EL AGUA ES LA VIDA Y LA VIDA NO SE VENDE

The Cochiti Pueblo and the Cultural Impact of the Cochiti Dam: Water, Landscape and Spiritual Connection

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By

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On my honor
I have neither given nor received aid
On this thesis

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ABSTRACT

The people of the desert Southwest have significantly felt the global water crisis. This paper explores the constant struggle for water rights by focusing on the Cochiti Pueblo in New Mexico, a community which plays a central role in understanding the issue of water shortage and disputes over water claims in the Southwest. The building of dams, a primary solution to the water crisis, also creates environmental and social impacts on the local cultures. This ethnographic study explores to what degree land conversion, as a result of dam building, has affected the Cochiti people's native agricultural lands and practices. This paper incorporates perspectives of multiple stakeholders, including local farmers and ranchers, lawyers, forest rangers and members of the Cochiti community. The multiplicity of voices reveal the complexity of water sharing, as every party involved upholds different values and often one profits at the expense of others. The struggles of the Cochiti illustrate the difficulty in finding balance between environmental sensitivity, corporate interests and traditional cultural practices. Specifically, this project identifies the need for maintaining control of the water distribution, stabilizing the environmental issues resulting from the Cochiti Dam and preserving the cultural traditions of the Cochiti Pueblo. Exploring these issues on a local and global level is integral for the future of our environment and local cultures.

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INTRODUCTION:

Devon Pena's words, "El agua es la vida, y la vida no se vende" bring to life one of the most pertinent topics of our day, water is our life and life isn't material wealth to be purchased and sold[1]. Humans' emotional and physical connection to the natural landscape is at risk within the global landscape. Over the past century and a half, water rights have been an ongoing struggle amongst private, public and shared property values (Gallegos 1998: 241). The legal system treats water as a commodity to be purchased and sold, leaving the wealthy as the most powerful in the equation (Peña 1998: 252). Corporate interests often do not align with environmental protection or cultural conservation. For instance, in the North American Southwest, the war for water has become a political battle over a commodity at the expense of Native peoples.

Water has played a major role in shaping human development and the physical landscape. Bodies of water have always been magnets for civilizations on Earth, as life wouldn't be possible without this essential resource. Looking at history to understand the present, Ancient Egypt could never have existed without the Nile River. Egypt is surrounded by vast sandy landscapes not conducive to agriculture and other cornerstones of civilization (Baines 2012). Luckily, the Egyptians knew just how to innovatively make use of the Nile, shaping it to their benefit. For instance, they created a dam system for water storage to be utilized later for crops during drought conditions. The fluctuating water levels of the Nile were seen as a

[1] (D. Peña, Acequia Conference, October 20, 2012). Devon Peña is an American Latino professor of Anthropology and an activist in the environmental justice movement. Beyond all, he is a farmer in southern Colorado the founder of the Acequia Institute, located on the historic lands of the San Luis People's Ditch.

spiritual haven representing the cycle of death and rebirth. Additionally, the river enabled trade and communication as the country's most important roadway, and the Nile's inundation period also supplied much-needed drinking water. The Egyptians turned a seemingly barren wasteland into a thriving empire by utilizing the Nile River.

Today, rivers are still an integral part of human and cultural survival, providing a basic life necessity for any living organism to a source of wealth for corporate growth. It plays a role in spiritual practice, such as using water in response to receiving salvation in Christian Baptism, and water is often the protagonist in origin stories around the globe. To many, water represents a valued landmark embodying a sense of place and home, as it literally carves out our landscape and shapes our environment. The human management and control of rivers has always been a controversy.

This seemingly free flowing natural resource is actually very complicated and directly affects human societies. Whoever controls the water has the power, and they can use water frivolously. In this day and age, even in our global landscape, the abundance of water in some places allows for flexible usage of watering perfectly manicured residential lawns and taking ten-minute hot showers. Meanwhile, in other places, water is scarce and people must spend a full day fetching pails of water from neighboring creeks to have enough of the resource to cook a family dinner of rice. According to a recent World Bank study, 783 million people worldwide do not have access to safe drinking water and 2.5 billion are without adequate sanitation facilities. Ninety percent of wastewater in developing countries is discharged into

local water sources without any treatment, and every day, nearly 6,000 people on our planet die from water-related illnesses (Water for People Website: About Us 2012). Although many people are without access to this essential resource, others not only have access, but they claim water as if it's an object to be purchased and sold. Such demand for water has created the need to store water and sell it as a capitalist commodity. One of the many ways to accomplish this goal is to build dams.

