted and never summarized. Although the report Dunning made for the AEC was never classified, it was not made for the general public. It took hours of going through documents in the Department of Energy’s OpenNet database to find this report, and hours more to parse through it and understand critical information for the public. People’s towns and cities are listed as exposed, yet the report was never released for the general public. Figure 4 summarizes the data in the report in a way that is digestible for the general public, but also shows the immense scale of populations exposed to radiation. Over 90,000 people were exposed.

Many of the locations listed in Dunning also intersected with tribal lands (Figure 5). Notably, besides the Ely Shoshone, Duckwater Shoshone, Moapa Band of Paiute, Kaibab Paiute and Utah Paiute, the American Indian Areas that were exposed lay beyond the extent of the isodoses in Figure 2 and Figure 3. In fact, they lay beyond the entire extent of both maps. The differences between the areas shown to be exposed by the DOE (Figure 2), and those derived in

<sup>249</sup> Dunning, Gordon. “FALLOUT FROM THE NUCLEAR TESTS AT THE NEVADA TEST SITE.” United States Atomic Energy Commission, May 1959.

Figure 5, is quite alarming. The U.S. government has the power to determine who gets recognition for being exposed, yet internally they distributed contradictory information. For Shoshone and Paiute tribes attempting to get recognition for the mistreatment of themselves and their lands by the U.S. military, this information is key. Again, there was no procedure in which the Atomic Energy Commission informed people of exposure.

<b>American Indian Areas</b>	<b>Cumulative Exposure (Roentgens)</b>
Ely Reservation	1.2
Walker River Reservation	0.22
Las Vegas Indian Colony	0.21
Fallon Paiute-Shoshone Colony	0.14
Kaibab Indian Reservation	1.62
Paiute (UT) Reservation	0.64
Paiute (UT) Reservation	0.05
Hualapai Indian Reservation	0.01
Hualapai Off-Reservation Trust Land	NA
Hualapai Indian Reservation	NA

**Figure 5.** Cumulative exposure (Roentgens) of American Indian Areas. Calculated using workflow in Figure 1.



### 4.3 Exposure of the Marshall Islands in the Castle Series

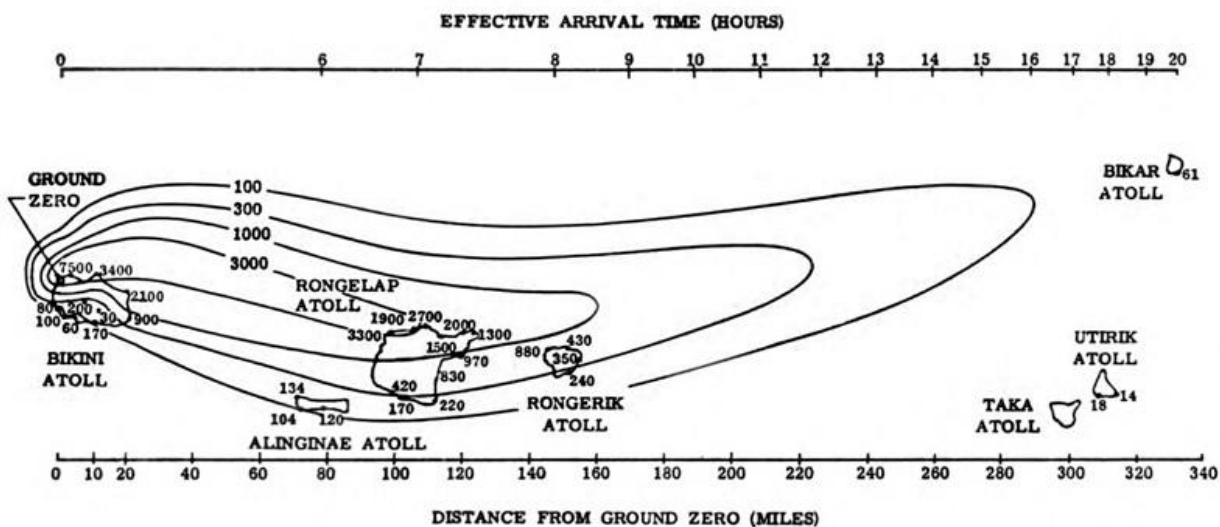


Figure 9.101. Estimated total-dose contours in roentgens per hours at 96 hours after the BRAVO test explosion.

