**Your Tribal Land is Not Secure: Traditional Knowledge and Science Face Wildfire in the Valley of the Wild Roses [[1]](#footnote-1)**

By

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***Abstract****:* *Through the discussion of two tribal college students, this case begins an exploration of vulnerability and resilience after repeated and devastating fires as a result of drought and climate change at Santa Clara Pueblo in New Mexico. The Pueblo holds a rich store of traditional knowledge about the fire-prone ecosystems. This knowledge contributes to restoration efforts after a series of high-severity fires in the Jemez Mountains. Forested lands and wilderness shrines are lost, Santa Clara Creek and watershed suffer from erosion, and much of the Pueblo’s protected lands burned along with Pueblo archeological and cultural sites on public lands. Long ago, the Pueblo created a three zone management system that preserved the upper wild lands as a sacred source of water, protected the middle creek as an ancestral home, and created a homeland supported by sustainable agriculture in the Rio Grande Valley. Deep interviews and discussions with key tribal and western scientists provided sources for a case that explores how western science and Pueblo wisdom converge in interactions to restore around the Pueblo lands model.*

**A scenario—a discussion on campus after the fires and floods**

**Place:** Southwest Indian Polytechnic Institute Campus, Albuquerque, N.M., June 2014

**People:** Paul and Cora, students from Santa Clara Pueblo

**Issue:** Repeated forest fires burned and led to flooding Pueblo lands and cultural sites

Paul was walking across the campus at Southwest Indian Polytechnic that afternoon, thinking about what he could do for the people at home. He was strong in his studies, particularly in GIT (geographic information technology). He sometimes wondered if he should be a political guy, a forestry guy, or a technology guy, considering what they were facing at his home in Santa Clara. As he cut across the flat area between the buildings, he ran into Cora who was also from his home at Santa Clara. He remembered she was shooting to be a lawyer and that she was really sharp and articulate—she might be a politician or tribal attorney someday. He decided to ask her what she thought about the problems they were facing at home. Catastrophic fires had wreaked havoc on their forested homelands. You had to wear a hardhat and get special permission even to go up into the forest. And with the loss of trees and groundcover, the floods were terrible when Santa Clara Creek raged right by the Plaza.

He hailed her, “Hey Cora! What’s up?”

Cora looked up from her book and said, “Oh, hey Paul, I was thinking of you and your family. Those fires were intense!”

Paul nodded his head and replied, "I have been thinking about what is needed at home because of the fires and floods, so I am glad I ran into you.”

"I don’t have a class right now. Let’s go talk over there in the shade where it's cooler,” Cora said brightly as she walked over to a stand of cottonwoods.

“Sounds good,” he replied, and they ambled across the drying grass to a shady spot. Settling down on the grass, he asked, “So those fires are having some serious impacts for the people at home, and I was wondering what I could do. What are you thinking?”

Cora replied without hesitation as she sat down, “We should sue them. It’s only right. None of these fires were started on our lands by our people. Yet we are expected to swallow the impacts. It’s justice after all. I think we could win.”

“I’m not sure,” Paul cautiously replied. “We can lose big-time there, even when we are right. And some of the agencies may just decide to get even by not cooperating with us in the future even if we did win.”

“That’s always how it goes, anyway,” she replied with a sharp note to her voice. “I think they are pretty distant from our needs and from understanding us anyway.”

“You may be right, but I’d like to think we should at least try to have better relationships,” he countered. “Aren’t we all about building relationships all around us? Isn’t that what our culture, elders and dances try to teach us?”

“Maybe so, but forty million dollars could change things,” she noted with emphasis. “Once we are in the leadership role with restoration and able to show our stuff, the relationships are likely to follow. We can do it our way, hire our own experts that really understand our cultural and economic objectives.”

“I don't think it’s just our Pueblo lands,” said Paul. “All the land that surrounds us impacts us. We have ceremonial and cultural responsibilities that send us beyond tribal boundaries. And we can’t rely on technology alone. Look, Bandelier National Monument is putting in a high tech flood monitoring system, but our Santa Clara Pueblo Governor is sending up a person who knows the mountains and can assess the movement of water from all directions. I use technology, but I don’t think you can just buy technology to restore and protect the lands. I think you need more. I want to find ways to use technology and traditional knowledge too. Traditional knowledge gives us the long view of the forests and how the fire regime works. I think I might be able to translate knowledge to maps that the scientists will be able to understand. I think I am going to need a little help from Kokopelli.”