One of the most frequent debate topics in the realm of the water crisis is the need and value of dam building. Dams help to regulate and control the amount of water assigned to people and corporations. In addition, dams redefine the natural landscape. These relatively new developments often clash with the established traditional ways of life of people living along the river. For example, the Rio Grande in particular has been victim of dam building with sixteen dams and many diversions as of 2009, housing developments, golf courses, and various revenues for recreation. As a result, the Pueblo people have been directly affected (Pinel Sandra Lee 2010). There are a total of nineteen pueblos along the Rio Grande, all with their own particular oral histories, traditions and cultures. While their specific customs may vary, all pueblo people respect their natural surroundings and give a spirit to everything, which is often inconsistent with the values of the material and industrial expansion throughout the region (R. Garcia, personal communication, October 11, 2012).

The Cochiti Pueblo provides one local example that represents water issues along the Rio Grande. This is the Cochiti watershed, which extends from the Otowi River flow gauge to the Angostura Diversion Dam situated near the confluence of

the watershed of the Jemez River and the Rio Grande (Abeyta 2009) (See Appendix 2a and 2b). According to Abeyta research (2009), the Pueblo natives constitute the majority of landowners along the Rio Grande, and the Cochiti Dam provided several problems that challenge their cultural traditions and belief system. This dam is a concrete structure rising 251 feet above the streambed and one of the ten largest earth fill dams in the United Sates (Sandra Lee Pinel 2010**).** This paper will explore how the dam construction along the Rio Grande in New Mexico has interfered with the indigenous people's ability to interact with the natural landscape through their traditional spiritual practices. Moreover, I will specifically be investigating to what degree the land conversion, as a result of dam building, has affected the Cochiti people's native agricultural lands and practices.

Modeling Laura Pulido (1996) provides an intellectual framework to examine the agricultural, environmental and anthropological perspectives of the Cochiti Dam. The next section will outline the origin of the river and the cultural, political and environmental history of the Rio Grande region. Afterwards, I will focus on the native's active relationship with the landscape using place theory (Tuan 1974), I highlight the water use by conflicting groups, and then provide a Cochiti Dam case study that highlights the various issues along the extensive span of the Rio Grande. After explaining how the Cochiti Dam has interfered with the Rio Grande in the dominion of nature, the focus will be drawing connections to pertaining worldwide current event with a specific focus on natives in Chile, Egypt and China. These countries have also been victim to competing interests with water and invasive dam building. My research incorporates a "polyphonic testimonio," which are forms of

personal communication with locals, lawyers, farmers, ranchers, community members and environmentalists that retell the complex and diverse perspectives of water and land rights along the Rio Grande, specifically within Cochiti Pueblo.

Looking towards the future, it is crucial to investigate alternative options for more-efficient irrigation, energy, and flood control to decrease our reliance on dams. However, the removal of dams has been highly controversial and can even backfire; dismantling dams is a multimillion-dollar task, removing dams would negatively affect the tourist industry in areas where dams provide leisure, energy would have to be generated from other sources, and demolishing dams can reactivate ecological destruction (United States Fish and Wildlife 2012). If no dam removal occurs, what will the future entail? Must the local native culture learn to adapt to the uncertainties of water scarcity and the imposition of dams on lands that are sacred to their traditional culture? This paper explores whether a balance between corporate interests, and environmental protection can avoid the destruction of native peoples' spiritual practices.