Figure 6. Fallout from Castle Bravo as depicted in Glasstone & Dolan (1977).

As the largest nuclear test conducted by the United States, Castle Bravo spread an alarming amount of fallout. Moreover, the Marshallese were purposefully exposed to the fallout from Castle Bravo in order for the military to conduct experiments of radioactive fallout on humans.<sup>250</sup> Figure 6 shows estimated total dose of radiation, in roentgens per hour, from Castle Bravo. The cartography in Figure 6 follows the dominant narrative of island nations as “islands in a far sea.”<sup>251</sup> Displaying atolls as thin black lines, the map proceeds without any recognition of the people who lived on many of these atolls at the time of the test. By using their power to distribute and produce knowledge, the US military reconstructed the Marshall Islands as an empty, isolated landmass.

Figure 7 shows how it was not only Castle Bravo that spread dangerous radiation doses to inhabited atolls, but also other nuclear tests with much lower yields, such as Castle Yankee. The

<sup>250</sup> Barker, 2012.

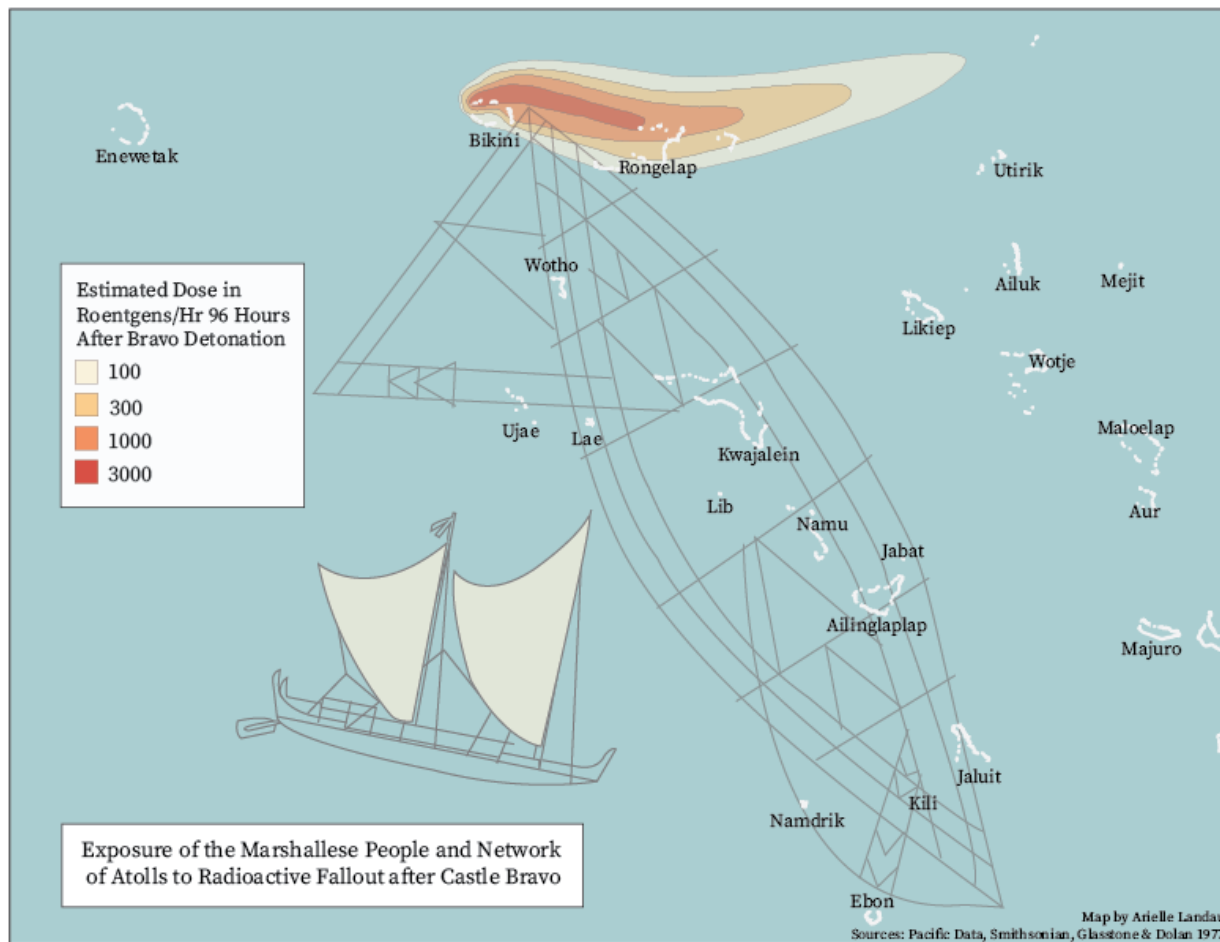
<sup>251</sup> Hau'Ofa, 1994.

