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## FACING THE UNIMAGINABLE: HOPI AND SOUTHERN PAIUTE RESPOND TO MASSIVE RISK EVENTS

RICHARD W. STOFFLE, RICHARD  
ARNOLD, AND KATHLEEN VAN VLACK

### ABSTRACT

This is an anthropological analysis of two massive risk events, (1) the 1780 North American smallpox pandemic at Hopi and (2) the contemporary transportation of radioactive waste along the Southern Paiute path to heaven; and an assessment of how these American Indian societies responded. Findings from the analysis are used to ground the Risk Society Theory of Ulrich Beck (1992). The analysis is based on historic documents and contemporary ethnographic interviews. A cross cultural and diachronic analysis of risks is theoretically important according to Boholm (2009) because understandings of risks, like other experiential phenomena, are informed by socially and culturally structured and historically conditioned conceptions and evaluations of the world.

**KEY WORDS:** Risk Society Theory, Social Resilience, Hopi, Southern Paiutes

A fundamental principle of Risk Society Theory (Beck 1992) is that humans in recent times have experienced unprecedented and thus unimaginable risks. As a consequence today we all face *ontological insecurity* (Giddens 1990) because we have neither experienced nor prepared for these new risks and our future is unclear. Often these risks occur due to our proceeding with science and technology decisions based on *timescapes* (Adam 1998) that were too narrow in temporal and spatial scale (Stoffle, Stoffle and Sjolander-Lindvist 2012). Of course sometimes, natural events just happen.

This analysis provides another data-based perspective on Beck's Risk Society Theory (Stoffle and Arnold 2003, Stoffle et al. 2004). Here we ground in case examples the Beck assertion that recent risk episodes are both unprecedented and beyond our pre-existing cultural strategies to maintain social resilience. According to Beck (1992: 20) the modernization process leads to more destructive forces being unleashed and these forces are unlike any others previously experienced. These *unimaginable risks* are considered here in terms of three variables: (1) frequency of occurrence, (2) magnitude, and (3) substance of risks. Each of these variables is viewed as key for understanding (perhaps predicting) the ability of a specific human society to understand, prepare for, and adapt to extreme risks. Risk preparation is the cultural foundation of *resilience* (Resilience Alliance 2013).

Two cases contribute to the analysis. The historical case involves the recovery of the Hopi Indian society after a severe regional drought and the massive North American smallpox pandemic of 1780 (Fenn 2001). Hundreds of American Indian societies experienced this pandemic from central Mexico in the south to British Columbia in the north. This historic case is then compared with a contemporary case involving impacts from the transportation of radioactive waste along the Southern Paiute path to the Afterlife (Stoffle and Arnold 2003). Radioactive waste is currently hauled from 22 Department of Ener-

gy national laboratories across the traditional lands of dozens of American Indian societies, including Southern Paiutes, en route to the Nevada Test Site. These two cases illustrate the characteristics of unimaginable risks and the cultural ability (and limits) of these two American Indian societies to be resilient.

### THEORY

Risk Society Theory frames many popular and scientific explanations of the contemporary world, especially social and cultural conditions in Europe and the United States. The notion of Risk Society was presented by the German sociologist Ulrich Beck in 1986 and the term quickly caught on as a way of describing and explaining the stresses shaping human society in the late 20<sup>th</sup> century. According to Beck, even though humans have always been exposed to and subsequently adapted to risks, qualitatively and quantitatively new kinds of risks now confront society. During this period, Europe experienced risks from the Chernobyl Nuclear Plant melt down, widespread chemical pollution, the mad cow disease outbreak, and biotechnology (Adam, Beck, and Van Loon 2000; Lash, Szerszynski, and B. Wynne 1996). According to Beck (1992: 56) the growing awareness of modernization risks was a totally *unimaginable phenomenon* (emphasis added) a generation ago and is now already a political factor of the first rank. Knowledge of risks that are threats from 20<sup>th</sup> century techno-scientific civilization has only become established against massive denials and bitter resistance (Beck 1992: 58). The consciousness of modernization risks has had to be argued against the resistance of scientific rationality (Beck 1992: 59). According to his Risk Society Theory one reason these risks have been denied is because the established leadership of modern society (political and scientific) neither has a way of fixing the risks nor of helping society be resilient against their challenges. Not only is contemporary society facing unimaginable risks but it is doing so without the help of traditionally

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trusted leadership and knowledge providers to set these problems right. This situation has led to a widespread loss of confidence in society itself – another contribution to ontological insecurity, which might be considered as modern *social anomie* (Durkheim 1897).

*Resilience* is a term that has emerged in common use as well as in the biological and social sciences. Interestingly its popularity emerged just as society lost confidence in its ability to persist in the face of new risks, and it is possible that the two were related. As natural and social disasters increased in frequency and intensity, the issue of lifeway survival became increasingly salient. Resilience is used in this analysis as a social, not an individual or small group, phenomenon. Resilience is about a social condition that occurs when people, acting in traditional ways, learn about their ecosystems and adjust their adaptive strategies to protect them from natural and social perturbations. According to Holling (1973), the Resilience Alliance (2008), and Berkes, Colding, and Folke (2003: 13-16), resilience can be understood in terms of the magnitude, frequency, and kinds of disturbance that can be absorbed or buffered without the society and culture undergoing fundamental changes. In human terms the simple question is “Are we still here, largely unchanged, after the risk event?”