HISTORY OF THE RIO GRANDE:

Geology of the Rio Grande Region

To understand the origin and identity of the Rio Grande, it is essential to go far beyond human interaction with the river and become familiar with the geologic evolution of the earth itself. The Rio Grande River, known in Mexico as the Río Bravo, flows 1800 miles south from southwest Colorado to the Gulf of Mexico (Rio Grande National Forest 2012). The Rio Grande River flows along the San Juan Mountains and the San Luis Valley to Boca Chica, Texas, but it actually isn't the

river that carved the rift (Ross 1968). It is the underlying geologic features that determine the flow and course of the river that characterize the well-known rift valley (See Appendix 3). For hundreds of millions of years, from the late Oligocene era to the early Miocene period (27-21 million years ago), geologic tension uplifted the earth along fault lines forming the rift valley (Ross 1968) (See Appendix 4). High within the San Juan Mountain Range in southern Colorado, Canaby, Pyramid, Ute, Green, and Pole Mountains help perpetrate the Rio Grande. Snow melts from mountain peaks to form Bear, Pole, Ute, and Lost Trail Creek, which ultimately merge to form the Rio Grande. The confluence of these creeks then flows through the jagged peaks of the Sangre de Cristo Mountains, which shape the eastern border of the valley (Rio Grande National Forest, visitor center, October 15, 2012). The Rio Grande riverbanks have been home to human settlement and to many cultures throughout time and space. Many prehistoric cultures have affected the Rio Grande and the river has equally impacted them. The Cochiti Pueblo is one of the cultures that have maintained a consistent relationship with the river.

The Cochiti Pueblo is situated at the heart of the geological events that created the river, as it lies directly in between the upper Rio Grande, the Rio Arriba, and the lower river, Rio Abajo (Horgan 1984: 269). The physical line formed by La Bajada Hill divides the canyons of the Rio Arriba and the endless valleys cradling the river below. The geologic location has shaped the Cochiti people's culture, lifestyle and relationships, seeing as they have depended on this river since the very beginning (Phillips, Hall and Black 2011: 2). Having discussed the geology of the

Rio Grande headwaters, it is now important to discuss the political impact on the Rio Grande region.

Political History and the Rio Grande

The Rio Grande basin is home to some of the oldest communities and cultures in the United States, many of whom have suffered oppression by different culture colonization projects throughout cultural periods. For example, in 1540, Spanish conquistadors under the command of Francisco Vasquez de Coronado began their long journey in hopes of finding the illustrious "cities of gold" (Horgan 1984: 140). These "cities of gold" were in fact the Pueblos, but material wealth was nowhere in sight. Pueblo wealth was weighed in spiritual happiness, family, agriculture, and love. In contrast, the "empire builders," including big waves of Spanish explorers, priests and bison hunters, entered the Rio Grande region in 1600. Throughout the 17th century, these Spanish settlers brought trade, new farming techniques, and domestic animals to the region (Earick 1992). However, the effects of Spanish imposition weren't all positive. In fact, the outcomes were often extremely detrimental to the Pueblo cultures; The Spanish took control of the land, mined all the gold and silver, imposed military, government and religious power, and cooped the native people to convert them to Spanish culture, an act of Spanish Colonization or forced acculturation (Teske and Nelson 1974: 354)[2]**.** Spanish owned what is now the American Southwest until 1821 when Mexico won its independence from Spain. It was then when Mexico colonized the region, took control and granted land to individual citizens. During this year, Mexico sold a huge portion of the land to

[2] Professor M. Montano, Culture and History of the Rio Grande Region, class lecture, September 19, 2012.

United States Governor Gilpin (Horgan 1924: 408). He used the property for both communal farming practices and capitalist investments, two uses that were in direct opposition with one another (Colorado State Government Website 2001). This business land arrangement is one early example of incompatible land usage due to corporate versus traditional cultural interests. Despite the many forms of oppression from different cultural groups (Spanish, Mexican, and United States), the Native people of the Southwest still maintain their cultural values and respect for the landscape.