table also shows alarming differences between atolls visualized as exposed in Figure 6, and those listed as exposed in other DOE documents. Utirik Atoll is listed as having a dose of 25 R/hr for Castle Bravo, yet it lies outside the radiation isodoses in Figure 6. Although Figure 6 only has contours for 3000, 1000, 300 and 100 R/hr, the fact that Utirik Atoll lies outside all isodoses leads the viewer to believe that it received no doses of radiation.

The difference in atolls reported as exposed or not exposed has significant consequences for Marshallese people seeking compensation for the harms of nuclear testing. Differences between reported doses and geographic spread of fallout among Department of Energy and Department of Defense documents is alarming as it hints at gaps of knowledge in the U.S. military on the scope of damage cause by the nuclear testing program.

<b>Atoll</b>	<b>Population</b>	<b>Bravo (R/hr)</b>	<b>Yankee (R/hr)</b>
Rongelap	64	200-2400	100
Ailinginae	18	100-200	0.1
Rongerik	28	200-800	10
Utirik	157	25	1

**Figure 7.** Estimated dose rates for four atolls from Castle Bravo and Castle Yankee. Radiation estimates as reported from US Department of Energy (n.d.); population data as reported in Burr et al. (1993).



**Figure 8.** Counter map of estimated dose rates from Castle Bravo. Includes navigational stick chart from Finney (1998).

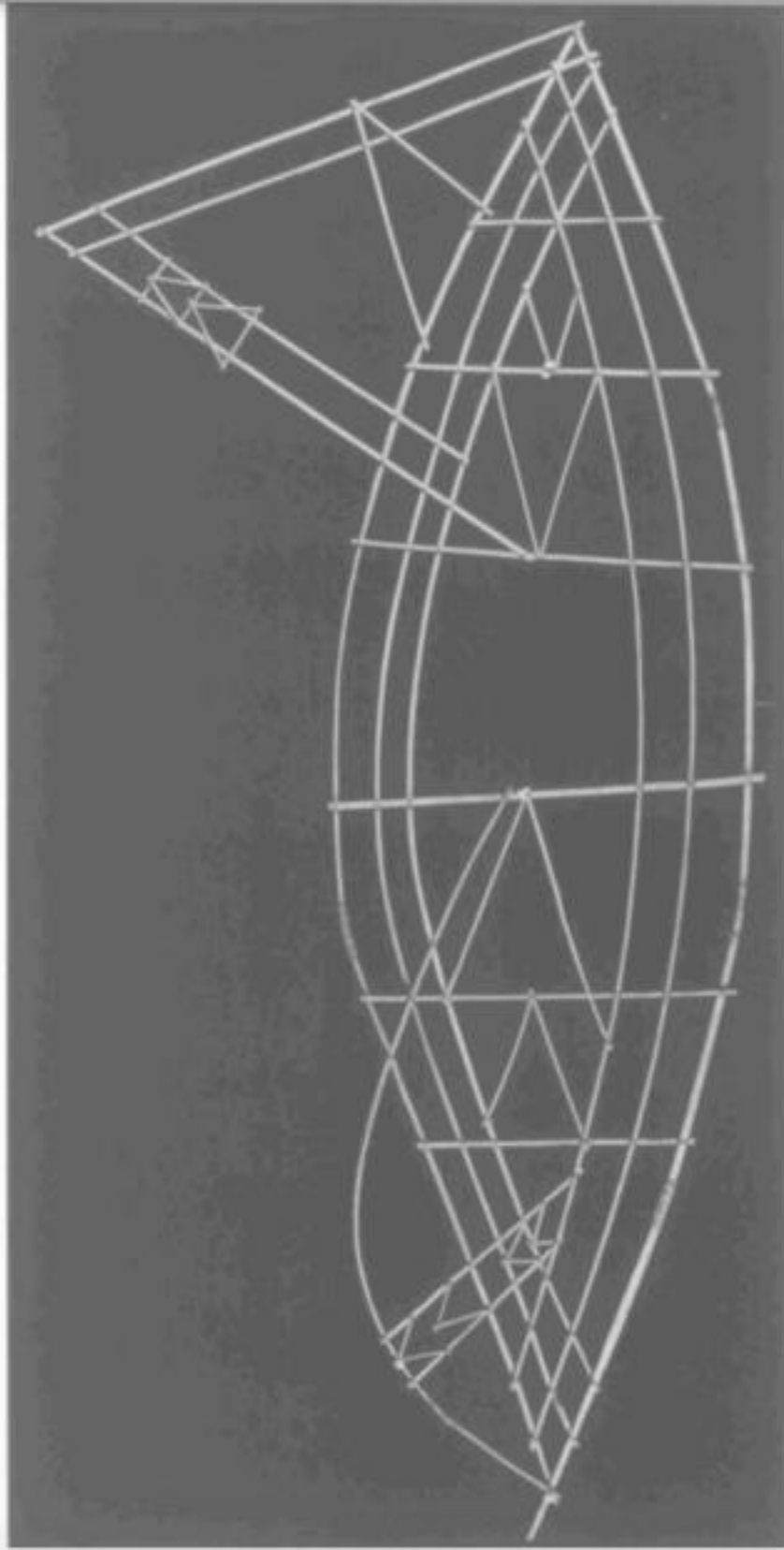
The counter map of estimated dose rates for Castle Bravo is meant to visualize the cultural significance of the Marshall Islands, as well as emphasize atolls as a network (Figure 8). In the center of the map lies another map: a *rebbelib*, a navigational stick chart for the chain of atolls from Bikini to Ebon (Figure 9). The Marshall Islands has an impressive history of wayfinding, using different stick charts to navigate between atolls as well as understand the winds and the tides. Although the radiation isodoses for Castle Bravo only make up part of the map, the *rebbelib* shows the fluidity of the Marshallese population, and the importance of voyaging for their culture. The significance of contaminated atolls goes beyond just the physical

