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Islands of The Bomb: (Re)Imagining Bikini Atoll through Archaeologies of Cold War Occupation and Destruction[1]

Bikini is not a beer, a bathing suit, or the home of SpongeBob SquarePants.
(The National Nuclear Commission of The Republic of the Marshall Islands)

The battle for Bikini Atoll Beer began in late 2019, although the conflict had actually been brewing since 2017 when the Manhattan Project Beer Company (MPB) of Dallas, Texas first brewed a small batch of gose beer they named Bikini Atoll. Served on tap in local bars until the initial batch was gone, the beer's borrowed name did not seem to bother MPB's customers. In fact, neither a 28 March 2019 MPB blog entry announcing a new batch of Bikini Atoll beer, nor a 5 May 2019 Instagram post picturing the new beer prompted any significant public response. That is until August, when the tiny company was suddenly engulfed in a social media firestorm by members of the global call-out culture, which accused it of being insensitive to the historic plight of the Bikinians. After a barrage of social media attacks and some pointed communications from the Republic of the Marshall Islands (RMI) government that included the epigraph above, MPB fired their final volley in the conflict on 13 August 2019, issuing this statement on Instagram:

> Our beer named Bikini Atoll was not created to mock or trivialize the nuclear testing that took place in the Marshall Islands. Through our brand and naming, we are creating awareness of the wider impacts and implications of the United States's [sic] nuclear research programs and the pivotal moment in world history that is often forgotten. We are sharing this because we have received significant harassment and death threats. This is the only statement we will make and will take no further action in this matter. (qtd. in Lang)

Proving that the names of the world's most famous geographical places are rarely considered the exclusive possession of those who inhabit them, MPB continues to brew and sell Bikini Atoll brand beer.

As a site of American Cold War nuclear weapons testing, Bikini Atoll holds an enduring place in the global nuclear imaginary as a contested cultural icon. The roughly oval-shaped ring of twenty-three low-lying coral islands encompassing a 230 square-mile lagoon in the central Pacific Ocean found itself included in the nuclear imaginary after being used by the United States in the 1950s for atmospheric nuclear testing. Imagined thereafter as a radioactive wasteland, devoid of vegetation and uninhabitable by anything but mutated science fiction monsters, after nuclear testing ended the US planted coconut palm forests on some islands as the indigenous flora and coral regenerated itself and restored much of the Bikini's original beauty. Solidly placed in the nuclear imaginary as the birthplace of the hydrogen bomb, Bikini was both an icon of The Bomb and a physical manifestation of twentieth century nuclear imperialism.[2] As the Bikini people sought to reimagine the Atoll as another site in which indigenous people were misled and dispossessed of their ancestral home by a nuclear hegemony, their efforts were frustrated by those who misappropriated the Atoll's identity for other uses and by a continuous lack of detailed information about nuclear testing activities on the atoll. Using archaeological evidence as a basis, this essay examines for the first time publicly the physical transformation of Bikini during a dozen years of nuclear violence. By reimagining the Bikini islandscape in terms of the constructive/destructive duality of America's Cold War occupation as the islands of The Bomb, I seek to use historical archaeology to support the

ongoing Marshallese efforts to authenticate, demythologize, and safeguard their homeland in the current and future nuclear imaginary.

The notion of employing archaeology to better understand a complex belief system is not a new one. Archaeological evidence has long held the power to challenge and transform our mythologies, beliefs, and ideas about the past. The archaeology of the contemporary era, in particular, approaches the late twentieth and early twenty-first centuries as a period characterized by massive epistemological, ethical, philosophical, and political movements indelibly manifested in materiality. The archaeology of that materiality serves as a tool for reading the recent past in ways that can help to validate, or possibly refute, historical and anecdotal evidence.