*Ontological insecurity* exists at the juncture of risk and resilience. Over time a society can and will co-adapt to social and natural perturbations (like hurricanes, earthquakes, droughts, and wars) that occur within cycles of a few hundred years (Stoffle, Toupal, and Zedeño 2003). When co-adapted with such threats, people are confident that their way of life will persist beyond the risk event. Some perturbations, however, can overwhelm resilience preparations (Stoffle and Minnis 2008). It is beyond the ability of a society to prepare for and adapt to perturbations (like massive tsunamis, volcanic eruptions and devastating pandemics), which have never occurred before, or only occur every millennium, or have never been this severe, or have unique components. Such perturbations are unimaginable and can lead to ontological insecurity.

## RISKS THEN AND NOW

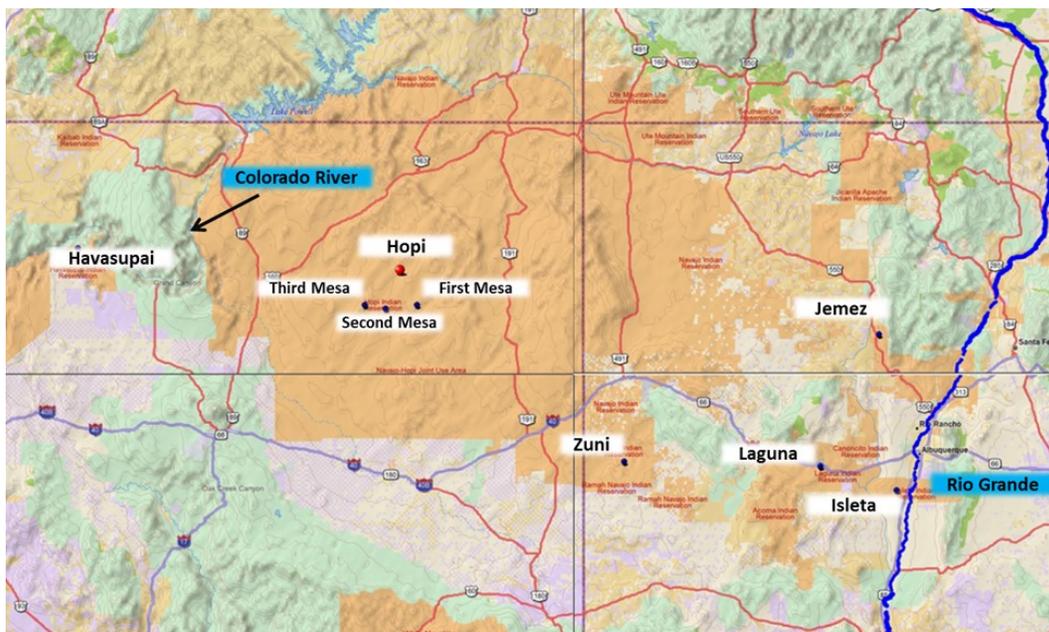
Beck’s argument that contemporary society has been changed by unimaginable risk events is open to discussion because of its importance and because it has not been grounded in local cases and other time periods (Boholm 2009, Boholm and Lofstedt 2004, Stoffle et al. 2004). According to Beck, when Chernobyl released radiation that exposed Europe

and most of the planet, it created a *new risk event* that not only caused health effects but also changed the nature of society itself. Because Chernobyl exposed all Europeans regardless of wealth and rank it thus weakened the foundations of social class, which had been developed during the rise of Industrial Society due to the uneven distribution of valued resources. After Chernobyl evenly distributed its radioactive risks no one was safer than another. Two key foundations of resilience, trust in leaders and reliance on knowledgeable people, were weakened by previous assurances by political and scientific leaders that a Chernobyl-like event could never happen and later by their public rhetoric downplaying both the event itself and the probability of reoccurrence. When trust is a victim of a risk event, the future of society is doubted.

## Hopi and 1780 Drought and Smallpox

The Hopi are an American Indian people who have lived for thousands of years on and near a series of isolated mesas in northern Arizona (Zedeño 1997) where they traditionally engaged in complex ceremonial cycles mostly focused on balancing the world, causing rain to fall in this extremely arid desert, and living from the dry farming of corn, beans, and squash (Figure 1). During this period they co-adapted with surrounding American Indian groups and a fluctuating natural environment. Key in this co-adaptation was what might be called a *breathing community* that can increase or decrease its local population (see for comparison Stoffle 2001). According to Levy (1992: 156) the Hopi have a system of resource control wherein the best local agricultural lands are controlled by a single household in the prime lineage of a clan. As resources become scarce, excess populations are removed in an orderly manner. This preserves the core of every social unit: phratries, clans, and lineages. So, in times of normal cycles of regional drought, selected

Figure 1. Hopi Lands





portions of the Hopi population moved away to be with other tribes with more permanent water (Levy 1992: 107-108), like to the northwest along the Colorado River among the Havasupai people or east to the Rio Grande Pueblo communities (Parsons 1936).

Social networks created by intermarriage and reciprocal exchanges facilitated gaining access to other people's natural resources in times of normal local drought (Titiev 1972: 273). These relationships seem very old according to Lyons (2003) who tracked pulses of ethnic migrations arriving at Hopi after 1150 AD by using pottery styles, perforated plates, ladles, ceramic colanders, ladle handles, kivas, and other archaeological data. Fewkes (1900) documents that Hopi and Havasupai, for example, had reciprocal agreements, which took the form of intermarried families, local exchange groups, and common clans present in each society. Such exchanges were adaptive for many groups having difficulties supporting themselves in times of drought and stress. For example, refugees from Jemez, Zuni, Laguna, and Isleta pueblos came to Hopi in 1715-1716 when drought and raids from Utes, Navajos, and Apaches caused these other pueblo people to seek refuge (John 1975: 238). In 1775 Hopi as the only Pueblo not under Spanish control continued to be the primary home for many Rio Grande peoples who participated in the 1680 revolt against the Spanish (Adams 1963: 104). Usually, however, according to this adaptive pattern, refugees returned to their home territory when conditions permitted.