“All well and good,” responded Cora. “What about the floods? People suffered damages to their houses. They closed Puye Cliffs, our major recreation site for tourism on many days, and we lost revenue and jobs. Who is going to pay us back for that?”

“I know, Cora. I feel for you on that. My mom’s house got severely damaged.” He paused and ran his hand over the green cottonwood leaves. “I still think the most important things are keeping up our language, our culture, and our important knowledge like how to make our beautiful pottery,” he countered. “Keeping up the dances and remembering to renew the earth is important.”

“I agree,” Cora responded. “But I think there has to be some justice and I’m just not sure about those relationships you are talking about. I don’t see those agencies and organizations moving without a little nudge. I think sometimes that we should really pursue the United Nations Declaration on the Rights of Indigenous Peoples and try to get some standards in place.”

“Who will enforce that?” Paul questioned. “I think we can find ways of communicating with the agencies and our neighbor organizations. If they don’t understand what we are trying to share, they will just go on making mistakes that leak into our Pueblo world. Remember that thing we learned about last week about the Federal Emergency Management Act---it won’t do any good to sue as long as the Act itself dictates that you have to put things back as they were, even if they were unsustainable.”

“You may be right, but I still think a little push from the legal eagle could help,” replied Cora as she stood up and bumped Paul with her backpack. “Come on, let’s walk over to the snack stand and I’ll buy you a lemonade.”

**The place—Pueblo of Santa Clara**

Santa Clara Canyon, formed by Santa Clara Creek, is a deep ravine lined with spruce, pinon and aspen for over eight miles, pouring at last into the Rio Grande River. The Jemez Range surrounds it on the east, and the snowpack at the higher elevations feeds into a vast system of tributaries, underground waters, and springs. It is the source of water for Santa Clara Pueblo: the headwaters form a cultural shrine. The Pueblo of Santa Clara, called *Kha P’o Owinge*, Valley of the Wild Roses in the Tewa language, is a place where culture, and water in all of its forms, are intertwined in time. Integral to the heritage and to spiritual connections, the use of clear water from the wild watershed source in the upper region remains vital to ceremony and to practice. The upper watershed is regarded as a shrine, the middle section holds the knowledge of ancestral dwellings and ways, and the lower component provides a homeland for sustainable agriculture.

Fish and deer were plentiful along the clear waters of the creek, and a protected old growth forest thrived in the upper watershed. Spruce, aspen and ponderosa thrived along with plants important to ceremonial life. Medicinal plants grew there. Further down the canyon lay the ancestral Puye Cliff Dwellings, inhabited until 1600. Santa Clara Pueblo itself sits at the bottom, in the rich valley today, with Santa Clara Creek skirting the Pueblo’s Plaza on its way to the nearby Rio Grande River. With the upper canyon surrounded by federally protected land including wilderness, preserves, and other protected areas in federal hands, and the Pueblo in control of 47,000 acres of the Canyon, it would seem a serene and sustainable future was in place.

**Snowball on Fire—Ice to Flames and Floods**

While this case focuses on the Santa Clara Pueblo, the impacts from the absence of the natural fire regime are widespread in the Southwest and other regions, creating landscape level problems and ecosystem changes. Frequent fires were part of the previous regime in the Jemez Mountains that encircle the Pueblo lands to the East. Fire in wild areas can have beneficial effects extending to other areas: it can help to clear out fuel buildup and balance the natural regime (Arno, et. al., 1999; Pyne, 1995, Noss et. al. 2006; Miller, 2013). The benefits can vary depending on the terrain, size, and severity of the fire. The Santa Clara case points to the need to take an interdisciplinary approach in all phases of fire planning and response. The forests of the Southwest United States are not comparable to the great boreal or temperate rainforests of the North. In the Southwest, ponderosa and spruce forests usually exist on the isolated peaks and mountain ranges—the String of Turquoise—that feed the watersheds critical to all life. An adequate snowpack and gradual melt in the dry springtime provide the water for most life forms. In recent years, drought and lack of frequent low-intensity fires combined with past practices like logging and grazing to bring about the result of unhealthy, disease-prone forests. These densely packed forests cut off sunlight from the forest floor, arresting the development of grasses, shrubs berries and insects that are foundations of the forest food chain. As temperatures warm up, fires of increasing size and intensity are the result. Historically, prescribed fire and un-suppressed natural ignition fires were frequent in the Jemez Mountains, and Puebloan thinning practices for agriculture opened up areas (Margolis, Swetnam, Allen 2013). As Pyne has noted, “Much of the natural world that preservationists seek to protect co-evolved with anthropogenic fire. To remove that fire regime may be catastrophic……” (Pyne, 1995). In the case of the Jemez Mountains, very little land is allocated to wilderness. It is possible that if wilderness areas were expanded with specific legislation that dealt with restoring the natural fire regime through carefully-planned prescribed fire, that risk might be reduced.