Asserting that the archaeology of the contemporary era can also be a powerfully inclusive practice, Rachael Kiddey and Paul Graves-Brown have suggested that contemporary era archaeologies greatly benefit from the existence of living populations with whom archaeologists can work in order to augment existing historical or anecdotal knowledge (137). In collaboration with Native American communities in the American Southwest, Robert W. Preucel has shown that inclusive archaeologies can be particularly empowering for communities whose traditions or perspectives have historically been ignored, romanticized, plagiarized, or otherwise misused by hegemonic powers (20). Because the materiality manifested in the epistemological, philosophical, and political beliefs of Bikini's Cold War occupiers continues to exist on the Atoll amid the ruins and rubble of nuclear weapons testing, archaeology presents itself as a way to work with the Marshallese to more fully understand what happened on the atoll during their exile. However, before turning to the specifics of this archaeological evidence, it seems prudent to first examine how American nuclear weapons testing consigned Bikini Atoll to the global nuclear imaginary and how the Atoll has been imagined and re-imagined within that context over time.

The American Occupation

The American occupation of Bikini Atoll was unlike any other in US military history. Seized as a matter of course during World War II with no immediately compelling political or economic reasons behind its occupation, Bikini was chosen for use in nuclear testing because of its distance from large populations, an almost pristine environment, and a small indigenous population. With the impetus behind America's Cold War occupation being scientific exploitation, Bikini Atoll became part of a larger legacy of using "big science" projects to further US colonial exploitation.

America's scientific occupation of Bikini left an indelible mark upon the physical landscape of which the most obvious were blast craters, the partial destruction of two islands and the construction of more than five hundred structures over a 12-year period beginning with Operation Crossroads in 1946 and ending in 1958 with Operation Hardtack. Although many of these structures were ephemeral, existing for only weeks or months before being literally blown away in nuclear weapon tests, other more substantial reinforced concrete structures were built to survive humankind's most powerful explosions. To build what proved to be an extensive and expensive testing infrastructure, Bikini's natural foliage was bulldozed and burned. Causeways – raised roadways of coral mined from reefs – were built over the reef flats to connect multiple islands. Harbors were dug and docks and jetties were constructed, as Bikini's island landscape and seascape – its islandscape – were radically transformed over time.

America's occupation of Bikini began officially in the summer of 1952 when civil engineers and surveyors from the Los Angeles engineering and construction firm of Holmes & Narver (H&N) arrived to conduct a reconnaissance study for the United States Atomic Energy Commission (USAEC). H&N would go on to design, construct, and operate almost all of the United States' nuclear weapons testing structures at Bikini Atoll over a series of three testing campaigns designated Operations Castle, Redwing, and Hardtack. Prior to H&N's arrival, the US Navy had relocated Bikini's inhabitants in March 1946 to Rongerik Atoll in preparations for Operation Crossroads. Promised that America's use of the Atoll was temporary, the Bikinians suffered extreme hardships in their exile. These hardships have

been well documented by others (see Chambers; Kiste; Firth; Hezel; Peck; Niedenthal[3]), while the story of what happened to the Atoll itself during that exile remains all but untold.

The American occupation of Bikini Atoll was rooted in the United States' capture of the atoll in World War II. There had been no battle to win the remote ring of islands, since Imperial Japanese Army soldiers had essentially surrendered it to US military forces in April 1944 by committing suicide (Niedenthal 2). The US took control of the entirety of the Marshall Islands in 1947 under a United Nations trusteeship created as the Trust Territory of the Pacific Islands and was responsible for the territory's civil administration until 1986, when the Marshallese withdrew from the Trust Territory by drawing up a Compact of Free Association. With the signing of the Compact, the US handed control of Bikini back to its indigenous inhabitants without informing them of the extensive physical damage nuclear testing had caused.

Although Crossroads had made comparatively minimal use of the Atoll, building a Navy recreational area and erecting a dozen camera towers, roughly five thousand H&N employees would build and operate the structures and infrastructure needed to serve the more than thirty thousand men that came to Bikini for Operations Castle, Redwing, and Hardtack. Coming from the USAEC and all branches of the military, as well as from research laboratories, universities, and corporations, the extent of these organizations' involvement in nuclear weapons testing was reflected in the myriad of structures their presence required. From massive reinforced concrete instrument bunkers to tall steel towers, the scientific work of nuclear weapons testing required an extraordinary diversity of architecture. Experimental nuclear devices were deployed at the top of steel towers. In structures dubbed "scientific stations," physicists installed instruments for measuring and recording nuclear and thermal radiation, blast pressures, wind speeds, and electromagnetic fields. Other researchers conducted biomedical studies on animals, used fallout stations to collect radioactive particles, and placed cameras in concrete blockhouses to capture millions of still and moving images of the nuclear blasts.