Around 1780 the people at Hopi faced an unimaginable perturbation – an extensive three year long drought (1777-1779) which when combined with a North American smallpox pandemic (during about the same period) jointly killed most of the Hopi population (Upham 1986). In the *Hopi Dictionary* (The Hopi Dictionary Project 1998: 378) the word for smallpox *paayawu* has two more phrases of reference “*Hisat Oravve ~y akw wùukoso’a*. (Long ago in Oraibi many people died from smallpox) and *Hópiituy amumi pitu* (This smallpox afflicted the Hopi people). So many Hopi people died at this time that the living could not properly bury the dead. The massive number of bodies combined with only a few healthy survivors necessitated that the bodies be thrown off the edge of the mesas (Emory Sekaquaptewa, personal communication).

Father Escalante made it possible to measure these impacts when he traveled from Zuni (where he had been stationed) to formally meet with Hopi leaders in June of 1775 (Adams 1963). The Father's visit officially was for the purpose of converting the Hopi. The Spanish more broadly had plans to push the frontier further west by conquering the Hopi and finding a route to Upper California (Adams 1963: 100, 108). These military goals clearly made it important for the Spanish to accurately know how many Hopi lived in their seven pueblos. Escalante's 1775 Hopi census (actually a counting of what he calls families which we would define today as households) estimated a population of 7,494 people in 1,249 families (households), with an average of 6 people in each family (Adams 1963: 133-135).

In order find a route to California in 1776 the Spanish

launched a major expedition headed by Fathers Dominguez and Escalante (Dominguez and Escalante 1776). On their way back from their failed attempt to find the trail to California the expedition visited Hopi in November of 1776. Their diary entries at Hopi neither mention the drought nor the smallpox so apparently these had not arrived by that time (Warner and Chavez 1995).

In September 1779 the Hopi leaders sent messengers the Spanish Governor Juan Bautista de Anza requesting that he come to Hopi so that he would understand their dire condition and perhaps provide assistance. This was a surprising event inasmuch as the Hopi had a policy of not welcoming the Spanish. When Governor Anza and his men arrived he officially estimated a population of 798 people living in 133 families – he still used an unrealistically high estimate of 6 people in each family. The Hopi village of Oraibi, for example, had 800 families in 1775 and barely 40 in September of 1779, a loss of 95%. The seven Hopi villages had dwindled to 5 families with no more than 40 families left in any village. By most calculations the Hopi lost at least 90% of their population by 1780 (John 1975: 600).

Some Hopi people did move away as part of a traditional pattern of relocating to ethnically different communities living in wetter ecosystems. Some refugees moved safely to Havasupai, but many of the Hopi refugees who moved towards the Rio Grande were killed or captured by the Navajos and never returned (Fewkes 1900: 611; John 1975: 593, 597). The Navajo people were “at war” with the Hopi in 1775. The severity of these threats caused the Zuni to agree to provide Father Escalante with armed escorts for this journey to Hopi. Escalante's escorts, however, forcibly rerouted him against his will to protect him from the Navajos on his way to Hopi (Adams 1963: 105, 109-113). During this period there was a recurring pattern where the Navajo people sometimes (1) provided full protection for refugees and other American Indian travelers, (2) killed only the men and kept the women and children, or (3) killed everyone (Grant 1978: 70-71, 82).

By 1780, however, many Hopi people had simply chosen to die in place on their mesas – their options were extremely limited because other peoples who might have helped in the past were also in similar trouble. At Zuni, for example, people experienced a similar fate and had largely died or left that pueblo. The Rio Grande pueblo people did have river water but they were dying in similar numbers from the smallpox (John 1975: 598). So, a lower number of deaths than 90% may have occurred because some Hopi did leave to live with neighboring ethnic groups, but the prognosis was poor for everyone and Hopi society was in extreme jeopardy by 1780.

The Hopi population partially recovered but it never again (until modern times) reached the pre-1780 size. Levy (1992:108-109) correlated more declines in Hopi population in the 1800s with additional droughts and smallpox episodes. The most detailed analysis of the Hopi population during this period was provided in 1893 by Thomas Donaldson who produced an Extra Census Bulletin entitled *Moqui Pueblo Indians of Arizona*. On





page 15 of that Bulletin is the following summary of the best counts and estimates of the Hopi population available (Donaldson 1893:15):

- In 1745 two friars claimed to have counted ... 10,846 people at Hopi.
- In 1775 Governor Anza counted 7,494 people at Hopi.
- In 1775 Escalante counted 7,494 people at Hopi.
- In 1780 Governor Anza counted 798 people at Hopi – no rain had fallen for 3 years and at that time the Hopi deaths were given at 6,698.
- In 1846 Governor Bent counted 2,450 persons at Hopi.
- In 1853 Lieutenant Whipple counted 6,720 people at Hopi (this was just prior to the small pox of 1853-54).
- In 1861 US Indian Agent Ward estimated 2,500 people at Hopi.
- In 1865 US Indian Agent Ward estimated 3,000 people at Hopi
- In 1863 Colyer estimated 4,000 people at Hopi.
- In 1890 the Eleventh US Census counted 1,996 people at Hopi.