The recent fires originated outside Santa Clara Pueblo lands and they were all sparked by human activity. Conditions on public lands combined with climate change and increased human habitation and activity led to the incendiary conditions where fires ran up the steep canyon terrain and created high risk for firefighters. Not only are the fires larger and faster—Las Conchas moved at an acre per minute in its early stages—but the area was burned again just a few years before by the Cerro Grande fire. The after-fires created a massive scar with damaged and unstable soils.

The Cerro Grande Fire in 2000 burned 12,000 acres of forest on Santa Clara Pueblo lands. In 2011, the Las Conchas Fire was worse: it burned over the old fire scar and entered the Santa Clara watershed again. This time the Pueblo lost 16,600 acres of forested tribal lands and 80% of the watershed was impacted in this 150,000 acre fire. The Dome Wilderness on Forest Service lands burned twice. The Thompson Fire in 2013 burned in the Valle Caldera National Preserve, only 20 miles south of Santa Pueblo lands. The floods that followed the fire ravaged lands in summer, ripped away trees, destroyed cultural areas, and filled the riparian areas and fishponds with mud.

 **The Importance of Traditional Knowledge**

The Santa Clara Canyon and all of its beings, including the Santa Clara People, hold a rich storehouse of phenological knowledge necessary to conduct sustainable agriculture and conserve wild areas as shrines. A ceremonial calendar connects people with the land, the wilderness sources of water and life, and the harvest and planting cycles. Over the years, the Pueblos drew from their treasure house of knowledge, for taking care of the forests, for dry land farming, and later for indigenous irrigation systems. This existence was, and remains, based on access to clean water sources that emerge from federally protected lands and wilderness and tribally protected areas.

The knowledge they hold—traditional knowledge—is knowledge in motion across time, passed through the centuries by a community of people. Dr. David Warren, an intellectual leader from Santa Clara Pueblo, speaks of its origins and the intergenerational reach of the Santa Clara model:

I think it would be well for us to remember whatever was defined by the earliest people here in defining the universe. The area we live in is a little crucible. It is bounded and it is shaped, and it is defined by the physical mountain ranges. I think it is within that crucible that for 10,000 years, perhaps even longer, people had learned to live on the margin of many, many kinds of limitations.… in the human and material resources that define a land that has got very little water. (Loeffler 2008 pp. 83-84)

He suggests that knowledge is found in the visible artifacts of the past that are understood through cultural transcription through hundreds of generations—through the story of the Cliff Dwellings, the pottery, the symbols, and the language. (Loeffler, 2008)

Joe Baca, Intergovernmental Coordinator for the Pueblo, eloquently described three components that support traditional knowledge forming the basis of Santa Clara identity that should not change:

1. The language: language carries the traditional ideas and concepts, the oral history, the vehicle for continuance of traditional ecological knowledge *Kha P'o Owinge* means Valley of the Wild Roses implying the beauty of the existence of extensive riparian areas.
2. The arts of the Pueblo: famous for its pottery, the Santa Clarans use a variety of symbols like Avanyu (the water serpent and protector) that carry cultural meaning. The practice of pottery-making uses native clays, handwork and the firing process uses dried manure not fossil fuel.

