

Confronting the Angry Rock: American Indians' Situated Risks from Radioactivity

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abstract *Numic people in the western United States are co-adapted with their traditional lands and these lands are spiritually and physically co-adapted with these people. This relationship has been documented through studies funded by the Department of Energy, Nevada Operations.¹ Elders from twenty-six Indian tribes participated in two studies in order to explain why the transportation of radioactive waste poses serious threats. Key in their interpretation is the perception that radioactive material is an angry rock. Indian knowledge and use of this rock goes back for thousands of years. As a powerful spiritual being the angry rock constitutes a threat that can neither be contained nor controlled by conventional means. It has the power to pollute food, medicine, and places, none of which can be used afterwards by Indian people. Spiritual impacts are even more threatening, given that the angry rock would pass along highways where there are animal creation places, access to spiritual beings, and unsung human souls. A most troubling concern is that radioactivity would be transported along the path to the afterlife. The juxtaposition of the angry rock and human spirits being sung to the afterlife is unthinkable.*

keyword *Radioactive waste, risk perception, US Department of Energy*

Calvin Meyers, a Southern Paiute person from and former Chairman of the Moapa Paiute Tribe in Nevada, responded to the potential impacts of radioactive contamination of his traditional lands as follows:

You non-Indians can move if you pollute the land on which you live, but we were created for this place, so we must face whatever happens here. We cannot move and continue to be Paiute people – this is our land – we are this land.

This essay is about how traditional human communities who have multi-generational cultural attachments to the place where they live experience

situated risks. Traditional people are often uniquely threatened by pollutions that have the potential of eliminating either their residency in or use of their homeland; thus, they are a special type of people at risk.

The paper is not so much about the direct health effects of pollution, as it is about how pollution can damage and even break the cultural ties people have with their land. Pollution-based risks are widely experienced as epidemiological health effects or shared psychological stress and doubt about the future of society at large. Ulrich Beck (1992; 1995) has defined post-modern Europe (and much of the rest of the world) as being a 'risk society,' due to the pervasive and powerful nature of pollution-based risks and the resulting social distrust and disruption that has occurred. Lash, Szerszynski and Wynne (1996) suggest that a new view of ecology must emerge as a foundation for addressing problems produced by the new risk society. Adam (1998:23-59) says that humans can only face risk society problems if they begin to see themselves as essentially a part of nature – we must re/conceptualize and re/constitute nature. This paper suggests that communities who are mutually and sustainably co-adapted with their natural environment can serve as a model for reconnecting with nature.

Environmental pollution risks can be situated; that is, clearly bounded in space and time. Situated risks are narrowly tied to specific peoples, living in specific places, who are confronting specific pollution threats. Situated risks are subject to very specific cultural interpretations by the people who are impacted. Such interpretations are often termed 'perceived' impacts, but this paper documents that these impacts are as clearly understood, actively responded to, and as real in these respects as 'calculated' risks. The fact that perceived risks are founded on abstract cultural phenomena does not make it a trivial action to study them.

Theoretically the paper draws on the ideas of time and cultural adaptation. Specifically useful are the observations of Barbara Adam who suggests the notion of 'timescapes;' that is, a view of planned technical change as having impacts that are spatially wider and temporally greater than is typically considered, especially through cost-benefit analysis and other neo/classic economic approaches. The paper further documents the idea that perceived risk can be cross-culturally conceived (Douglas & Wildavski 1982); that is, understandable from different epistemological systems. This is a different point than that made by Wynne (1996) who balances the expert/lay knowledge debate by pointing out that both parties to the debate share a common epistemology and are similarly aware of what physically happens in the environment.

The issues of time scale and epistemology differences are illustrated by a belief held by some American Indian peoples that radioactivity is an angry rock. The paper draws on the experience of American Indian people in the western United States as they have been confronted and have responded to the threat of environmental pollution from radioactivity. More specifically, the paper discusses research findings from two studies conducted with Numic-speaking peoples including the Owens Valley Paiutes, the Western Shoshone, and the Southern Paiutes. The general processes that influence this situated risk case are illustrated with specific threat-response events, which describe how atomic bomb testing can block natural resource use and how the transportation of radioactive waste can block the path to heaven.

