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stuartharris@ctuir.com

CULTURAL LEGACIES

Stuart Harris, Director
Department of Science and Engineering
Confederated Tribes of the Umatilla Indian Reservation
stuartharris@ctuir.com
541-966-2400

Tots Maywe. Good morning.

I am Stuart Harris. I am a staff scientist for the Confederated Tribes of the Umatilla Indian Reservation, or CTUIR. My job is to analyze the risks to our people from pollution impacts. My primary work effort is focused on addressing nuclear pollution and associated cleanup at the Department of Energy's Hanford Site. The CTUIR is a sovereign government that has a legal interest in the natural resources upon which the CTUIR's treaty rights are based. This includes lands of the Hanford Site.

The Umatilla Indian Reservation, located near Pendleton, Oregon, is occupied by descendants of three Columbia Plateau Tribes – the Cayuse, the Walla Walla, and the Umatilla Tribes. Under the Treaty of 1855 [12 Stat. 945], the Tribes ceded lands to the United States yet retained rights to perform many activities on those lands, including but not limited to fishing, hunting, gathering roots and berries, and pasturing livestock. Effective exercise of these treaty rights depends on the health of the natural resources. The CTUIR government does not want the people exercising their treaty rights to be placed at risk.

We, the Tetokin, have been impacted through the encroachment of your society. Our tribal population has been affected by biological warfare, ecological warfare, economic warfare, and downright attempts at genocide. Yet, we have endured, with our culture intact even through a 600 year holocaust. Our struggle is not over. With each successive generation we are forced to react to numerous environmental, cultural, and health impacts from members from your society who still perceive us a characters in a Louis L'Amore novel or a Hollywood movie.

My people have to deal with this complex set of problems, complete with numerous entrenched interests such as agribusiness, mining, and government, and competing value sets vying for ever decreasing resources. We use a process that includes education, law, analysis, research, and planning. Each of these processes is filtered and translated through our culture.

The CTUIR culture, which has co-evolved with nature through thousands of ecological education, has provided its people with their unique and valid version of holistic environmental management. Throughout the year, when the CTUIR traditional American Indian participates in activities such as hunting and gathering for foods, medicines, ceremonies, and subsistence, the associated activities are as important as the end product. In the Judeo-Christian tradition, an analogy would be “kosher” dietary practices.

All of the foods and implements gathered and manufactured by the traditional American Indian are interconnected in at least one, but more often in many way. The people of the CTUIR community follow cultural teachings or lessons brought down through history from the elders. Our individual and collective well-being is derived from membership in a healthy community that has access to ancestral lands and traditional resources and from having the ability to satisfy the personal responsibility to participate in traditional community activities and to help maintain the spiritual quality of our resources.

This is an ancient oral tradition of cultural norms. The material or fabric of this tradition is unique, and is woven into a single tapestry that extends from far in the past to long into the future. In order to encompass the wide range of factors directed tied to the traditional American Indians of the CTUIR, a risk assessment has to be designed and scaled appropriately.

Only our people, the Tetokin, know what is good for the Tetokin people. We don't give our knowledge away as the cost of buying improved risk assessments that may or may not result in lowered exposures and better resource protection. Within the decision-making context of CERCLA and NEPA, risk assessment as it now stands is woefully inadequate for addressing Native American concerns. In effect, a re-structuring of the risk assessment process must occur in order to address the overwhelming problems including but not limited to:

- Lack of breadth of coverage,
- Lack of integration and deficiencies related to not addressing the CTUIR traditional American Indian's quality of life,
- The interrelated eco-culture and their unique exposure parameters and pathways

Unfortunately, the processes, the approach, and even the necessity to account for traditional American Indian lifestyles have gone unnoticed in classical risk assessments that typically focus on suburban lifestyles. A risk from nuclear or hazardous waste that potentially affects one person of the CTUIR community may have lasting impacts throughout all of the community. In other words, a wave of risk can ripple outwards, affecting all of the individuals in our culture, just like a wave generated and propagated in a tapestry. If a culture dies, the only remnants are the material artifacts. In the event of the unthinkable happening, a continuously sustainable natural resource based material culture such as the CTUIR would rapidly disperse into the natural environment leaving no trace of the living CTUIR culture.

The need for understanding the pathways that directly involve the traditional American Indian cannot be understated. Our ties to the environment are much more complex and intense than is generally understood. Because my tribal culture and religion are essentially synonymous with and inseparable from the land, the quality of the socio-cultural and eco-cultural landscapes is as important as the quality of individual natural resources or ecosystem integrity.