atolls that lie below the radiation isodoses, but also to the whole network of atolls. This map, in Hau'ofa's words, aligns itself with "our sea of islands" rather than "islands in a far sea."<sup>253</sup>

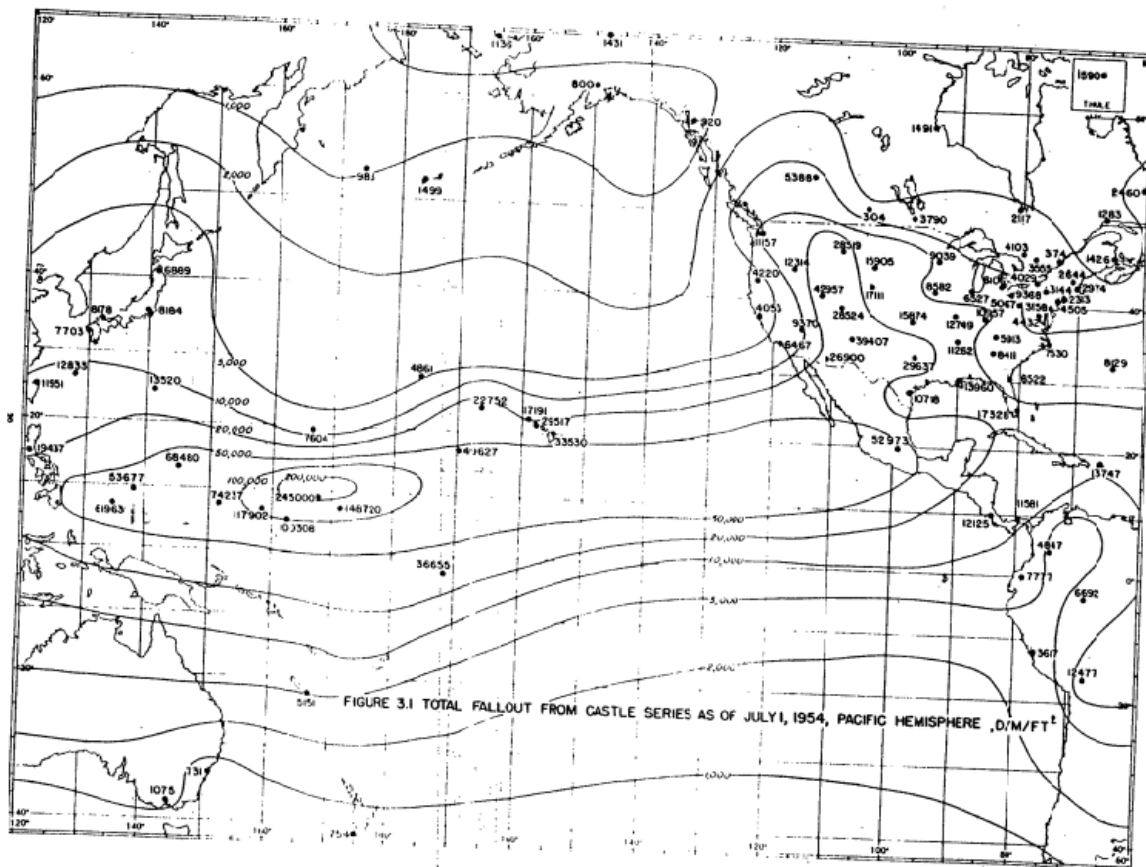
Many colonial maps include images of men conquering the land or dominating tall ships in the corners, providing narratives to the cartography of European power over the New World. To counter western cartographic principles that support colonization, I included a traditional double hulled canoe, used by the Marshallese for voyaging, to provide a narrative that emphasizes Marshallese culture. All of the changes to the original map were with the goal to add humanity and to ground the viewer with the knowledge that real people with history and culture were affected by the US's nuclear testing program.