Traditional Peoples²

This analysis builds on the notion that co-adaptation is a process by which people increasingly adjust to and incorporate natural resources and topography into their lives (Bennett 1976:30–32). In so doing they alter the environment by making mistakes and then finding adaptive solutions. There is a dynamic tension between their need to use an environment and its need to be sustained. Lessons learned eventually result in cultural conservation ethics and the formulation of a human-land epistemology that contains ultimate sacred postulates (Rappaport 1999:263–271, 446), which serve as guides to sustainable survival. Over many generations, perhaps thousands of years, successful environmental adaptation is expected to result in integrated cultural cognitions that account for why the people were created in their home lands and why they cannot live elsewhere. The environment where they live then becomes their holy land and their connection to the environment becomes a birth-right tie. For traditional people, such realities frame their own notions of risk and guide how they confront these risks.

Basically, you become a traditional people when you live a long time somewhere and do not destroy the natural environment, yourselves, or your way of life. Humans become traditional through a diachronic process of co-adaptation (Bennett 1976) in which both the people and their environment co-evolve (Holling *et al.* 1995) to produce a sustainable way of life. Co-adaptation with the environment is the foundation of becoming a traditional people. Through time basic rules of environmental use are combined with cultural cognitions of the environment as having its own rights and needs. At some point the people decide they need to establish a partnership with the environment because it is key to the people's survival. At some level the people

and the environment reach a unification, such as the one being called for by Adam (1998). The continuum never ends because the environment itself is always changing, so human adaptations are always in need of adjustment. At the later end of the continuum are traditional societies that have existed so long and so successfully in an environment that their members have come to believe they were created on and for their home land environment.

Deep cultural adaptations tend to be a foundation for permanent sustainable land use and human survival; however, environmental pollution potentially threatens the ability of these people to reside in and use their traditional land. Therefore, a special type of situated risk situation exists when the environment of traditional people is exposed to certain types of pollution. If generations of knowledge and perhaps thousands of years of cultural adaptation are at risk from environmental pollution, then Adam is correct in raising our horizon of analysis to reflect how long it has taken to create the contemporary cultures and environments that are at risk, as well as to assess the time they may remain at risk.

Our research is with traditional people in North America, including a variety of peoples each having different lengths of time in a place for environmental adaptation. Many of these traditional peoples are American Indians – we have worked with more than 90 tribes in all portions of the United States and some portions of Canada (Stoffle & Evans 1990). Except for those tribes who have been relocated by the Federal government, most are living in their holy lands where they perceive they were created. We also have worked with people who have lived for from one hundred to two hundred years on their lands. These include rural villagers from Kentucky who faced relocation from a dam (Smith & Stoffle 1972) and rural villagers in Michigan who faced both the Superconducting Supercollider, the world's largest underground accelerator (Stoffle *et al.* 1987; Stoffle *et al.* 1988a, 1988b), and a radioactive waste isolation facility (Sommers *et al.* 1994; Stoffle *et al.* 1990; Stoffle, Traugott *et al.* 1991). Recently, we collected ethnographic data regarding Scandinavian Folk Fishers who built a unique way of life after coming to the United States (Stoffle, Toupal, & Zedeno 2000). They developed a folk fishery centered on Isle Royale in western Lake Superior – a new way of life that became well co-adapted with the environment and in many ways culturally unique. They appeared to develop an original conservation ethic within three generations (Toupal, Zedeño, Stoffle & Barabe 2001). All of these people taught us something about the stages of co-adapting with an environment and how pollution, dams, or atomic accelerators can adversely impact those adaptations and that environment.

Atomic Testing and The Angry Rock

Over the past fourteen years our study teams have facilitated a government-to-government consultation relationship between American Indian tribes and the Department of Energy/Nevada Operations (Stoffle, Zedeño, & Halmo 2001). The focus of the consultation has been the Nevada Test Site, which is located just north of Death Valley, California, and just west of Las Vegas in southern Nevada.

Involved Tribes

The Indian tribes and organizations that have participated in the consultation program are *culturally affiliated* with the land. In anthropological terms, the concept of cultural affiliation means that an ethnic group (or groups) has an established history of prior occupancy and use of a region's lands and resources. For the purpose of this paper, the concept also implies co-adaptation and thus it is another way of referring to and explaining traditional people.

The concept of cultural affiliation has been legally defined in u.s. Federal legislation and regulations in order to implement federal laws that require the government to work directly with specially affected Indian tribes. The concept was updated in regulations for implementing the Native American Graves Protection and Repatriation Act (nagpra) of 1990 (43cfr10, Vol. 1, Parts 1-999:189-213, 1997). A critical aspect is that the people have lived long enough in a place for it to become a part of their cultural definition of self. Therefore, in the United States, traditional people must prove they are culturally affiliated in order to participate in Federal programs designed to protect their rights and their environments.