Many cultural and religious activities also occur in natural settings, and would increase exposures over suburban factors. The difference in mean exposures between an average suburban resident and an average traditional-subsistence person co-located in a particular contaminated area are due to differences in assumptions such as the percentage of plant material grown locally. The actual percentile will vary with the contaminants that are present in particular media, the pathways that are applicable, and other habitat- and climate-specific factors.

The average subsistence lifestyle is equivalent to at least a 90th percentile of the average suburban exposure. Initial sensitivity analyses show that the difference between means of the two types of lifestyles ranges from 2 to 100 fold. The magnitude of the difference is due to the fact that the traditional of life as it is currently practiced is more than just a suburban lifestyle with extra fish consumption.

There are certain exposures that are potentially underestimated for a broad cross section of tribal members. For example, animal parts have many non-food uses that could contribute to personal exposure: teeth and bones are used for decoration and whistles, skin is made into clothing, fish belly fat is rendered and used as a base for body paint, and so on.

As with game, plants are used for more than just nutrition. Daily cleaning, preparation and ingestion of stored plants, and crafting of plant materials into household goods occurs throughout the year. The cattail provides an example: in the spring the shoots are eaten, the roots are consumed, and the fibrous stalks are split, woven or twisted into baskets, mats or cookhole layers. Later in the year the pollen is used for breads. Each of these activities involves the selection and gathering the plants from marshy areas, sorting, cleaning, stripping, peeling, splitting, chewing, and using various parts of the plant. Our basket weavers typically hold plant materials in their mouths during separation of the inner and outer bark. In addition to the plant itself, they contact sediment and water, and generally there will be cuts on the hands from the sharp edges that could facilitate dermal absorption during gathering, preparation, and weaving.

Likewise, the scenarios for children and other segments of our populations with greater exposures or greater sensitivities are not explicitly called out. These factors are part of both the uncertainty analysis and the risk characterization.

There are additional co-risk factors that could modify both exposure and sensitivity, such as:

- Individual cancer and non-cancer risk using the subsistence exposure scenario,
- Exposure to future populations,
- Community-level exposure burdens
- Additional background exposures such as evidenced by fish advisories,
- Underlying health problems using health statistics where available,
- Influence of underlying nutritional status, dietary quality, and the physiological effects of substituting a modern diet if the traditional diet is not available,
- Socioeconomic status and access to health care
- Potential differences in biochemical genetics and ethnopharmacology.

It is clear that evaluating impacts to a traditional way of life would include environmental quality and community quality of life in addition to personal exposures to contaminants.

Given this complex set of factors, along with the sovereign standing that my government has, I have found it useful to express my work within general guiding principles. There are some overriding principles, such as stewardship, trusteeship, and treaty compliance that apply to every aspect of my job. When we combine those principles with sustainable environmental management and a naturally integrated and holistic perspective, this leads us to some core performance measures that are reflected in my tribal mission statement. The things that are important to my tribal policy makers are:

1. Continuity and well-being of my people and our land,
2. Treaty rights, sovereignty, and the ability of my tribal members to safely exercise their treaty rights,
3. Restoration of environmental conditions for cultural wellness and subsistence rights based on traditional environmental knowledge,
4. Individual and community health over time,
5. Equity within this generation and between generations,
6. Trusteeship of cultural and natural resources and landscapes,
7. Sustainability of cultures within ecosystems, and
8. Protection of the ethno-ecosystem or ecocultural health

There are no assessments to which those principles do not apply. The following is a short list of projects that I am working on to fix or modify to meet these information needs.

First of all, I have developed a Native American subsistence scenario, which is being used in the CERCLA process and other assessments. But ultimately CERCLA assessments need to be based on more than just human exposure. They must include cultural risk as well. There are two NEPA EISs at Hanford that have some unique features such as recognizing treaty rights and using the subsistence exposure scenario.

Second, one of the EISs is also using the ethnohabitat concept and is substantially improving the environmental justice section.

Third, the Natural Resource Damage Assessment process at Hanford is now including the cultural use of natural resources with new metrics for evaluating cultural use.

Fourth, I have borrowed terminology from EPA's comparative risk methodology, which has three components – human health, ecological health, and quality of life. The quality of life component was modified to reflect cultural well-being specifically for the tribes.

Fifth, I have recommended certain modifications to the Hazard Ranking System so that it would be suitable for use as a tribal hazard ranking system, including incorporation of a tribal cultural perspective.

The point of these examples is that if you are well-grounded in the values and perspectives of the people you are trying to protect, then you should be able to find a way to apply those principles to any situation or tool. I believe that there is no risk assessment tool that cannot be made to follow those principles.