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<sup>253</sup> Hau'Ofa, Epeli. "Our sea of islands." *The Contemporary Pacific* (1994): 148-161.



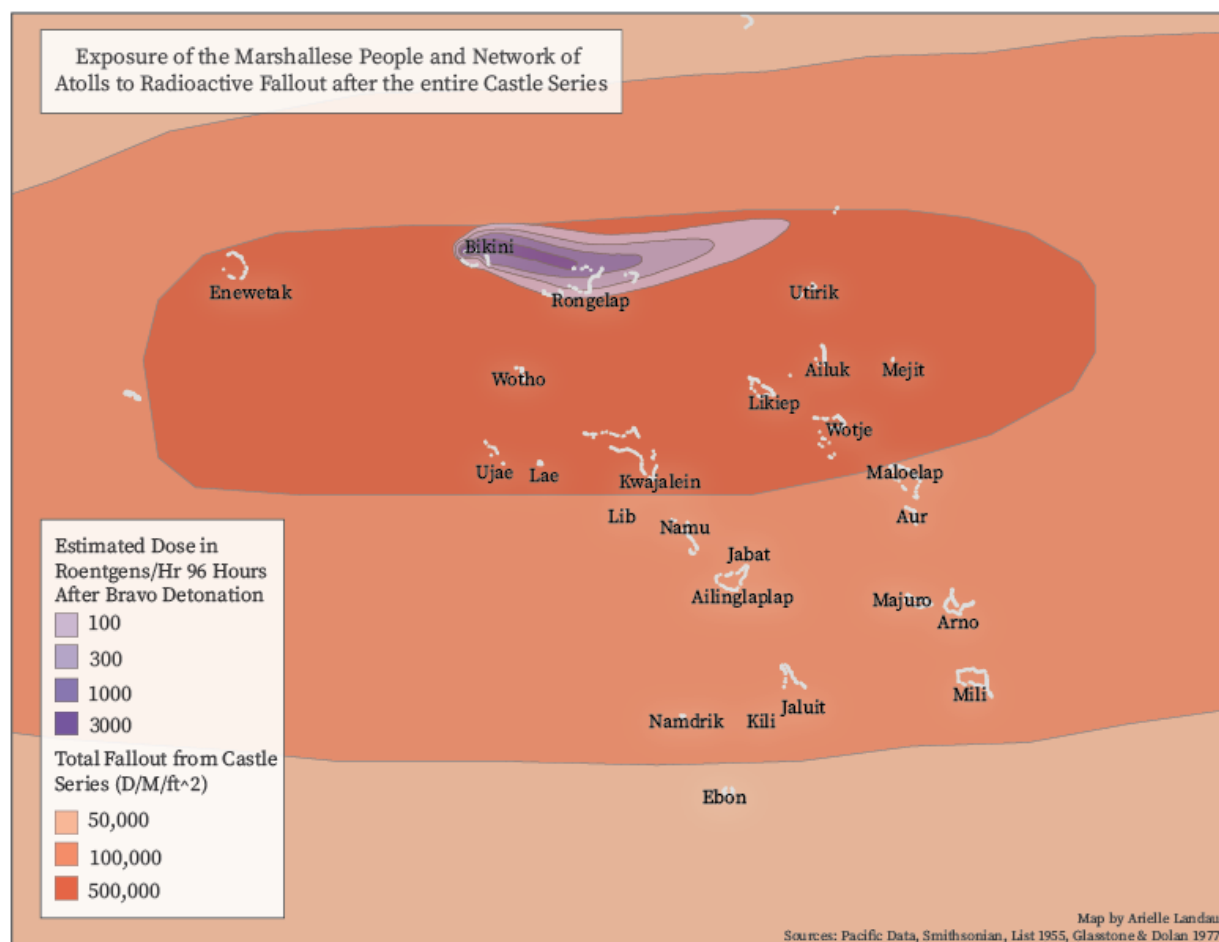
**Figure 9.** Rebbelib: navigational stick chart for the chain of atolls from Bikini to Ebon, from Finney (1998).