The 1890 US census indicated a total Hopi population of 1,996 persons, the 1900 US Census recorded 1,852 persons, and the 1910 US Census documented 2,009 persons. Thus the early 20<sup>th</sup> century Hopi population was less than a quarter of what it was in 1775 and what it was between droughts and smallpox episodes in the 19<sup>th</sup> century.

Still the people at Hopi in the early 20<sup>th</sup> century appeared to be living a traditional lifeway, conducting balancing and rain ceremonies, and experiencing a daily round of life much like that observed by Father Escalante in 1775 (Parsons 1936). The question then is, how did they restore/reconstitute their society and culture after the 1780 drought, pandemic, and massive population loss? The most robust explanation is that other American Indian peoples from distant communities who lost much of their population became unable to sustain a traditional way of life there and so subsequently moved to Hopi. These other peoples then permanently joined this increasingly multi-ethnic community as new clans. Joining Hopi, however, involved accepting strict protocols where the newcomers recognized the primacy of Hopi language, culture, and political leadership model. Newcomers were permitted unique roles in Hopi society, they could continue to practice specialized religious ceremonies in private kivas, and speak their own language in isolation. Each clan and religious society was welcome to become a part of a Hopi village but only on the assurance that the new people would make a contribution to the common good of the community (Hieb 2002: 91).

Hopi society in the 20<sup>th</sup> century is now made of many peoples and cultures. Their perception of traditional lands constitutes what is called *Hopitutskwa* (Hopi Land), which encompasses everywhere the Hopi ancestors traveled, lived, and were buried during the long migration from the place of origin to *Tuwanasa-*

*vi* (earth center) on the Hopi Mesas (Kuwanwisiwma and Ferguson 2004).

In retrospect it appears that outwardly the Hopi language, culture, and population were resilient with respect to the 1780 smallpox pandemic and drought. Clearly, however, many clans did not survive these two perturbations and there was a much different ethnic mix of peoples afterwards living at Hopi. Hopi has had up to sixty-four clans in the past few hundred years. Today, there are more like 32 clans, many members of which have participated in five of our ethnographic studies as elders of the Hopi Cultural Committee, which serves the Cultural Preservation Office (Stoffle et al. 2009). To be Hopi, according to interviews with these elders, is not so much a being a part of a biological group as it is a way of life (Sekaquaptewa and Washburn 2004). Elders we interviewed (Stoffle et al. 2009) maintain that among the key pillars of Hopi culture are cooperation, respect, stewardship, compassion, and humility; humility perhaps as the greatest. They say Hopi is a philosophy and a way of life.

The Hopi society is now, according to the elders, composed of clans who share the overarching identity of being Hopi, but many clans have their unique history, language, and ceremonies, which derive from an ancestral home elsewhere (Yava 1978: 46 - 61). There are Hopi clans today composed of people whose ancestors were Navajo, O'Odham, Southern Paiute, and the people from Chaco Canyon, all of whom came to live at and as Hopi.

#### *Southern Paiutes and Radioactive Waste on the Path to Heaven*

Southern Paiutes have a spiritual trail known as the Salt Song Trail, which was established at Creation as the cultural and physical path to the Afterlife (The Cultural Conservancy 2010) (see Figure 2). The Paiute Afterlife is a concept similar in many ways to the Christian concept of Heaven, except that all people who arrive are whole and healthy again and live a contented life until they are reincarnated. When a person passes away his friends and relatives move him along this Salt Song Trail by singing a series of Salt Songs and Bird Songs over a period of days. Each set of songs moves the departed person along the trail to a specified physical and spiritual place where he stops and remains until the songs begin again. The departed person only moves along the Salt Song Trail because of the singing of Salt and Bird Songs.

This path to the Afterlife traverses about a thousand miles through Southern Paiute traditional territory and that of the Hualapai people to the east across the Colorado River (Laird 1976) (see Figure 2). The trail is both spiritual and physical. It has physical places such as an approximate center point of the trail and distinctive places all along where the departed person stops at the end of each set of songs. It has spiritual elements most of which are not discussed by Southern Paiute people, but one component is a mountain ridge to mountain ridge viewscape centered on the trail that is important to the well being of the departed and the performance of the singers who mentally fol-





low along and track the trail as the songs are sung.