3. The ceremonial life and ceremonial calendar along with wisdom of the elders. Dances mark events in the ceremonial calendar, renew the bonds with the land, the waters and the forest. The elders and the kiva leaders still control the decisions of elected tribal leaders. (J.Baca, personal communication, 2013)

All three of these components connect the people with the wilderness headwaters of Santa Clara Canyon and the waters of the Rio Grande in a model for living with wild places. The waters that issue from the shrine high in the Canyon support sustainable agriculture and the life ways of the Pueblo. Of particular importance is the ceremonial calendar “in which, each event is associated with traditional seasonal tasks, [and] also reflects the Tewas’ view of time” and the importance of seasonal transitions (Sweet, 2004, p. 30). The ceremonial calendar outlines the ceremonies and tasks associated with annual renewal.

# Resilience and Traditional Knowledge in the Post-Fire Situation

# The commitment to retaining cultural identity and an ancient relationship to the waters, lands and life systems while preparing for an uncertain future is the essence of resilience. Repeatedly, voices from the Pueblo spoke out that they would remain, that they would continue to be the stewards, and that their way of life is inextricably linked to protecting the watershed. They came to meetings, they worked with news reporters, they went on television and radio, but it seems little was heard.

Floods follow severe fires in the summer monsoon season. Another impact of the changing climate emerges with more intense monsoon rains that are further apart, leading to flooding and erosion. Faced with the triple threat of damage to cultural sites, wilderness shrines, and their way of life from a nine-foot wall of water rushing down the Canyon during monsoons and unstable soils, Governor Dasheno stated the problem concisely:

We are devastated by the vast damage to our once beautiful Santa Clara Canyon and P'o pii Khanu, the headwaters of our Santa Clara Creek,” states Governor Walter Dasheno. "This is our only homeland, the place we have been entrusted with since time immemorial. Never again in our lifetime will we see our Santa Clara Canyon as we have known it. It will take generations for our community and lands to recover from this fire. (NMCF, 2011)

The Pueblo works closely in partnership with the New Mexico Community Foundation to meet the immediate needs of families and begin the restoration work on their wilderness shrine. They involve children and youth in replanting trees so that they will remember. But response to the Pueblo’s needs has been slow, and trust needs to be built with surrounding agencies. There is a great need to incorporate traditional knowledge and cultural concerns at all levels of planning, fire response, and post-fire restoration.

They face many barriers to re-wilding, a process to restore the wild components of the ecosystem. Although FEMA (Federal Emergency Management Act) monies are available, they can only be used to restore past infrastructure (J. Baca, personal communication, 2013). This means that needs for infrastructure change that would better protect the watershed cannot be improved with traditional knowledge. Since the Reagan administration, significant sources of emergency funding for Tribes come through the State. The governor must work with the Regional Forester and then release the funds (J. Baca, personal communication, 2013). In any state, these are two of the busiest people, and bringing them together and up to speed on what the funds were designated for creates long delays. Santa Clara Pueblo waited for several years for the funds for projects that were delayed before the fires. Better coordination between state, federal, tribal and local governments is needed if wildlands and watersheds are to be protected: the state legislature in New Mexico passed a resolution calling for just that in 2012.

BAER (Burned Area Emergency Response) implementation teams can pose additional problems. Run by the Bureau of Indian Affairs (BIA) for reservation lands, there is a tendency toward uniform prescriptions for one-size-fits-all practices that exclude traditional knowledge and that often present environmentally and culturally inappropriate solutions. The desire to adhere to practices in line with traditional principles, even in new situations, creates conflict with fire restoration efforts is demonstrated in this first example. After a fire in the Southwest, part of the restoration effort includes activities to prevent flooding after the loss of trees and vegetation to hold the soil. At Santa Clara, in keeping with traditional practices and principles of using materials within the watershed, they requested the use of wood mulch to help accomplish this task. Instead, the restoration that was done through the BIA used straw. Unfortunately, straw can contain invasive seeds that can change the watershed carrying the potential to bring plants that compete with native species. Also, straw is a lighter material than wood, and is less likely to hold in major rain events.