Now I am going to shift topics and discuss how risk managers can use cultural risk information. As an example, in any particular cleanup situation, there could be three bases for selecting a remedy:

1. If only human health is evaluated, and if the only cleanup goal is to reduce human risk, then institutional controls might appear to be the most cost-effective remedy. The most permanent remedy might be complete excavation regardless of the environmental damage this causes.
2. If the cleanup goal is to protect both human health and the environment, then the remedy might consist of limited excavation, a cap, a fence, and natural attenuation. This remedy ignores the cultural effects of lost access and use.
3. If, however, the cleanup goal is to protect human health, the environment, *and cultural use*, then the most cost-effective remedy might be a more expensive but less intrusive remedial technology combined with ALARA (a process to reduce concentrations to as low as reasonably achievable) plus mitigation for impaired cultural use.

While protecting cultural resources and cultural health might seem to be an obstacle to achieving site closure because it might prevent excavation in culturally sensitive areas, I think that this is a great opportunity for innovative and credible and acceptable negotiated closures. More thoughtful scholarship needs to be applied to this area. More scholarship is also needed in the neglected discipline of risk ethics.

Please note that the current EPA guidance for environmental justice fails to capture tribal concerns and does not deal fairly with the science of traditional environmental management. It does not adequately describe how to evaluate the distribution of risk between population groups such as tribes compared to suburbia. It completely omits evaluation of differences in impacts between cultures and the resources on which those cultures depend. For example, we know that traditional members with subsistence lifestyles receive 2 to 100 times more exposure than a suburban resident might receive at identical environmental concentrations. We also know that tribal members typically have a larger burden of co-risk factors such as poor nutritional status, loss of natural diet,

poorer access to health care, differences in metabolism, and so on. This means that tribal members might hypothetically not only receive more exposure but might also be more sensitive. Therefore, the cumulative impacts could be greatly magnified for tribal populations versus suburban populations. We as members of the risk community need to consider the concept that risk to people and their culture is composed of both exposure and sensitivity.

I have talked about cultural risk as one of the three types of risk, and have described why it should be evaluated just as rigorously and systematically as human and ecological risk. Risk Characterization needs to include those three types of risk integrated into a more holistic summary that tells a more useful story about all the impacts to my culture that contamination causes. The current approach to risk characterization is to determine a probability of developing adverse human health effects, and sometimes to describe some ecological effects completely separately from human health effects. From the perspective of an exposed community, what is needed is a more complete story that describes everything that is at risk from the particular contamination incident, including a cultural way of life. Risk characterization is another neglected part of risk assessment.

Ultimately, the complete story about the long-term impacts of pollution on my culture needs to be incorporated within the oral histories because of the long-lived and/or persistent nature of some of the contaminants. This relates to many stewardship issues that are gaining attention. As the original managers of sustainable environmental systems, I believe tribal scientists can contribute a great deal to stewardship programs.

In closing, I want to review the conventional scientific method because my tribal religion is based on an observational and applied science that has proved its worth over thousands of years through survival of my people. I want to briefly review the process for moving from observation, to hypothesis, to theory, to law. Tribal science has followed this path also.

Science is the observation, identification, description, experimental investigation, and theoretical explanation of phenomena. The scientific method is a general term for the lines of reasoning that scientists follow in attempting to explain natural phenomena. It typically includes observation, analysis, synthesis, classification, and inductive inference, in order to arrive at a hypothesis that seems to explain the phenomenon or solve the problem.

Remember that a hypothesis becomes theory if it withstands repeated testing and application. A hypothesis is a conception of proposition that is tentatively assumed, and then tested for validity by comparison with observed facts and by experimentation. A theory is a hypothesis that is supported to some extent by experimentation or factual evidence but that has not been so conclusively proven as to be generally accepted as law. Deductive use of the theory may then explain additional problems.

Science is a product of the society that develops it, and it is formed to serve the needs of that society. American Indians have been observing natural phenomena, describing them

experimentally investigating them, and explaining natural phenomena and natural resources for thousands of years. This tribal environmental knowledge forms the basis of traditional environmental management.

The reasoning that led to the determination of how to behave in the environment, based on what the environment consists of, is transferred to members of the tribe. Therefore, when a tribal member is gathering cultural materials, whether it is food or something else, he or she does it in a manner that reflects the principles of the science of traditional environmental management. This is the application of science, traditional tribal science, distilled into daily practice for the survival of a people.