As the Cold War scientific mission at Bikini grew, so too did the abuse of the islandscape. Bikini would be used to test the United States' most

powerful nuclear devices with twenty-three nuclear tests generating more than 89 megatons (Mt) of explosive yields, or nearly three-quarters of the total energy yield (119 Mt) released at the Pacific Proving Grounds during the entire US atmospheric nuclear weapons testing program. When atmospheric testing ended in 1958, the US left Bikini Atoll littered with ramshackle structures, derelict vehicles and monumental concrete ruins. Although a clean-up in 1969 eliminated many of the major physical and radiological hazards on the islands of Bikini and Eneu, the Bikinians were able to return to the atoll for only a short time in 1972 before being evacuated again, permanently. After that, restricted public access to the Atoll kept visitors away for the next four decades, leaving the fate of Bikini in the nuclear imaginary to the world's imagination.

Imagining Bikini Atoll

Bikini Atoll had exploded into the global consciousness during Operation Crossroads, with much of Bikini's renown being the result of extensive media coverage. With more than 300 still and motion picture cameras mounted on twelve steel towers and in three C-54 cargo planes flying over the lagoon, and 170 journalists in attendance, the Crossroads stories and images were published in many of the world's major newspapers and magazines (Degroot 119; Shurcliff 12). Bikini's place in the global nuclear imaginary became irrevocable as over the next several decades the public's interest in the Atoll was fed by the steady release of motion pictures – first theatrical and later documentary – that pictured Bikini through the lens of the imagined and real consequences of nuclear weapons testing.

Particularly provocative in those early decades were science fiction films featuring nuclear weapons testing in the Pacific plotlines. Beginning with *Godzilla* (1954), and followed by films like *It Came From Beneath the Sea* (1955), *Attack of the Crab Monsters* (1957), *From Hell It Came* (1957), *Mothra* (1962), and *Brides of Blood* (1968), the trope of Bikini Atoll as a violated and violent Pacific island paradise often saw Bikini being renamed or used anonymously in the films as habitats for Hollywood monsters. As vacuous as these films may seem, they represent an important contribution to the

history of Bikini's development in the nuclear imaginary, andare some of the first tangible representations of nuclear fear in American popular culture.[4]

It was not until 1987 that the world received a more factual depiction of Bikini's use as a nuclear weapons testing site with the release of director Robert Stone's documentary *Radio Bikini*. Making extensive use of films created by the US government during Crossroads, which were interwoven with contemporary interviews with the then Bikini *irooj* (king) Kilon Bauno and US Navy veteran John Smitherman, the Academy Award-nominated film documented the exile of the Atoll's population along with the health consequences of the nuclear tests on American servicemen.

Bikini was featured in 1988 in *Nuclear Exiles,* an episode of the long-running television documentary series *National Geographic Explorer*. *Nuclear Exiles* chronicled the history of the Bikini exile as it followed a group of elders on their first heartbreaking return visit to the Atoll. The film was also the first to examine scientific efforts to deal with the Atoll's residual radioactive contamination and the Bikinian's legal battles with the US over contested reparations.

In 1992, the American Broadcasting Corporation network's documentary series *World of Discovery* featured the Atoll in an episode entitled *Bikini: Forbidden Paradise*. Focusing principally on the Crossroads shipwrecks, the widely viewed program used film footage of the USS *Saratoga* aircraft carrier and the Japanese Navy flagship *Nagato* shipwrecks captured during the US National Park Service's Submerged Cultural Resources Unit's underwater archaeological survey. Paying particular attention to the Atoll's hazards, *Bikini: Forbidden Paradise* contributed much to the notion of Bikini as a poisoned ecosystem.