Drawing on rich histories of people and cultures eleven thousand years ago, the nomadic Clovis group was the first prehistoric cultural group to occupy the San Luis Valley. They were hunters and gatherers from Siberia, and made camps along the streams and creeks (The Great Sand Dunes, Visitor Center, October 14, 2012). In the fifteen hundreds, the Pueblo Indians, many of whom were native potters, inhabited regions surrounding lakes and rivers and used the water as a daily resource to create their art and tools (Great Sand Dunes, visitor center, October 14, 2012). Later, in the 1700's, Spaniards came to the region. Many Pueblo people, including Cochiti, adopted Spanish skills and cultural knowledge they felt useful, but simultaneously held true to their native roots despite the repetitive imposition of Spanish colonialism over time (Phillips, Hall and Black 2011: 4). Over the next decades, many Native people, accustomed to their landscape and natural lifestyle along the river, were forced from the lands (Great Sand Dunes, visitor center, October 14, 2012). Some descendents of the Pueblo de Cochiti, and other ancestral pueblos of the 14th and 15th centuries, were relocated but still inhabit the

surrounding area and have a strong oral tradition that documents these cultural and landscape changes along the river (Bureau of Land Management, National Homepage, 2012).[3]

Cultural History and the Spiritual Connection to the Landscape

Not only is the Rio Grande basin home to some of the oldest Spanish communities and cultures in the United States, it is also noted as one of the first regions in the nation that used agriculture as a lifestyle (Peña et al., 2012). Farming is a tradition that has been carried on in the Southwest United States for centuries, dating back to pre-Pueblo Indians over one thousand years ago, to the more recent Pueblo groups, to the first Spanish colonists of the 1500's **(**Bureau of Reclamation, Department of the Interior, 1977). Even today, the lifestyles of the Hispanic natives in Southern Colorado and New Mexico are rooted in Spanish tradition. Specific material culture and innovations of Moorish tradition, such as acequia irrigation, horno and adobe architecture, craftsmanship, agriculture, foods, traditions, and Spanish nomenclature made its way to Native American Pueblos and farming communities. This is one way to analyze the complex cultural change and fusion in the Rio Grande region throughout time and space (Angelita Surage 2009: 5). Specifically, the Pueblo Indian's Spanish ancestors came from arid countries with Moorish traditions of water management, and they implemented the methods in

[3] Public History Notes: The Great Sand Dunes, a Colorado national park and preserve, is a cultural site protected by the National Park Service archeologists, architects, curators, historians, and other cultural resource professionals. The National Park Service is a bureau of the U.S. Department of the Interior, and all information, responsibilities, and programs of the Great Sand Dunes cultural history site are under the authority of Federal law.

Colorado and New Mexico to grow crops and raise animals as a lifestyle, including the earliest forms of permaculture (Arellano 2006)[4]. For example, the Spanish installed acequias, the oldest water structures for agriculture in the southwest region. An acequia is a canal that is formed by one of two ways: a manmade ditch to divert water from a river or by snowmelt. The latter of the two is often found in the Southwest region and is described as a "snowmelt dependent, gravity driven, community irrigation system managed by local farmers who own use rights and don't own the water itself" (Peña, et al. 2012). Acequias are not only physical structures, but there is a community of people who maintain the great water tradition. Greg Hicks, Professor of Law at University of Washington, an expert in water law and Colorado acequias, describes this farming community as the following:

> 'Acequiahood' offers a sense of place, and we have these communal acts to reinforce solidarity. Acequias dissert interdependence and need for community. It is difficult to maintain when people move away. We are farming at a high altitude in a scarce, arid environment so the value of water is high. We must be one with the land to efficiently get the job done. There is the expression of early traditions, but operating acequias is truly rooted in necessity[5].

[4] (E. Vigil, Acequia Conference, October 20, 2012). Edward Vigil is originally from San Pablo, CO and is currently a legislator in the U.S. state of Colorado (2008-present). As a Democrat, he represents House District 62, which encompasses a large portion of the San Luis Valley and portions of Eastern Pueblo, CO. He is vice president of the livestock, agriculture and natural resources legislative committee and was named to seats of the House Local Government Committee (Project Vote Smart 2012).

[5] (G. Hicks, Acequia Conference, October 20, 2012). Professor Greg Hicks is the dean of University of Washington Law School. He teaches courses in property, water law, and public land and natural resources law. Professor Hicks has served on the boards of a number of non-profit organizations, including The Nature Conservancy (Washington, 2000-07) and the Pacific Forest Trust (2001-04). He has also participated on governmental advisory and oversight panels, including the National Endowment for the Arts and the Water Law Advisory Panel of the Washington State Attorney General's Office.