The principles of traditional environmental management have been codified into law. There are some things you can do out in the environment and other things that you cannot do. The results of an action affect many things. As we know from the first law of thermodynamics, energy is conserved. Yet the entropy of reactions, especially in complex ecosystems, is difficult to determine, but has been observed by our elders through the noting of occurrences of the most probable reactions. For example, the type, quality, quantity, and occurrence of food or other natural resources has been noted and is related to us younger people through oral histories. Attention to the knowledge passed down means immediate survival and continuation of our people. Disregarding the knowledge can result in eating a poison, starvation or poor health.

For countless generations our elders have told us about environmental conditions, and that our behavior is a product of rigorous and proven methodology that has guaranteed our survival through all types of natural cycles. Our lifestyle is resilient and has persisted through floods, droughts, cataclysms, upheavals, and warfare. We carry the unique and individual genes specifically adapted to and modified by our homelands.

Therefore, when I am asked, “What is cultural risk?” my answer is:

“Because our people, the Tetokin, have been genetically modified by the ecology for thousands upon thousands of years, and have had their behavior modified as a result of responding to the flux of the ecology of our land for thousands upon thousands of years, and have produced a viable holistic environmental management system designed for continuously sustainable enhancement of our culture, and because the fabric of our very existence, including our sounds, medicine, science, art, music, and lifestyle is a reflection of thousands upon thousands of years of site-specific environmental shaping, any impact to those resources of which we are an inseparable part, is a risk to my culture.”

I was asked by an educated man once, “How can a culture be irradiated?” He thought that only tangible things can be irradiated and therefore only tangible things can be at risk. My answer is: “If my people are kept from a sacred site because that piece of mother earth has been contaminated, then I cannot transmit traditional teaching to future generations about the life significance of that site and therefore a significant part of my culture will be irreversibly altered.”

How can you put a price on a sacred song that is derived from a landscape feature and is significant to the survival to my people and therefore my gene pool? Impacts to the ecology directly impact the health of my people and put my culture at risk. Through time, my genetic characteristics may be adversely affected, thus destroying a multi-thousand year long fabric of blood. When an organism interacts and specializes within a finite set of environmental factors for thousands and thousands of years, that organism becomes the ecology. Within an ecological system all parts are important and all parts interact. Eventually the parts become mutually dependent, and neither part can be removed without harming or killing the whole.

My people, the Tetokin, have developed the science of holistic environmental management and have evolved with the ecology in my home, driving it towards a sustainable, aesthetically nurturing environment that mutually enhances our culture through time. This is why I come to you today, to bring forth the concept of the reality of cultural risk and how I have, through my work, been able to develop it in terms that are easily understood by risk managers and as a process that can be used by risk assessors so that we, as risk professionals, will have the tools to provide more complete and satisfactory answers, and make better environmental decisions.

Thank you.

Tribal Community Melds Science into Daily Living

Stuart Harris
Confederated Tribes of the Umatilla Indian Reservation

The scientific method is the observation, identification, description, experimental investigation, validation, and theoretical explanation of natural phenomena. It typically proceeds from observation to hypothesis, then theory, and finally to law. Native American traditional environmental management science has traveled this exact path and has proved its worth through the survival of my people for thousands of years.

Tribal elders have explained that our behavior is a conscious response to rigorous environmental shaping. They understood the value of systematic observation and used inductive reasoning to determine the most probable reactions of very complex, interrelated ecosystem functions. The entropy of reactions is difficult to determine in open systems, but has been extensively studied by our people at the ecologic unit level. The understanding of ecological thermodynamics forms the basis of our resilient and adaptive holistic environmental management science. The application of this science has been codified into law and has been distilled into daily practice. This knowledge is still transferred between generations. Attention to and application of this knowledge means personal survival and enhancement of our ecology, culture, and religion. Disregarding this knowledge can result in eating a poison, starving, degrading resources, or societal collapse.

The threads of this tradition are woven into a single tapestry that extends from the past into the future. Because the tapestry of our culture, and the very fabric of our existence are truly dependent upon the health of our ecology, any impact to those environmental resources into which we have been woven is a cultural risk. If pollution affects our resources now or in the future, the health and well-being of everyone could suffer. A risk from nuclear or hazardous waste may ripple throughout all of our communities like a wave generated and propagated in a tapestry.

This perspective, along with our legal interest in Hanford lands as a result of our Treaty rights, sovereign status, natural resource Trusteeship, and historic use, are some of the reasons that our holistic environmental management science should be used to guide the management of the U.S. Department of Energy's nuclear legacy. This is an example of why my people bear and must respond to unique and multifaceted risks.