A 1995 documentary focusing on the history of nuclear weapons testing emerged out of efforts by American filmmaker Peter Kuran to declassify and restore some of the hundreds of nuclear weapons testing films in US government archives. Released as *Trinity and Beyond: The Atomic Bomb Movie*, Kuran's film was the first independently produced documentary of American atomic and thermonuclear weapons testing. Making extensive use of previously unseen footage, Kuran's digitally-enhanced video provided disturbingly lucid evidence of the explosive devastation caused

by atmospheric nuclear weapons tests, including the Operation Castle Bravo detonation, the largest atmospheric nuclear test ever conducted by the US. The images of Castle Bravo and other hydrogen bomb tests made public for the first time in *Trinity and Beyond* reinforced notions of, yet did not specifically show, the nuclear violence done to Bikini Atoll.

Reimagining Bikini

By the time the Bikinians reacquired possession of their Atoll under the Compact of Free Association there was little they could do to reverse the pollution and environmental damage caused by Cold War nuclear weapons testing. Although the islands of Bikini and Eneu had been cleared of debris, derelict vehicles, and minor testing structures (such as concrete slabs) during a joint Atomic Energy Commission-Defense Atomic Support Agency task force cleanup effort in 1969, and new palm trees had been planted in regular rows across land that had been flattened by road graders, much of the Atoll's original topography, fauna, flora, and built landscapes were gone. Because the cleanup had focused almost exclusively on Bikini and Eneu, there remained dozens of reinforced concrete blockhouses and other structures on other islands. Built to withstand nuclear explosions, these blockhouses were also able to weather Nature's most formidable forces and without significant human intervention, their ruins would last for hundreds of years. Recognizing this apparent inexorability of the change in the landscape and determined to make the most of their ravaged homeland, the Bikinian people began efforts to shape what may be the most logical and realistic public image of the Atoll in the nuclear imaginary.

It began with the 1989 archaeological survey of Bikini Atoll lagoon conducted by the US National Park Service's Submerged Cultural Resources Unit (SCRU) and featured in the *Bikini: Forbidden Paradise* documentary. Invited by the governing Bikini Council to assess the historical significance of the sunken fleet and the feasibility of developing the lagoon into a marine park, the SCRU extensively surveyed eleven of the twenty-one ships sunk at Bikini (Delgado et al. 22). Although a marine park never materialized,

the SCRU investigation became the basis for an even more ambitious and significant reclamation of Bikini's place in the nuclear imaginary.

In 2005 the Kili-Bikini-Ejit Local Government began work with the International Council on Monuments and Sites (ICOMOS), a global non-government organization dedicated to promoting the application of theory, methodology, and scientific techniques to heritage conservation, on the process of adding Bikini Atoll to the UNESCO World Heritage List. ICOMOS serves as an advisor to the United Nations Educational, Scientific and Cultural Organization's (UNESCO) World Heritage Committee. Australian archaeologist Steve Brown visited Bikini in 2009 as an ICOMOS representative to undertake an evaluation of the Bikini's World Heritage nomination document. Brown conducted a terrestrial survey of the Atoll to do a preliminary recording of features associated with nuclear weapons testing. Making copious field notes that included maps and floor plans of structures and features, Brown also took more than eight hundred digital photographs of artifacts, structures, and features on ten islands, documenting the extensive landscape and seascape modifications he believed were attributable to the American occupation of Bikini Atoll ("Physical Traces of the Nuclear Test History of Bikini Atoll" 8). Although Brown did later expatiate on the nature of his expedition,[5] he had not been tasked with interpreting the remains of Cold War nuclear weapons testing activities at Bikini. Instead, his report recommended the Bikinians undertake research to identify imagery showing development during the nuclear test period on Bikini Atoll and then use this material to document landscape modifications and construction associated with nuclear testing. He also suggested they undertake detailed recording of the surviving material evidence of nuclear testing at Bikini Atoll, including structures, infrastructure, and buried remains (18). Brown's recommendations are the basis for my archaeological work.