A second example comes out of the BAER implementation team’s insistence on tributary treatments utilizing sandbags and cable-rails, since rock check-dams failed after the 2011 fire. However, these new technologies may not work well in this environment and may have negative aesthetic, cultural and ecosystem impacts. In fact, extensive use of sandbags may not only be ineffective but may have deleterious effects on pristine conditions and water features by releasing large amounts of sand into the watershed when the bags eventually deteriorate. This represents a failure to understand the waters of the Santa Clara Canyon within the traditional category of “fast water” (Swentzell, cited in Loeffler, 2012, p. 30) that must be treated differently than slow waters such as the Rio Grande.

Michael Aune describes a third example: the installation of hundreds, perhaps thousands, of smaller rainwater (flooding) retention basins toward the top of the mountains to slow the speed of the flow before it picks up steam and becomes a destructive flash flood. The benefits of more hand-built earth and rock retention basins toward the top include holding water, including snowmelt, for longer periods of time to allow it to soak into the ground at the higher elevations. This minimizes the stress on trees, though it doesn’t eliminate it, due to prolonged drought (Aune, Sept 2013, p. 33). The benefits are many: water seeping slowly through the basins feeds the underground aquifers and provides water for wildlife. It could be accomplished mimicking pre-historic systems using native materials in low-profile structures that meld with the landscape. Once before Pueblo peoples employed handmade rock and earthen dams, utilizing traditional knowledge, technology and materials found within the watershed.

The fourth element is partnership. A recent debate in the state legislature focused on the need to include watersheds and fire dangers on National Forests in state planning, passing two resolutions requesting the Forest Service, the Bureau of Land Management and the Core of Engineers and Bureau of Reclamation to participate in integrated watershed planning and to identify and implement hazardous fuel reduction on Forest Service properties (Aune, July 2013). Prescribed burning comes with risks in this dry, drought-plagued era, but traditional knowledge about prescribed fire can assist in implementing low-intensity burns in specific areas. Santa Clara Pueblo has reached out to universities to partner with them in creating a restoration plan for their severely damaged forest shrine, but so far none have responded. There is a need for more opportunities for tribal employees to obtain forestry restoration training and forestry degrees locally, so they can remain at home and begin the work with the “two-eyed vision” by combining their traditional knowledge and western science.

All of these blockages can be removed through partnerships and the resilience of traditional wisdom held in the three components that should not change for Santa Clara Pueblo.

**Kokopelli, Research, and the Question of Intervention**

Kokopelli is the great symbol of the creative spirit that connects with dynamic energy, productivity, and fertility in the Southwest (G. Cajete, personal communication, July 21, 2013). He carries seeds on his back and a flute in his hands. He symbolically represents traditional knowledge and the innovative spirit of innovation. He offers us guideposts for limited and respectful intervention when conditions become extreme and out-of-whack in the fire-prone ecosystems of the Southwest.

More resources like time, money, and new technology and understandings will be needed to establish effective partnerships with state, federal and local agencies in order to bring traditional knowledge into the planning processes for fire and post-fire actions. It has been noted that the “difference between agencies, ecosystems, wilderness size and political factors make it difficult to generate consistent policy for the greater wilderness preservation system. This leads to inconsistency in how policy is translated into action” (Lawhon, 2013 p. 177). Beyond these concerns, there is great need to extend this coordination and enhance understanding of special tribal areas that carry wilderness values as culturally defined by Tribes. The full implementation of the Forest Service’s Sacred Sites Policy will be an important support. The United Nations Declaration on the Right of Indigenous Peoples calls for more work like this to be done. Further, the Council on Environmental Quality could set standards for incorporating traditional knowledge into the planning process. Secretarial Order 3206 defines the responsibility of agencies to solicit traditional knowledge in important actions like Recovery Plans for Endangered Species (Secretarial Order, 1997). Fire planning under the extreme threats now facing the southwestern forests should do no less. Protocols for working together need to be in place and regular round-table meetings for joint planning established not only for officials, but for the environmental, emergency and fire management personnel from all the parties. Voices from the Pueblo remind us all that we are responsible for protecting and healing wild places: "While we are devoting all the resources we can to the protection and haling of our land, we can't do it alone," says Pueblo Governor Dasheno” (NMCF 2011).

Even in catastrophe, the spirit of Kokopelli may lead us. Through research and traditional knowledge, combined with continued cultural remembrance of seasonal cultural activities and tasks, we may find pathways to protect larger areas in the Jemez that help restore the natural fire regime and the regenerative power of its wild areas.

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