Radiation – The Angry Rock

When cultural resource interviews began, it became immediately clear that Indian people were expressing three basic ideas – they had been in these lands since Creation, non-Indians have failed to appreciate the importance of these lands, and radioactivity is viewed differently in Indian culture. First, they wanted to emphasize that they had been created in these lands and that there was nowhere else they wanted to live. As a consequence of this birth-right attachment to the land they had exclusive rights to use the land and a continuous obligation to protect it. That was why they participated in the cultural studies, even though the studies were sponsored by a Federal agency that annually arrested many of these Indian people for formally protesting atomic testing. Thus thousands of scientists involved with atomic bomb testing were



Crystal Spring near Hiko massacre site Pahrump Valley, Nevada.

unwelcome visitors to the land. Equally unwelcome was the environmental pollution from the atomic testing that had been conducted on the Nevada Test Site. A second point was that EuroAmericans in general, and especially Federal scientists, simply do not understand where they are and what they are doing. This point is most basically illustrated by contrasting the scientists' perception of the environment as an empty and ugly wasteland – fit only for atomic testing – with the Indian perception of the environment as a beautiful holy land filled with places of power and life-sustaining natural resources.

Another contrast between the atomic scientists and the Indian people concerned the identification of radioactive materials. To the scientists, radioactive minerals are well understood with specific measurable physical properties, which if one prepares properly for them, are largely safe for use and disposal in a wasteland like the Nevada Test Site. American Indian people, on the other hand, explain radioactivity as an angry rock – a spiritual being that has been taken from its home without its permission, used in ways it does not agree with, and is being returned to the land without reducing its anger. The angry rock is alive and as sentient as humans are, but because it is both powerful and spiritual it cannot be contained – only talked to by religious leaders.

The angry rock interpretation of radioactive materials derives directly from the Numic belief that the entire world is alive. At the time of Creation all things were imbued with *puha* (power or energy) and given anthropomorphic

characteristics. Air, water, rocks, mountains, animals, plants, and humans have a language, complex emotions, different types and amounts of *puha*, and individual freewill. Rocks feel the need for relationships with people, and experience emotional pain if these relationships do not work out. For example, a quartz crystal will appear before a person in the desert. If the person then picks up the crystal and takes it home, the crystal will bring success to the person. Technically the crystal adds its power to the power of the person to attract other power and achieve their now mutual goals. Unfortunately, the success comes from the power of others, so eventually the person must return the crystal to its exact home in the desert or risk the health and wellbeing of family and neighbors. If the situation is properly explained, the crystal will simply disappear back into the desert without harming its lost friend. If mishandled, the crystal can become angry.

Indian people throughout the western United States traditionally knew about and used radioactive minerals. Indian people today talk about the yellow mineral as being used by Puhaganti³ (*puha* = power and *ganti*= having) and as paint for warriors. Areas with high concentrations of the mineral were called dead zones and placed off limits to average 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 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 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) (Lindsay *et al.* 1968:44). The cave lies within the traditional territory of the Numic 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.

Transporting Radioactive Materials and The Path to Heaven

The transportation of radioactive materials is seen as putting people at risk from what might be termed spiritual and conventional impacts. Conventional impacts are the center of calculated risks. A conventional accident might involve a truck, loaded with radioactive materials, having an accident and spilling its contents. Impacts can be spiritual if radioactive materials are considered an angry rock that can leave any container and cause supernatural damage.

The Department of Energy considers the Nevada Test Site as a safe place to deposit radioactive wastes produced at twenty-two other Federal facilities. Indian people have raised questions about impacts that could derive from transporting these wastes across thousands of miles of highways and rail lines. Meeting after meeting has been sponsored by the involved Federal agencies with representatives of hundreds of potentially impacted American Indian tribes. At these meetings tribes consistently express concerns about environmental pollution and agencies consistently provide calculations that suggest there is a low probability that pollution will happen. While tribal people are also concerned about conventional impacts, it is just as certain that their concerns have largely been expressed in terms of spiritual impacts. So the agencies and the tribes have largely talked past each other because they are using different cultural definitions of radioactivity and what is out there that it can impact.