In 2010, Bikini Atoll became the world's first Cold War site to be inscribed on the UNESCO World Heritage List. Based on the intrinsic heritage value of Bikini's terrestrial and underwater nuclear weapons testing remains, the World Heritage Committee inscribed the Bikini Atoll Nuclear Test Site as having Outstanding Universal Value as "tangible testimony of the birth of the Cold War and… the race to develop increasingly powerful

nuclear weapons," as well as having given "rise to powerful symbols and to many images associated with the 'nuclear era', which characterized the second part of the 20th century" (148). Acknowledging that the displacement of indigenous people and the contamination of their homeland was a consequence of nuclear testing repeated around the Cold War world, the Honorable Tomaki Juda, Nitijela (RMI Parliament) Senator for the People of Bikini and son of the *irooj* of Bikini when the US evacuated the atoll for nuclear testing, spoke on behalf of the Bikinians in the preface of the World Heritage List application:

> As a World Heritage site, Bikini Atoll will forever tell the story of this period of human history. We wish the world to remember the role of our tiny atoll in the global politics of the 20th Century – for the role of the Bikini tests in the start of the Cold War and the nuclear arms race. As a World Heritage site, Bikini Atoll will remind all of us, around the world, of the need for global peace and the elimination of weapons of mass destruction. Bikini Atoll may then actually fulfill the promise for which we reluctantly left our homeland, more than 64 years ago, "for the good of mankind and to end all world wars." (qtd. in Baker 7)

In this tribute to an Atoll that was all but lost to the hegemony and global politics of the twentieth century, Tomaki Juda gave voice to a future for Bikini in which the sacrifice of their beloved Atoll was not in vain. Reincarnating the promise made by US Navy Commodore Ben H. Wyatt to his father, in which the US vowed to use Bikini "for the good of mankind and to end all world wars," Tomaki Juda articulates a powerful re-imagination of Bikini Atoll as a tragically enduring artifact of nuclear imperialism.

Archaeologies of Occupation and Devastation

Early in the summer of 1952 a shallow-water reef, roughly three hundred meters long by one hundred meters wide, separated Bikini's two southern islands of Aerokoj and Aerokojlal. It was small space, but culturally important nonetheless as in the reef's tidal pools native Bikinians had for

hundreds of years trapped fish of the Diodontidae family (Streck 258). The deadly Diodontidae, or porcupine fish, based on archaeological evidence and ethnographic evidence from Bikini and other atolls, is believed to have had deep-rooted religious and ceremonial uses. By summer's end the Aerokoj/Aerokojlal reef was gone, buried under a three-meter-thick layer of borrowed sand and coral rock mined from Aerokojlal's oceanside reef in order to create a single island long enough to accommodate Bikini Atoll's first airfield. The infilling of the Aerokoj/Aerokojlal reef was only one of many modifications made to Bikini's islandscape for the sake of nuclear testing. Other changes would follow, with many having similarly deleterious effects on traditional Bikinian life styles, yet prevailing mythology would have us believe that most were caused by nuclear detonations.

Historical archaeology allows us to read America's Cold War occupation of Bikini Atoll through the scars it left upon the islandscape. Some of the most obvious scars are the ruins of concrete structures built as scientific stations for data collection. Of the more than five hundred structures built, none were more expensive, extensive or robust than the blockhouses. Built to endure nuclear explosions in frighteningly close proximity to ground zero, blockhouses required tons of concrete and steel and months to construct. Built on meter-thick concrete foundations, a blockhouse's exterior wall and roof thicknesses typically varied from 1-meter to 2-meters thick with concrete reinforced by steel rebar (short for reinforcing bar) up to 4 cm in diameter. The concrete consisted of Portland cement, sand, and calcareous coral mined from the reefs. In some cases the blockhouses incorporated the mineral limonite, which made the concrete even more impenetrable to radiation. The roughly one dozen largest blockhouses built at Bikini ranged in extent from 10 to more than 280 square meters and from one to three stories in height. Depending upon the size and complexity of its design, in 1956 a blockhouse cost roughly US$125,000 to build, which today would be more than one million US dollars (Hanson 292). This cost is useful in understanding not only the expensive nature of American nuclear testing, but also the rationale for the purposeful location and orientation of Bikini's blockhouses.