The majority of these farmers and ranchers were born into generational traditions; that is, they continue to live by the same land and water values as their ancestors. There is deep and intimate land-based knowledge that people can't just learn from books, but from oral tradition and practice[6].

Cultural values are great indicators as to what people think and feel about a landscape and can help an observer understand how emotionally connected one is to the space. The natural landscape, especially the watercourses (rivers, water holes, creeks) formed significant roles in the natives' lives and held rich meaning throughout time. The land was a spiritual haven of familiar senses, and it was *there* that the natives formed an emotional connection and sense of place.

> Fueled by sentiments of inclusion, belonging, and connectedness to the past, sense of place roots individuals in the social and cultural soils from which they have sprung together, holding them there in the grip of a shared identity, a localized version of selfhood. (Basso 1995: 85)

Using place theories from outside scholarly sources and personal interviews from my ethnographic field study, one can make sense of the extent to which individuals and communities are connected to the physical space. The great Chinese philosopher, Yi-Fu Tuan defines this human love of a place as "Topophilia" (Tuan 1974: 93) and the New Mexican Spanish descendents describe this emotional

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[6](P. Garcia, Acequia Conference, October 20, 2012). Paula Garcia is the Chair of the Mora County Commission in New Mexico, where she was elected on a platform of ethics in government, revitalization of the land-based economy, and protection of land and water resources. During her time with the Acequia Association of New Mexico, acequias have built a movement around the principle that "el agua es la vida – water is life" and have achieved major policy changes locally and statewide to protect rural water rights. She is a local and strong advocate for cultural heritage and the historic land and water rights (Acequia Conference Bios, October 2012).

connection to land as "carencia" (P. Garcia, Acequia Conference, October 20, 2012). Tuan continues by stating that, "The appreciation of a landscape is more personal and longer lasting when it is mixed with the memory of human incidents," which supports the notion of the natives' deep connection to the New Mexican terrain. This emotional attachment is intensified when working as one with the earth through traditional, collaborative agricultural practices (Tuan 1974: 95). Joe Gallegos captures the comfort, dedication and loyalty he feels when interacting with the land:

> The value of the water and land can be weighed in emotion. There is a sense of comfort when working with our water on our lands for generations, and we live for that! We need to keep our water in the family, and look at it as our lifestyle, not just the money to maintain this tradition**.** (Joe Gallegos, personal communication, October 19, 2012)

Evidently, many Southwestern cultures have a truly sentimental and spiritual connection with the earth, saying that they belong to the land; the land does not belong to them (P. Garcia, Acequia Conference, October 20, 2012)[7]. Another person who abides by these indigenous beliefs is Monica Taylor from Antonito in Conejos County, Colorado who defines spirituality as, "Going to the mountains, finding a pond, a waterfall, a grove, a meadow with flowers, anything that is serene, anything that is calming to the spiritual essence" (Counihan 2009: 54). Monica Taylor remains loyal to these rituals on a daily basis. Another example of local knowledge and water use is the accumulated snow on the San Juan Mountains hovering above San Luis, Colorado. The snowfield on Culebra Peak reveals to the native ranchers and farmers how much water they will accumulate that season. If the snow forms a bird shape ("Pajarito") there will be significant water that particular season (D. Peña,

Acequia Conference, October 20, 2012). Moreover, Devon Peña illustrates this traditional native symbolism and describes his community in San Luis, Colorado as a group of spiritual people who bless the fields and acequias daily. When the farmers hear from El Pajarito at the beginning of irrigation season, they throw a feast where everything is shared and they celebrate their water (D. Peña, personal communication, October 20, 2012).[8]