The Department of Energy funded two studies of American Indian perceived risks related to the transportation of low-level radioactive wastes to the Nevada Test Site. Twenty-six American Indian tribes in four western states participated in the studies. The tribes were represented by a committee of Indian people who guided all aspects of the study from the research design to interviews, to analysis, and write-up. The studies utilized both quantitative and qualitative data, much of which was coded into arc info, a geographic information system, to analyze and map perceived impacts.

The First Study

The first study focused on potential impacts on Indian people and natural resources at a regional scale (Austin 1998). This study documented that Indian people frequently travel the radioactive waste transportation routes and they do so whether or not they live near the routes. This was an important finding because calculations of risk normally only consider impacts to people from communities located on a transportation route. The study also documented general patterns of natural resource use, which tended to occur most frequently in traditional areas. Indian people also travel hundreds of miles away from traditional lands in an effort to replace scarce medicine plants and traditional foods that either have disappeared or been made unusable from pollution in their own territories. Indian men described not hunting animals that live along highways where radioactivity is hauled. Women will not gather medicine plants from areas where atomic fall-out occurred two generations ago. Withdrawal from these areas also means these Indian people are not taking youth with them during hunting and gathering activities. Studies have documented that

many contemporary Indian health problems derive from their leaving traditional diets. So perceived contamination has disrupted the transmission of cultural lessons to youth as well as access to traditional foods and medicines. Given that certain lessons can only be taught at specific places, the contamination of places has caused critical and spatially unmovable problems in cultural transmission.

The first study provided the opportunity to more fully understand the concept of the angry rock. It had emerged in previous elder interviews, but this study involved many more elders from culturally different tribes. These Indian people confirmed the concept of all things in the world being alive and having anthropomorphic characteristics and human-like rights. From this premise naturally followed the idea that a powerful rock like uranium can become angry and strike back in some manner. These findings were expected because the participating tribes have a common Numic background. Somewhat unexpected was how radioactivity was so richly conceived, both in its physical and spiritual characteristics and in the various ways it can strike out and punish humans. Puhaganti today report viewing the power of the angry rock as a blue light, and people describe places where plants, animals, and even hot springs disappeared after radiation came into the area. In some cases, the natural resources withdrew because they had been harmed or scared by the power of the angry rock. In other cases, the angry rock was described as talking with the natural resources about the misbehavior of humans and recommending that the resources disappear and/or consciously withhold their life-giving powers from humans.

The Second Study

The second transportation study (aitc 1999) was funded to understand what exact cultural impacts could derive from transporting radioactive waste along specific sections of highways. This study built on findings from the first study, but it was guided by a different methodology designed to collect site-specific data for any potentially impacted place along the study highways. Again members of the Indian advisory committee helped with study design, data analysis, and write-up. Tribal councils selected elders to participate because they were interested and knowledgeable about specific segments of highways. A large van was filled with study team members and two 500-mile-long highways were traversed. When an elder wanted to talk about an area the van stopped and the team remained as long as necessary. Two data collection forms were developed in order to systematically collect site data. Elders were

interviewed while members of the American Indian Transportation Committee filled out their own forms.

The findings from this study seemed to surprise everyone except the elders who have been telling us for decades that many things are out there and being impacted.⁴ The following is a list of the kinds of places that were identified along edges of these highways.

Places traditionally needed to live:

- a. Sources of water
- b. Farming areas
- c. Permanent home areas
- d. Seasonal homes
- e. Plant seed gathering areas
- f. Fiber gathering areas
- g. Small mammal hunting areas
- h. Large mammal hunting areas
- i. Insect gathering areas

Places traditionally needed for spiritual well-being

- a. Big powerful caves
- b. Vision quest
- c. Song places
- d. Paint sources – red, white, black, green, blue
- e. Clay sources – extraction of poisons from body, eye wash
- f. Small doctor rock sources
- g. Animal nests – eagles, hawks, chuckawallas, tortoises, bluebirds, humming bird feathers, mountain sheep horns-hoofs
- h. Mineral sources – crystals, obsidian
- i. Hot springs
- j. Special water spots – waterfalls, volcanic constrictions in rivers, pools in streams, rock tanks
- k. Ritual preparation areas
- l. Rites of passage areas for boys and girls
- m. Science teaching places – star gazing areas
- n. Story telling places
- o. Story and song scapes and their places
- p. Healing areas – big doctor rocks, edges of rivers, tops of mountains, volcanic areas

This list of places illustrates the breadth of environmental impacts that can be expected when studying a people who are extremely well adapted to their environment. Note that there are many more places needed for spiritual well-



Potato Woman, Moapa, Nevada.

being than for just survival. In addition to these general types of places are some where specific historic events occurred. Therefore, spiritual and historic impacts are far more likely to occur than conventional impacts.