Constructed at locations near ground zero, yet distant enough away to ensure the structure's survival, blockhouses required an unobstructed line of

sight to the nuclear device. Occasionally it was feasible to remove any trees or brush on islands along this sight line, but more often the blockhouses were simply built close to an island's shoreline with their fronts oriented toward ground zero. Apertures in this face allowed instrumentation and photographic devices to collect data and images. Because the initial nuclear blast on any island or reef caused a crater, the orientation of the blockhouse's front face required the use of barges for subsequent nuclear tests. The use of barges eliminated the need to construct new blockhouses or the need to attempt to change the facial orientation of existing blockhouses. The use of barges anchored in the lagoon also helped limit the destruction of Bikini's islands by reducing the number of ground shot detonations.

In the archaeology of Bikini Atoll, the terms "borrow areas" and "borrowing" are used in the rhetoric of America's occupation as euphemisms for acts of occupation and devastation. In excavations performed by H&N workers, "borrowing" was the act of relocating hundreds of tons of sand and coral rock from one area of the atoll to another for use in roads, causeways, airfields and the modification of islands. Apart from nuclear detonations, borrowing was one of the most significant ways in which the Bikini islandscape was altered. In situations where sand was borrowed, large alluvial sand deposits were excavated and hauled to construction areas, while coral rock was mined from reef flats.

Bikini Atoll's bedrock is coral compacted together over millennia into calcium carbonate rock. Bikini's reef flats consisted of four hermatypic (reef-building) coral species, including Porites lutea, Helioporacoerulea, Isoporapalifera, and Acropora digitefera (Emery 208). Coral mining began in April 1953 as one of the first operations set up by H&N under Operation Castle. H&N miners favored *Porites lutea* for its density and hardness, and for the fact that it could be found in a roughly 50 to 300 feet wide band parallel to the island's seaward shoreline (*Completion Report – Operation Castle* 40). Coral quarries were created on the reefs of Aerkojlal, Bikini, Eneu, Nam and Oddik islands, as H&N estimated more than 20,000 cubic yards of coral would be needed. Based on the reported amounts of concrete H&N produced during the Castle, Redwing and Hardtack operations, as much as 40,000 cubic yards of coral was mined for concrete production alone (*Completion Report – Operation Redwing* 2-7). Given that coral rock

was also used for building roads, causeways, airfields, and for ballast in the hulls of nuclear test barges, much more coral was probably mined. As an act of environmental destruction not often considered part of the American occupation, coral mining left indelible scars on the Bikini islandscape.

Among Bikini Atoll's most iconic proof of destruction are its blast craters. The direct effect of powerful nuclear explosions, they appear as three large, deep bowl-shaped cavities in the reef. The largest, the Bravo Crater, was created by the Operation Castle Bravo test and enlarged by the Castle Romeo test and the Aspen, Cedar, Fir, Poplar, and Sycamore tests of Operation Hardtack, which were all detonated on barges in the Bravo crater. Romeo deepened Bravo Crater, but it was the 9.3 Mt Hardtack Poplar test,[6] detonated roughly 600 meters southwest of Bravo ground zero, that expanded the crater's initial width by destroying reef on its western rim and washing away much of the adjoining Bokbata Island. Other blast craters include the Tewa Crater on the reef between Nam and Bukor Islands and the Zuni Crater in the atoll's southern chain of islands. Created by the 5 Mt. Tewa detonation of Operation Redwing, satellite imagery reveals the crater as a 900-meter-wide "bite" out of the lagoon-side reef. Likewise, the roughly 560-meter-wide Zuni Crater was initially created by the 110 Kt. Operation Castle Koon test, but then substantially enlarged by the 3.5 Mt. Redwing Zuni detonation.