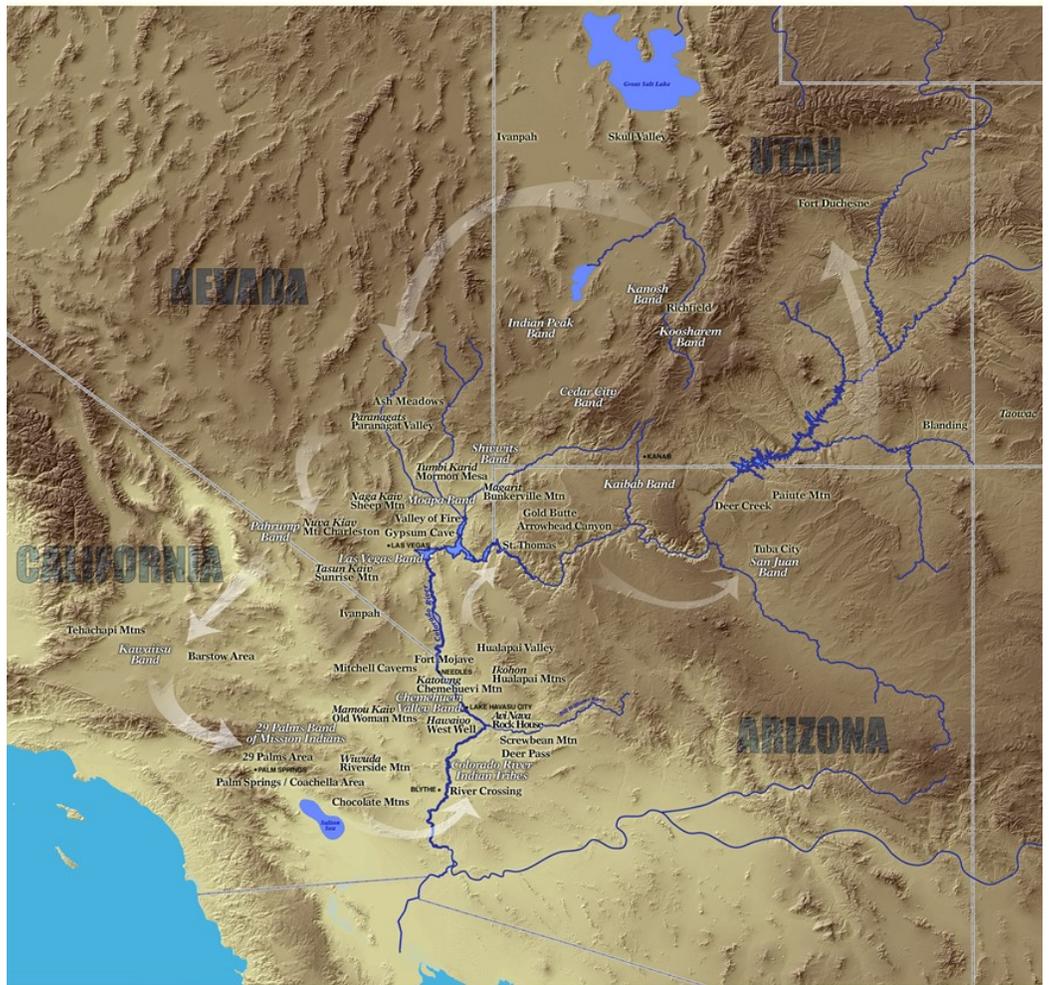
In 1996 the Department of Energy (DOE) began funding ethnographic studies of potential impacts to American Indian people and cultural places deriving from the transportation of radioactive waste along various highways in Nevada and California (Austin 1996; American Indian Transportation Committee 1999). The radioactive waste is being hauled from DOE national laboratories to the Nevada Test Site (NTS) now known as the Nevada National Security Site. One route that already had some waste hauled along it leads from Baker, California north up highway 127 to Death Valley Junction on the way to the NTS (see Figure 3). Most of this route corresponds with an 83-mile long segment of the Salt Song Trail, which includes the Amargosa River hydrological system.

Three radioactive waste transportation proposals have been considered for this segment of the path to the Afterlife. In 1986 the States of Arizona and California considered the Silurian Valley north of Baker as a site for a joint radioactive waste isolation facility (Stoffle 1987). That proposal was rejected. The NTS transportation study discussed here was the second proposal (American Indian Transportation Committee 1999). Finally an Environmental Impact Study (EIS) was conducted which assessed the impacts on American Indian culture of the movement of Greater Than Class C (GTCC) radioactive waste to the NTS (Department of Energy 2008). GTCC waste is much higher in activity than many other types of radioactive wastes, and as such, it is potentially more threatening to deceased spirits passing on to the Afterlife according to Indian people involved in the study.

There are numerous specific places (song stopping places)

Figure 2. The Salt Song Trail

## Salt Song Trail Map of Nuwuvi (Southern Paiute) Sacred Landscapes, Culture Areas and Bands



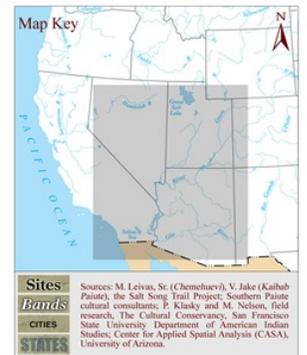
This map shows Nuwuvi (Southern Paiute) holy lands spanning ocean and desert, mountains and rivers and across four states. These landmarks are described in the Nuwuvi Salt Songs and represent ancient villages, gathering sites for salt and medicinal herbs, trading routes, historic sites, sacred areas, ancestral lands and pilgrimages in a physical and spiritual landscape of stories and songs. The Salt Songs are a cultural and spiritual bond between the Nuwuvi and the land, and represent a renewal and healing of a Nuwuvi's spiritual journey.

The Salt Songs are sung at memorial ceremonies and follow a trail that begins at Avi Nava/Ting-ai-ay (Rock House), the sacred cave at the Bill Williams River, and travels to the Colorado River north to the Colorado Plateau, west to Nuva Kaiv (Mt. Charleston), through mountain passes to the Pacific Ocean and then back east through the desert to the Colorado River and to its place of origin.

The trail visits the fourteen bands of Nuwuvi people including: Cedar City, Chemehuevi Valley, Colorado River Indian Tribes, Indian Peak, Kaibab, Kanosh, Kawaiisu, Kaiparowits, Las Vegas, Moapa, Koosharem, Pahrump, San Juan, Shivwits, and Twentynine Palms Band of Mission Indians.