Four of the areas have been selected to illustrate the cultural importance of place and the process by which spiritual impacts can occur from radioactive pollution. The first two places are associated with Creation. They demonstrate that creation processes continue. The third place shows the role of historic events when these leave spiritual impacts near places of great *puha*. The final place is on the path to heaven, and this illustrates how fundamental pollution impacts can be.

Potato Woman, Moapa, Nevada

Potato Woman is a long, low mountain lying on its back along the southern flank of Mormon Mountains. She is a living topographic feature; a Creator Being who from her pubic lice makes a small and brown variety of Nah'-gah (Mount Sheep, *Ovis* sp.), a species that predominates in the Arrow Canyon Range. She is the only source of this Mountain Sheep, who in turn brings songs, stories, and medicine to Indian people.

Potato Woman's hair touches Interstate Highway #15. Potential radiation impacts include physical contamination that would derive from an overturned truck along i-15 near Potato Woman or from trucks parked in the i-15 rest area in her hair. Spiritual contamination could occur from presence of the Angry Rock, and she could cease producing mountain sheep.

Red Tail Hawk Origin, Maynard Lake, Nevada

At the narrow southern end of the Pahrnagat Valley an old Pleistocene lake left a 15-foot tall, continuous white ring around the edge of a once plugged up canyon, and here is the origin place for Kwi-nat'sits the red tail hawk (*Buteo*

ja-maicensis). Today, called Maynard Lake, this site is located on a wide sweeping s-curve on hy 93 just inside the boundary of Pahrnagat National Wildlife Refuge.

Maynard Lake was formed in the geologic past. Although the natural dam has been breached in modern times, various past lake levels are indicated by white bands that ring the red cliffs of the valley. The site is where the Kwi-nat'sits received the white band on his tail feathers. This occurred because the Kwi-nat'sits used the canyon walls as his perch from which he protected the area. When the natural weather conditions became more arid and the lake water level lowered it left a white band across the bottom of the tail feathers, just as it left its mark on the walls of the canyon. The existence of Kwi-nat'sits is tied to Maynard Lake, much like the Arrow Canyon Range mountain sheep are tied to Potato Woman.

Kwi-nat'sits is one of the animals that appears when an Indian person reaches the next life dimension (the afterlife). The appearance of the red tail hawk shows that the person is now whole and strong again. The hawk also helps the person go across to the afterlife at the end of the journey. The red tail hawk feathers are used in medicine fans because of the *puha* of that animal. Red tails hawks are a good omen.

Physical impact to this site could occur from truck accidents, parking, and drive-bys. Potential spiritual impacts are extensive. When a person passes on and you see Kwi-nat'sits then you know that the person has made it to the other side and is whole. If Kwi-nat'sits becomes extinct then you would never know the person has gone to the other side. If you pollute Maynard Lake the hawk will die. The red tail hawk is both a symbol and a helper to the next dimension and he needs this place to be born, live and to die – his spirit returns to this place.

Black Canyon and Hiko Massacre Site, Pahrnagat Valley

There is a volcanic butte in the middle of an extensive riverine oasis filled with clear fast flowing artesian springs, creeks, lakes, and marshes. This is Pahrnagat Valley and it was the traditional home of large irrigated agricultural villages and extensive fishing areas. The area so impressed Paiute people that they wrote poetry about it (recoded in the 1870s) calling it the Beautiful Valley (Fowler & Fowler 1971:125). The people of the valley and those living downstream along the Muddy River were related as a single district and together they had their own origin place called Coyote's Jaw, a peak in the mountains surrounding the valley.