Challenging one of the central tropes of nuclear mythology is the fact that none of Bikini Atoll's islands were destroyed in a single nuclear explosion, although two islands were severely damaged by multiple detonations over a decade of testing. Evidence of this fact is found in photographs, construction reports, and multiple mappings of the Atoll from before and after nuclear testing. Among the islands damaged by testing is the southern island of Jabej. Conspicuous for the Zuni Crater that lies off its western end, Jabej was once almost three times longer than its current length. Although the Castle Koon and Redwing Zuni explosions each took large chunks out of Jabej's northwestern shoreline, the Nutmeg, Hickory and Juniper tests of Operation Hardtack also eroded away much of the island with powerful water waves. Satellite imagery reveals five Hardtack blockhouses still stranded in shallow waters roughly one hundred meters offshore.[7]

Beyond the numerous terrestrial features comprising Bikini's archaeology

of destruction are perhaps the most famous ruins of atomic testing: the submerged ships of Operation Crossroads. Under Crossroads, ninety-three American, German, and Japanese ships were anchored in the lagoon for an experiment aimed at measuring the thermal pressure and radiation effects of atomic weapons. Twenty-one ships sank as a result of the Able and Baker atomic tests. Although the history of Crossroads and the archaeology of its shipwrecks are more capably discussed elsewhere by Delgado (see 1991; 1996; 2006), recent marine archaeology research in Bikini lagoon by the University of Delaware has generated a comprehensive geo-acoustic survey of the lagoon floor that promises to yield new high-resolution (one meter/pixel) digital elevation maps of the underwater landscape of Operation Crossroads and the Castle Bravo Crater (see Trembanis et al.). Imaging, for the first time ever, the Crossroads Baker crater on the Bikini lagoon floor, the researcher's high-resolution views of the lagoon landscape provide better context for the effects of nuclear testing on both ships and the lagoon floor.

Conclusion

In this essay I have suggested an archaeology-supported path forward for the Marshallese that focuses on developing a deeper understanding of the American occupation of Bikini Atoll and a wider promulgation of a historical narrative of a once-poisoned homeland that is slowly being healed by Nature while being actively managed by the Bikinians as a heritage resource. Bikini Atoll's place in the global nuclear imaginary has been decades in the making, but its status as a World Heritage List site will forever remind the world of the nuclear imperialism perpetrated on it by the United States. There may always be guileless others who will reach into the nuclear imaginary to appropriate Bikini's identity for their own ends. In a world where names, images, and even personal identities are stolen with regularity and occasional impunity, protecting Bikini Atoll as intellectual property may be a truly Sisyphean task. However, rather than have these moments devolve into a social media conflict, perhaps they might be better conceived as instances of both commonality and difference

in the recognition of a contested cultural icon that is in essence neither a beer, a bathing suit, nor home to SpongeBob SquarePants.

Notes

[1] LA-UR-20-23441. Approved for public release; distribution is unlimited. Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by TRIAD National Security, LLC, for the National Nuclear Security Administration of the US Department of Energy under contract 89233218NCNA000001. By acceptance of this article, the publisher recognizes that the US Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for US Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the US Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

[2] Broinowski characterizes nuclear imperialism as the "ideological and material domination and subjugation of one group, nation state, or ideology by another through the development of nuclear weapons and energy technology" (1348). For more on its nature, see Shiga.

[3] Among the best references on the exile are these six: Kiste and Chambers provide anthropological perspectives. Firth is an expert on the legacy of the colonial period in the Pacific Islands. Hezel is a Jesuit priest and expert on Micronesian history. Peck offers a unique bureaucrat/physician's view.Niedenthal provides a Marshallese perspective.

[4] For more on nuclear fear and artistic and popular culture responses to the Cold War nuclear arms race, see Weart; Jacobs.

[5] Brown (2013) provides some excellent philosophical discussions on the heritage of nuclear testing and the nature and politics of Bikini's World Heritage Listing.

[6] This explosive yield, as well as all others in this paper, are referenced from *United States Nuclear Tests July 1945 through September 1992. DOE/NV-209-Rev16.*

[7] The Hardtack structures are visible using Google Maps on the eastern rim of the Redwing Zuni Crater using the satellite image function at 11.502776, 165.373948. The geographic coordinates (in decimal degrees) of other sites mentioned include Aerokoj/Aerokojlal Island at 11.509216, 165.409905, Tewa Crater at 11.681532, 165.341161, and the Castle Bravo Crater at 11.699771, 165.274385.

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