For more information, copies of this poster and the film *The Salt Song Trail* contact Philip M. Klasky, director of The Storyscape Project of The Cultural Conservancy at [www.nativeland.org](http://www.nativeland.org), (415) 561-6594, Salt Song Trail directors Matthew Leivas (760) 858-4049 and Vivienne Jake (928) 643-7210.

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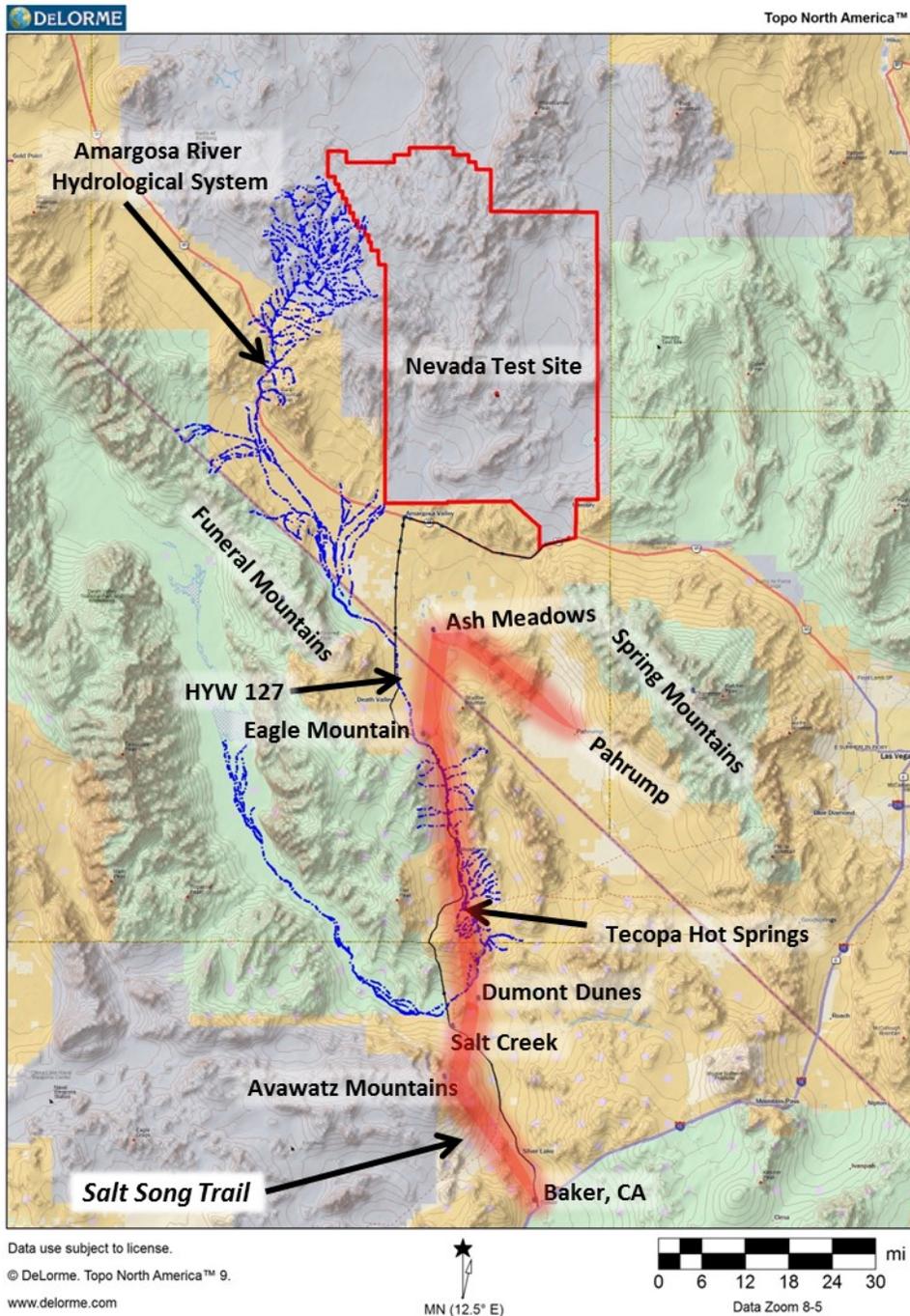
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Figure 3. The Salt Song Route Near Highway 127



mentioned in the Salt Songs along this portion of the trail. Prominent among these are seven places: Ash Meadows, Eagle Mountain, Tecopa Hot Springs, Dumont Sand Dunes, Salt Creek Spring, Avawatz Mountains, and the springs at Baker, CA. The song trail and contemporary highway generally follow the Amargosa River which flows south and turns west into Death Valley and the prominent hydrological systems that flow north from near Baker and turn west near Dumont Dunes into Death Valley.