This is a special *puha* place for Puhaganti who make it rain. The volcanic butte at Black Canyon has the cultural logic of a *puha* place; which involves volcanic activity, lots of flowing water, a small narrow canyon constricting the water flow, tobacco plants growing out of the cliff faces, and vistas. It is a place of great *puha* in a valley of great *puha*. Along the cliff faces are numerous large and unusual peckings. These seem of great antiquity but portions have been re-pecked, thus documenting repeated use (cf. Whitley *et al.* 1999). The Mountain Sheep images are interpreted by Indian people as symbolic of the normal spirit helper of the rain Puhaganti. Also present is the symbol of an unusual helper – a water baby. Normally, water babies are not used as spirit helpers because they are so powerful and unpredictable (see Liljeblad 1986: 653 for a summary of water babies). On this volcanic butte, however, a powerful rain Puhaganti can connect with water babies and concentrate great *puha*



Black Canyon volcanic butte, R. Arnold and C. Meyers.

for his or her rain making ceremonies. Indian people say that visitors from far distance came to this site, because the top of the butte is covered with large stone houses where they stayed. This may be the major rain Puhaganti site for a wide region covering hundreds of miles distance and dozens of Indian ethnic groups.

Just to the north of Black Canyon is the town of Hiko where there are massacre sites. Here in the late 1860s, two villages of Indian people were surrounded and killed by local non-Indian settlers. The massacres have been

documented by a local newspaper and more recently by oral history with longtime residents. From the non-Indian point of view the Indians had to be killed because they were stealing horses. Indian people believe the whites simply wanted to take the irrigated fields belonging to the Indian villages.

None of the human spirits killed have been sung to the afterlife along the Salt Song trail, thus they remain in the area. Elders believe that the water babies have taken these spirits and are holding them for some reason. This is a highly volatile situation involving on-going spiritual turmoil into which the angry rock would be brought. The Indian people know that the local ranchers have collected some of the artifacts and bones from the massacre sites. These will have to be buried with a proper funeral in order to restore balance to the area. The presence of radioactive materials can only further disturb the situation. Spiritual impacts could include damage to the power of this place and it could result in a reversal of the harmony and balance created by previous ceremonies at the rain Puhaganit site to the south.

On the Path to Heaven, Death Valley Junction, California

Numic people sing the souls of deceased tribal members to the afterlife in a multiple day ceremony called the Cry. The songs sung are called Salt Songs, a name derived from a spiritual journey taken by two sisters. The path of the journey is punctuated by topographically special places, which are reached at the end of various songs or sets of songs. The interaction between songs and places created a songscape (Stoffle, Halmo, & Austin 1997).

Highway 127 from Ash Meadows, Nevada to Death Valley Junction, California travels along a portion of the Cry songscape to the afterlife. This segment of the songscape is composed of many physical and spiritual places. The area contains human activity areas such as living, hunting, ceremonies, and trails. Spiritually, it is the place where giant birds and lizards lived and fought. The giant eagles and lizards came from a hole in the sky to do their fighting. The activities of these giants formed a number of places including three little green hills near Death Valley Junction and a mountain with a dark shadow that from one perspective looks like an eagle and from another perspective looks like a lizard. Tecopa is a major healing hot spring on the route. Such places also provide *puha* and spirit helpers for Puhaganti.

Radiation can have a variety of serious impacts. According to Larry Eddy, the head Salt Song singer and religious leader for the Chemehuevi Paiutes:

Our spirits will paint their faces and become angry because they are disturbed by the presence of angry rocks. When we are out there now, it is still and peaceful; it

is like being in a church chamber. Radiation will disturb the harmony of the valley; it will no longer be the same. It will be violated. All the previous songs stories that have been shared in the area will be disturbed. Once a song is sung it continues to be there. When you sing a song you are on the trail – your spirit is making that trip. You are describing where you are at and what is happening. You tell in the song where you are and what you are doing. When people go to these areas today a person can get a song. Previous songs live in the mountains in the canyons. If you were a gifted person that was meant to be an owner of the song you can actually hear it. The little people will come out of the side of the mountain and sing it to you. There are still areas today where you can go and hear the song. Some people hear the songs and it scares them because they do not know what it is. Young people need to be told what it is they are hearing. The places need to be protected from damage so the songs continue to be there for future generations. It is like a delayed echo that never goes away and can come again and again to new people. A native person has the ability to go there and hear, but it takes a person from twenty to thirty years to be effective.

The elders agreed with the judgment of another religious elder who noted that

a place like this has *puha* and only the shaman know how to use it. Each generation has its shaman, who knows about using the place, but repeated use over generations makes the shaman and his people feel the place is more significant. You do not just take power away from a place; you give back to the place. You give back prayer, honoring, and gifts to the place. Over generations of offerings the place is both honored and it becomes adorned by the offerings – that is, it becomes prettier. So if you take the offerings away, the sacredness of the place is diminished. The power is still there but you strip the place of its honor and beauty. If radioactive waste was to be spilled in this valley it could affect the path to heaven. Perhaps the angry rock would scare away the spirits on their path and we would be unable to get our relatives to the place of the afterlife.