The indigenous communities respect their surroundings, because according to them, everything from the water to the pottery possesses a spirit (Roberto Garcia, personal communication, October 5, 2012). However, it is not only the native people that have a spiritual, symbolic connection with the Rio Grande. Michael Blakeman, a Forest Service employee, lives along the river and relies on the water for his daily meditation and stress management. When something is taxing for Mike, he names a stick with his problem and releases it in the river to watch it float away downstream. This is a symbolic way for Mike to release his stresses, and have a meaningful connection with the river, which happens to be Mike's home. He believes that we, as humans, are all woven into the landscape (Michael Blakeman, personal

[8] The New Mexican Acequia Association is actively engaged in policy development to meet the needs of the southwest region, including protecting water and traditional acequia systems, growing healthy food for local families and communities, and honoring their cultural heritage. From October 19-21, 2012, I attended the first annual Acequia Conference in San Luis, Colorado. The forum was implemented as part of the organization's mission to highlight the unique histories and needs of each community and hear various perspectives from water lawyers, academics, and locals.

communication, October 21, 2012)[9]. Natural resources are embedded with great spiritual significance. However, water is also seen as a valuable commodity.

WATER AS A COMMODITY AND LIMITED RESOURCE:

There is a major disconnect between how one dwells and how one engages with the landscape. The natural world can be perceived through a number of conflicting lenses. Over time, water as a source of economic wealth flourished alongside the people's spiritual relationship with the water that is used for farming and spiritual traditions. In the case of native people, they have always viewed water and land as communally owned wealth to be shared and respected. In the past, water wasn't considered a commodity or privately owned property, but water was a communal resource for survival. Historically, it was not a legal issue, but a way to mitigate these problems and survive well (E.Vigil, Acequia Conference, October 20, 2012). Beginning as early as the conquistadors, through the last half of the 1800's and beyond, extensive farming practices developed along the Rio Grande, which have since been modified and become more technologically advanced (Earick 1992). Demands for irrigation on the Rio Grande have concurrently increased with the number of communities settling along the river. The demand was once sufficient to support the 20,000 acres hosting native populations, but over the years, this reliance on water has intensified and contributed to the destruction of the Rio Grande River. Water use was so excessive that by 1925, only 40,000 acres of farmland could be

[9] (M. Blakeman, personal communication, October 21, 2012). Michael Blakeman has been a spokesman and park ranger for the Rio Grande National Forest since February 1991. He has a broad understanding of the Rio Grande not only from his career, but also because the Rio Grande is his backyard, his home. He has an emotional tie with the river and deals with river issues on a daily basis. He specialized in watershed management at the University of Maine in Orono.

irrigated (Earick 1992). This is a direct consequence of upstream irrigation from the Rio Grande River Basin that has led to water depletion, rising riverbeds from increased sedimentation rates, fluctuating river flows and urbanization (Bureau of Reclamation, Department of the Interior, 1977).

Water is no longer used as a life-sustaining resource and cultural center for the local community, but as a transferrable commodity to be distributed and sold to the highest bidder for corporate benefit. As early as 1870, the railroad installed in the New Mexican territory was inviting for loggers, miners and others to consume the Rio Grande's rich natural resources (L. Gallegos, Speech, October 20, 2012). This land abuse was only enhanced over time. In the 1980's, water was mined and in the 1990's, the introduction of logging was "stripping water to death" (J. Gallegos, Acequia Conference, October 20, 2012). Devon Peña of San Luis describes his approach to local water as the following:

> Water is considered an asset in place and cannot be severed from the landscape; it is a community asset and not a commodity. El agua es la vida, y la vida no se vende. (Peña, Speech, October 20, 2012)

Local communities tend to prefer keeping the issues in their own hands, in the community, rather than dealing with lawyers and the legal system. By not divulging their spiritual lifestyles, the existing native cultures protect their religion and traditions in their daily lives. Consequently, their connection to the water is not fully understood by others with outside interests and is therefore an integral part of this ongoing conflict (R. Garcia, personal communication, October 11, 2012).