**Figure 10.** Total fallout from the entire Castle series in the Pacific Hemisphere in disintegrations per minute per square foot (D/M/Ft<sup>2</sup>) as reported in List (1955)

Figure 10 shows the alarming inconsistencies between maps of exposure circulating within the US government. While the Department of Defense circulated maps on cumulative exposure around the NTS (Figure 6), the Department of Commerce had maps that tracked global fallout from all tests in the Castle Series, a set of 6 tests beginning in March of 1954. These inconsistencies in visualizations of radiation exposure are especially alarming considering that in the COFA the United States refused to admit that contamination went beyond 14 atolls when at the same time they were producing maps that showed how they had exposed the entire world to radiation. Figure 10 is only one example drawn from thousands of declassified documents that prove the US knew radiation exposure went beyond the 14 designated atolls, and extended to

atolls previously considered unexposed such as Ailuk, Likiep, Wotho, Mejit and Kwajalein atolls.<sup>254</sup>



**Figure 11.** Counter map of total fallout from the entire Castle series in the Pacific Hemisphere in disintegrations per minute per square foot (D/M/ft<sup>2</sup>) as reported in List (1955).

Figure 11 takes a closer look at Figure 10 in order to focus in on the Marshall Islands and compare the reported fallout from Castle Bravo with the maps circulated in the Department of Commerce. The total fallout from the Castle series was measured in disintegrations per minute per square foot.. D/M/ft<sup>2</sup> was calculated using a network of gummed film stations. The gummed

<sup>254</sup> Barker, 2012.

film stations measured the number of atoms disintegrating on the surface of the film each minute. As far as a lengthy search could tell, this unit is rarely ever used beyond referring to the List paper itself. A similar unit, the becquerel, measures disintegrations per minute, so there is some precedence for this kind of unit in measuring radiation exposure. However, it can safely be said that all of the Marshall Islands was exposed to a significant amount of radiation as compared to the rest of the world, as it is located within the three highest radiation isodoses, from 50,000 – 500,000 D/M/ft<sup>2</sup>.

The radiation isodoses in R/Hr from Castle Bravo were included in Figure 11 as an attempt to understand the meaning of exposure in D/M/ft<sup>2</sup>. It is especially alarming that there are a number of additional atolls in the 500,000 D/M/ft<sup>2</sup> isodose that were not included in the estimated exposures from Castle Bravo, yet are within the same isodose when detecting cumulative exposure from the Castle Series. The US government has only admitted to contaminating the 14 northernmost atolls,<sup>255</sup> yet the entire Marshall Islands lies within the highest isodoses of total fallout.