Conclusions

Numic people are connected with their traditional lands and the lands are spiritually and physically adapted to these people. This relationship has been documented through interviews with elders from twenty-six Indian tribes from the western United States. These elders and their tribal governments participated in two studies in order to explain why the transportation of radioactive waste poses serious threats to themselves and others. Key in their interpretation is the perception that radioactive material is an angry rock. Indian knowledge and use of this rock goes back for thousands of years. As a powerful spiritual being the angry rock constitutes a threat that can neither be contained nor



AITC members B. Cornelius, L. Eddy, C. Meyers, R. Arnold, and anthropologist R. Stoffle.

controlled by conventional means. It has the power to pollute food, medicine, and places, none of which can be used afterwards by Indian people. Spiritual impacts are even more threatening, given that the angry rock would pass along highways where there are animal creation places, access to spiritual beings, and unsung human souls. A most troubling concern is that radioactivity would be transported along the path to the afterlife. The juxtaposition of the angry rock and human spirits being sung to the afterlife is unthinkable.

These are serious spiritual risks comparable with those perceived by scholars who have postulated a social theory of the Risk Society. This analysis contributes two considerations for Risk Society theory. First, risk perceptions can be as real as calculated risks. Second, the shared cognitions of risk among people of a common culture can raise questions of alternative epistemologies, which are not normally considered by risk assessments. The findings of this paper demonstrate that problems caused by contemporary risk society are even more extensive than those perceived by Beck and Adam and other risk theorists.

There is a logical step towards a solution to Adam's call for re/associating with the environment. This step would be to afford special protection for traditional people, like the Numic people, who are still co-adapted with their environment. As traditional people, they already have long-term sustainable connections with portions of their environment. By adapting to the place where they live they have made it and themselves different and mutually adjusted.

Protecting traditional peoples from situated environmental pollution is a positive goal, but these communities may have something more to offer modern

society than just their stewardship of a portion of the land. It should be valuable to look at these traditional communities and see if their local lessons can be used at the national or even the international level. At a minimum, the very fact that there are communities who have positive connections with the environment can serve to stimulate others to begin to work out similar relationships.

Not all traditional co-adaptations are specifically useful to modern society. To be so would mean that all environments and ways of life are basically the same, or would become the same. Soils, slopes, temperatures, oceans, fauna, flora, and the people who live there vary from place to place. We cannot ignore who we are and where we live, but we can establish general principles by which to live with nature. Adam suggests that these new principles should include respect for and a growing understanding of natural systems and timeframes. Natural systems must be understood to include many trophic levels including the functional interrelationships of local bacteria in the soil, the regional season habits of birds, and the movement of fish and water throughout the planet (Pimm 1991). Timeframes should include how long it really takes for things to happen in nature. Perhaps we should add to this how long it takes to create a society that is co-adapted with its environment.

Human societies can be re/centered as a part of nature. If we accept the principles of human-nature co-adaptation discussed in this paper, we must do this or face global environmental damage. We must learn and change. Today there are worldwide studies of environmental conservation ethics that demonstrate a growing awareness of environmental issues and a rapid rise in ethics among all the people of many societies (Dunlap *et al.* 1992; Inglehart 1977; Löfstedt 1993; Louis Harris & Associates 1989). Perhaps new attachments between humans and nature can be achieved in time to make a difference.

Notes

1. The u.s. Department of Energy Nevada Operations studies of American Indiacultural impacts from the transportation of Low Level Radioactive Waste were managed by Frank DiSanza. Consultation with the involved tribes was guided by Robert Furlow through the American Indian Program.
2. The term 'traditional' is used instead of indigenous, aboriginal, or first nations in order to argue that co-adaptation is a process that begins within a few generations and extends for thousands of years. At each stage of adaptation the people and their environment become more intertwined.
3. *Puhaganti* is the Numic word for what is often called medicine man or shaman in English (Laird 1976:31). There are various spellings like *poohaghooma*, a northern Paiute spelling (Hittman 1996:221).
4. The final report should be consulted for a discussion of all places studied (aitc 1999).

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