Southern Paiute epistemology stipulates that all the elements of the world are sentient and, like humans, have agency (Stoffle and Arnold 2003). Elements of the world have a range of positive and negative responses to how they are used and treated. Southern Paiute people traditionally knew about and used radioactive minerals (Stoffle and Arnold 2003). American Indian people today talk about the yellow mineral as being used by *Puhaganti* (*Puha* = power and *-ganti* = having) and as face paint for warriors. Areas with high concentrations of the mineral were called dead zones and placed off limits to average American Indian people. Such areas were places of *Puha* and could only be visited by a prepared *Puhaganti*. It is difficult to determine just how old is American Indian knowledge about and use of radioactive minerals; however, in southern Utah an excavation of burials and caches in a mountain cave yielded a small bag made of prairie dog skin,

folded over at the mouth and tied with cordage. The bag contained eighteen dart points, a wooden flaker, and two lumps of uranium ore (Lindsay et al. 1968:42-53). Carbon 14 dating of





a nearby sandal from the same level in the cave indicated a date of 7,000 to 9,000 years ago (or more than 10 k years when adjusted to calendar years – see: [www.rlaha.ox.ac.uk/orau](http://www.rlaha.ox.ac.uk/orau)) (Lindsay et al. 1968:44). The cave lies within the traditional territory of the Southern Paiute people, and the cache contents suggests that uranium ore has been used as a medicine or spiritual material for perhaps the past 10,000 years by the same people. It must, however, be used in ways it deems appropriate or else it becomes an *Angry Rock*.

Radioactivity comes from an *Angry Rock*, which uses this and other forces to warn sentient natural resources along its transportation path not to share their energy with humans (Austin 1996) and can interact with departed spirits on their way to the Afterlife. The *zone of influence* is perceived as being about a mile on either side of the highway and basically results in a warning to all nearby places and resources to withhold themselves from humans. The *Angry Rock* can also directly harm others. Radioactive waste can be spilled due to hauling accidents. Elders especially worry if a spill occurs near a water source. The *Angry Rock* also can upset spiritual beings like Water Babies and human spirits who have not yet gone to the Afterlife. Spills can also leave the *Angry Rock* permanently in the ground near the road. As a sentient being, radiation can choose to move away from a spill location, either on its own account or be moved by the wind.

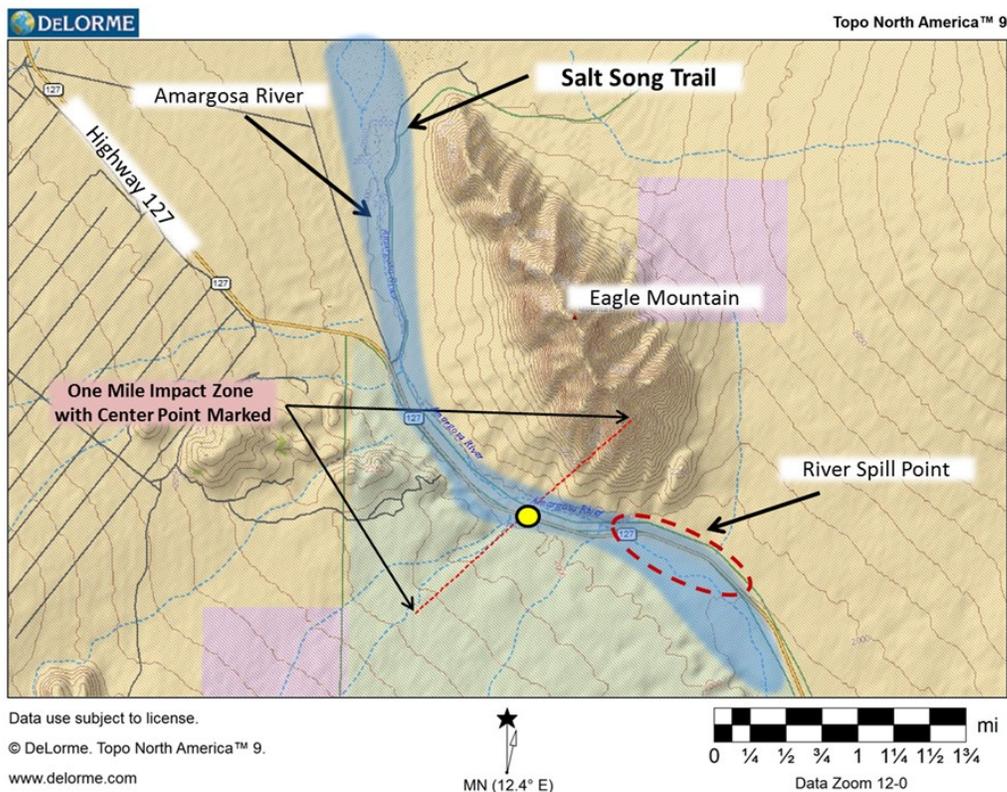
Southern Paiute elders specially selected by their tribal governments traveled during our studies along existing and proposed radioactive waste transportation routes (American Indian Transportation Committee 1999). Cultural anthropologists conducted interviews whenever an elder wanted to identify and discuss a place that would be sensitive to the presence of radioactive waste. Elders were especially concerned that the presence of radioactive waste could prevent the deceased person from passing along the Salt Song trail. Contamination was already perceived as occurring due to current radioactive waste hauling. Concern was expressed that more truck hauls (one projection considered up to 22,000 more hauls a year) and high-

er levels of radioactive waste could result in a radioactive waste spill that could cause a permanent spiritual disruption of the trail.

Elders believe that a large concentration of the *Angry Rock* at one of the Salt Song stops would prevent the deceased person from both stopping at this mandatory resting place and from further proceeding along the trail to the Afterlife. Figure 4 illustrates radioactive waste threats to a song-stopping place, Eagle Mountain, on a sharp bend in the road. Here there are possibilities of three kinds of pollution; (1) transportation of waste along the highway, (2) a spill into the Amargosa River, and (3) a spill along side of the highway. The spirituality of the mountain, the river, and the passage of the departed are all threatened at this point by both waste transportation and spills.