#### **4.4 Discussion**

I formulated these counter maps with the aim of visualizing indigenous exposure to radioactive fallout in a way that respects the culture and landscape of that which they depict. The maps circulated by the US government are devoid of humanity, allowing the real costs of the nuclear testing program to go unnoticed. By erasing the lives of people on these lands, the US was able to hide the importance of these spaces for indigenous communities, and instead reconstitute these spaces for national security.<sup>256</sup> Adding symbology that forces the viewer to

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<sup>255</sup> Barker, 2012.

<sup>256</sup> Davis, 2015.



reckon with the indigenous cultures exposed to fallout is an important step in recentering the narrative of nuclear testing as one of incredible injustice.

My inclusion of tables that display place names, population data and amounts of exposure are also important in breaking down the barriers between what the U.S. government knows and what the general public knows. The strategic classification of this kind of data, and the barriers of even finding this kind of data after it has been declassified shows the intentionality of the U.S. government to do the bare minimum when taking responsibility for the harms caused through its nuclear testing program.

Put together, the counter maps and data tables can help form a new discourse surrounding the US nuclear testing program as an environmental injustice against indigenous people as opposed to a story of American ingenuity and technology. Visualizing this gross injustice also takes steps towards providing representational justice for the Western Shoshone and Marshallese communities. The difficulty in uncovering data that clearly shows who was exposed to radiation, and at what dose is part of what makes this a uniquely destructive injustice - not in just its scale, but in the intentional decisions by the U.S. government to deny responsibility for detonating the world's most dangerous weapons in, or next to, indigenous communities.

## **V. Conclusions and a Way Forward**

### **5.1 Nuclear Colonialism Today**

The nuclear testing program has left a profoundly consequential legacy in the Marshall Islands and *Newe Segobia*, with the US government and military continually finding new ways to exploit these two indigenous communities. Continuously harming indigenous communities

decades after the nuclear testing program ended is yet another reason why nuclear testing is uniquely destructive.

The Runit Dome, a bomb crater filled with radioactive waste, and capped with concrete from 1979, still rests on the Marshall Islands. The dome holds more than 3.1 million cubic feet of radioactive soil and debris from Enewetak Atoll, and an additional 130 tons of irradiated soil from the NTS.<sup>257</sup> Now, the concrete is cracking and leaking radioactive material into the lagoon.<sup>258</sup> The waste drifts down to nearby settlements, entering the food chain, causing health problems for local communities<sup>259</sup> on top of the already existing health problems from the legacy of nuclear testing. The dome is also at risk of collapsing because of rising sea levels and climate change.<sup>260</sup> <sup>261</sup> Sea level rise is also set to inundate former test sites and other waste storage sites.<sup>262</sup> And because of the way the COFA is structured, the US is denying help.

The US's denial of help is especially egregious considering that they withheld information about the dome's contents when the Marshall Islands agreed to the COFA. The US did not tell the Marshallese that it shipped soil from the NTS in 1958, and also did not disclose that they used Enewetak for dozens of biological weapons tests, including experiments with deadly bacteria.<sup>263</sup>

Seismic booms from military jets are still a reminder of military presence for the Western Shoshone in Nevada.<sup>264</sup> They also face additional challenges with efforts to use Yucca Mountain as a repository for high level nuclear waste (HLW). Nuclear waste storage represents state

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<sup>257</sup> Rust, Susanne. "How the U.S. Betrayed the Marshall Islands, Kindling the next Nuclear Disaster." Los Angeles Times, November 10, 2019. <https://www.latimes.com/projects/marshall-islands-nuclear-testing-sea-level-rise/>.

<sup>258</sup> Keown, 2018.

<sup>259</sup> Ibid.

<sup>260</sup> Gard, 2017.

<sup>261</sup> Rust, 2019.

<sup>262</sup> Ruff, 2015.

<sup>263</sup> Rust, 2019.

<sup>264</sup> Fishel, 2006.

sanctioned violence on local communities,<sup>265</sup> and the only sites considered for federal HLW were on Native lands.<sup>266</sup> The Western Shoshone were specifically targeted as the federal government chose Yucca Mountain as the site for the federal HLW because of its proximity to the NTS.<sup>267</sup> Yucca Mountain is an important site of puha,<sup>268</sup> meaning the US government and military is attacking Shoshone traditions, knowledge and ancestors again.

## 5.2 A Way Forward

Despite countless legacies from nuclear testing, both the Marshallese and Western Shoshone communities have remained determined not just to survive, but flourish, taking the pride in their traditions and culture and resisting the colonial legacies of nuclear testing. The Marshallese and Western Shoshone people are powerful - transcending the environmental injustices on their land and resisting the discourse the U.S military used to portray them and their land as useless. They are reaching beyond their communities to the international ones, spreading the word of the US's gross injustices towards their communities, and becoming strong leaders for nuclear justice, and now climate justice.

Radioactivity continues to live in the bodies and communities of the Marshall Islands and *Newe Segobia*, making the very existence of these communities resistance. Their existence is also proof, however, of the injustices the US produced from its nuclear testing program. Contained within these communities are firsthand accounts of nuclear testing, of radiation-related illnesses, of military officials' suppression of this suffering, and the manipulation of law and policy to disenfranchise these two communities from their rights to compensation. The policies of the Atomic Energy Commission, among others, was literally one of white supremacy,

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<sup>265</sup> Kuletz, 2001.

<sup>266</sup> Endres, 2009.

<sup>267</sup> Ibid.

<sup>268</sup> Ibid.

where white, privileged populations were considered valuable, and others were considered less than human. The U.S military and government operated white supremacist discourse in order to portray *Newe Segobia* and the Marshall Islands as unimportant places perfect for dangerous experimentation. In the process, a uniquely destructive environmental injustice was perpetrated as it poisoned the life and land of the Western Shoshone and Marshallese people for generations, damaging the critical human and nature relationships so central to these communities. The Marshallese and Western Shoshone communities experienced a very real nuclear war – a uniquely destructive injustice at the hands of the most powerful weapons the world has to offer.

By exposing how power operated in these injustices, through a theory of discourse, environmental justice and counter-mapping, this thesis articulated how the legacies of nuclear testing began and persist in the Marshall Islands and *Newe Sebobia*, while simultaneously centering a narrative of indigenous epistemologies and resistance. Producing counter-maps to subvert the states representations of the effects of nuclear testing also served to center indigenous communities and reassert the narrative of nuclear testing as an incredible injustice against indigenous peoples. Moreover, the creation of tables that clearly state who was exposed and at what dose is equally important centering a discourse of the United States' nuclear testing program as one of incredible harm. As this thesis explained, nuclear testing on indigenous lands is a uniquely destructive injustice because it exposed indigenous communities to the most destructive weapon on earth, one that permeates people and the environment for decades, and its effects were simultaneously hidden from the general public and downwind communities. The results of this thesis sought to in part remedy the harms of this uniquely destructive injustice through representational justice, as well as through the uncovering and summarizing of important information that has for too long been hidden from the public.

## VI. Acknowledgements

My interest in nuclear testing began in high school when I represented my high school at the Critical Issues Forum at the Center for Non-Proliferation Studies (CNS), a high school conference for Japanese, Russian and American students to collaborate on and discuss solutions to nuclear non-proliferation. After the forum, I became involved in international advocacy for non-proliferation as a Youth Communicator for a World Without Nuclear Weapons, travelling to Nagasaki, Japan my senior fall of high school to attend a youth conference on disarmament.

After beginning my studies at Middlebury in Environmental Justice, I returned to CNS as a summer intern, where I first began my research on nuclear testing by looking at the French testing program on tribal lands in Algeria, the Russian testing program on lands of minority communities in Kazakhstan, and the U.S. testing program on the land of Pacifica people in the Marshall Islands. My research shifted about a year later into this thesis, to look at the U.S. testing program on indigenous lands in Nevada and the Marshall Islands.

As a privileged white student at a predominately white institution, I cannot speak for the Western Shoshone and Marshallese communities. I can only hope that this thesis provides the recognition of harm that these communities deserve. I also hope that I have provided visuals as well as summarized and compiled data that can help these communities get closer to compensation for the harms caused by the U.S. nuclear testing program.

I'd like to end by thanking my advisor Dan Suarez, for his support for the last year on this project, and for keeping me grounded with his feedback. I'd also like to thank Joe Holler for all of his help with the GIS and cartography components of the thesis, and for introducing me to the ideas of counter-mapping in the first place. A big thanks as well to Kate Crawford for her

advice on how to present the issues of radiation and the body. The largest thanks must, of course, go to the Western Shoshone and Marshallese communities for their countless resistance and strength in the face of the most dangerous weapons the world has to offer.

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