Elders continue to discuss the implications of having radioactivity on their Salt Song Trail to the Afterlife. Increases in volume and strength of radioactive waste contribute to an unimaginable perturbation. Although uranium was known and used traditionally, it was always mined by Southern Paiutes with reverence and only used by religious or medicine specialists. Contemporary U.S. society, however, has since the 1950s mined millions of tons of uranium and used it without Native American permission or proper ceremony. Now these tons of uranium

Figure 4. Eagle Mountain and Associated Radioactive Waste Threats





have become a waste product and the US is seeking places to safely dispose of these Angry Rocks. This is a risk problem that exceeds all traditional situations and cultural adaptations and now seems beyond solution, according to Southern Paiute religious leaders.

## DISCUSSION

The emergence of Risk Society by definition contrasts it with risks experienced by the pre and early industrial societies. As such, Beck was largely focused on social types and kinds of risks occurring over the past hundred years in western societies; although he did believe that Risk Society is being experienced worldwide. He made few assumptions, however, about how his new social type would play out in rural and culturally different societies other than to say because of a planet-wide ecology the circulation of pollutants and trust threats creates a World Risk Society (Beck 1992: 23).

The two cases in this analysis illustrate the value of disaggregating key dimensions of unimaginable risk. These cases demonstrate the utility of a risk analysis that separately considers the risk impacts and responses deriving from differences in (1) frequency of occurrence, (2) magnitude, and (3) substance of risks.

Hopi society was culturally pre-adapted to the drought and pandemic that had devastated them by 1780. American Indian people have farmed in and around the Hopi Mesas for more than 2,500 years (Smiley 2002) during which time they came to understand and build responses to various kinds of drought. Pandemic diseases emanated out of Mexico City by 1523 (Dobyns 1966, 1983), although Upham (1986) suggests that none of these exceeded a 30% loss of population. The 1780 trauma of massive population loss and the necessity of throwing the bodies over the edge of the mesas left an indelible emotional scar that exists today (personal communication with Emory Sekequaptewa). Generations of Hopi people had previously experienced drought and population loss from diseases, however, the question remains whether these experiences laid a foundation for the Hopi pattern of receiving people from other societies and cultures and incorporating them as new clans, or whether this was a cultural innovation stimulated by an unimaginable risk event.

A question that remains unanswerable, but nonetheless relevant, is which elements of Hopi society did remain the same and which had to be innovated or even radically altered to make such a massive accommodation. According to Chairman Abbott Sekequaptewa (2008), "Many people still believe that Hopis have always been one people. In fact, our ancestors were different groups, similar in nature, but each with its own history, tradition and priesthood authority for the performance of the rituals, which they possessed." Another Hopi commentator said that Hopi society today is culturally resilient to the extent that they still practice an ancient way of life (Lomawywesa 2008).

Southern Paiutes faced a threat from the transportation of radioactive waste (the Angry Rock) along 83 miles of the path to the Afterlife called the Salt Song Trail. There is serious speculation among religious leaders that the path to the Afterlife has and is being disrupted. These disruptions may be episodic such as when the waste passes a spirit on the trail. Spills are another kind of impact, especially were they to happen at certain locations where the spirit stops (see seven critical song stops discussed above) during the journey to the Afterlife. Spills also last much longer and can move at will. It is not clear to tribal elders, participating in NTS waste transportation studies, what the cumulative impacts of radioactive waste hauls and spills have been or will be and whether or not they could become permanent.

Paiute elders during the waste transportation EISs expressed a deepening concern about impacts to the Salt Song Trail. Elders increasingly believe that transported uranium has and probably will continue to be a permanent cultural problem not capable of being mitigated. Paiute tribal elders simply do not know how to culturally accommodate to what they perceive is a basic break in the life cycle.

This analysis returns to the initial question posed by Risk Society Theory (Beck 1992) that only humans in recent times have experienced unprecedented and thus unimaginable risks and as a consequence we all face *ontological insecurity* (Giddens 1990). Two case studies of massive risk events cannot fully resolve this question, but it is clear from the 1780 Hopi case that long before the Industrial Revolution, social risk phenomena were drastically changing the relationships of traditional peoples with each other and with their natural environment. These data thus indicate that Risk Society Theory is not correct when it assumes that unimaginable risks are new to humans. Human societies have adapted to some old risks and potentially can use some former cultural adaptations to face new risks.

These data also assess the proposition that some societies today are unable to adapt to unimaginable risks because the risk is unique in frequency or intensity. Even though Southern Paiute people knew about radiation and had used it in medicine for thousands of years, they never imagined it could appear inappropriately on the path to the Afterlife and do so in quantities so large that it could prevent the departed persons from reaching their Afterlife. This portion of Risk Society Theory is supported by the Southern Paiute case where traditional leaders are currently without culturally-based adaptive solutions to the risk.

These two cases support the Risk Theory assumption that unimaginable risks weaken social resilience, causing people to lose confidence in their own agency to adapt, and thus causing ontological insecurity. The Hopi people were all but eliminated but still were able to reconstruct a society that was similar to what it had been before the 1780 drought and pandemic. They remain, however, emotionally worried about being prepared if such events occur again. Southern Paiutes have not lost large portions of their population to radioactive waste and they do know about and have used radioactive materials, but



contemporary radioactive waste transportation poses a direct threat to their ability to sing their departed to the Afterlife. This has caused deep and abiding concerns.

These cases support the conclusion that risk impacts to society and culture must be understood in terms of more detail than that provided in Beck's conceptualization of Risk Society Theory. Theory is strengthened when grounded in real experience.

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