Water is not just a legal issue, but also an environmental issue. Joe Gallegos illustrates the change in mentality over generations due to the relatively recent global

emphasis placed on environmental sustainability:

> We were once a perfectly happy community with love, family, water, and no money. However, with the recent sustainability aspect, (which isn't necessarily bad, but we need to stress) we have problems. It's a whole other element, but it's important. (J. Gallegos, Acequia Conference, October 20, 2012)

Over time, mining and logging led to erosion, water pollution, and loss of biodiversity (J. Gallegos, personal communication, October 19, 2012). There is a major misconception that the Rio Grande has a plentiful supply of water. But in reality, the aquifers under the river are rapidly depleting. Groundwater pumping, in particular is a major concern. It has been recognized by the Colorado Water Conservation Board that groundwater levels have been depleted, especially since the drought in 2002, as farmers and valley residents relied exclusively on well water during the drought (Colorado Water Conservation Board 2012). As Joe Gallegos said, "It is important to shed light on quality versus quantity. We tend to avoid thinking about this, because our money doesn't want to deal with it!" (J. Gallegos, Acequia Conference, October 20, 2012). It is crucial to think long term, because if water in the Southwest is this valuable now, what will it be worth with a few hundred years of strict governance by the laws and continuous, intensifying climate change? Climate change, besides laws and cultural belief systems, plays a significant role in limiting water access.

Climate change is very important, as it has greatly impacted the ecology of the region. There are a number of existing theories regarding climate change. Some believe that humans are too small and insignificant to make an impact on the global climate (Morello 2012). Others are not willing to accept climate change for economic purposes, because their daily profit is based in activities that are directly

impacting climate change (Harris and Roach 2009). Some think that climate change is a natural occurrence even without the effect of human activity (Shah 2012) (M. Blakeman, personal communication, October 17, 2012). However, my approach to climate change, as evidenced by my framework throughout this paper, is that it is impossible to separate humans and population dynamics from the natural world (Wigley 2001: 6). We are all a part of the ecosystem. When acknowledging that climate change and human impact go hand in hand, there are a number of ways to predict the future. The dark side is that we will all eventually die off, while the more optimistic approach recognizes that humans are generalists and will most likely survive. We can either fit into many niches for survival or create fixes with technology, which will only advance over time (Michael Blakeman, personal communication, October 17, 2012). Either way, our natural resources are limited and there are no technologies to create basic resources, such as water. Therefore, abusing the Rio Grande water with greedy and industrial motives will only hurt those living along the river, the river itself and our future generations. After outlining some general issues concerning the relationship between humans and natural water resources, I will now illustrate a specific local culture and their relationship with the Rio Grande.

COCHITI PUEBLO:

The Cochiti reservation is situated on the west bank of the Rio Grande after the river exits the soaring Cochiti Canyon north of the Pueblo. The Jemez Mountains are even further west of the pueblo community and to the south is the towering Magdalena Range (Phillips, Hall and Black 2011: 2). The Cochiti people refer to

these surrounding white cliffs as Kasha-Katuwe, meaning “white cliffs” in the traditional Keresan language of the Pueblo (Cochiti Pueblo 2013). Kasha-Katuwe along the Rio Grande embody multi-layered stories and cultural significance (See Appendix 5)**.**

In the Southwest, it is common knowledge amongst all nineteen pueblos in New Mexico that their Anasazi ancestors first emerged from the underworld to a sacred mythical space in the form of lake, known as Shapipu (M. Montano, class lecture, September 21, 2012). Shapipu is an abstract space within their journey from the underworld to the physical world that acted as a gateway for the natives to connect with their inner spirit before entering the world (R. Garcia, personal communication, September 17, 2012)**.** This traditional Pueblo history and faith in the Great Spirit was the beginning of their rich and meaningful values and culture, still rooted in their daily lives today. Unlike many modern cultures, religion is a way of life for the Pueblo de Cochiti, rather than a compartmentalized tradition reserved solely for holy days. Inspired by the Great Spirit, the natives continually seek to live in harmony with the natural world to guarantee eternal pueblo survival. (Garcia 2012: 5). The words of the Great Spirit proved to be true; the Cochiti Pueblo thrived on maintaining balance with the environment through agricultural production and traditional rituals incorporating the land and the water (R. Garcia, personal communication, October 5, 2012). All facets of the natural world are intrinsically part of the Cochiti lifestyle, as even the stability of pueblo existence is a result of their unwavering relationship with nature. This balanced bond with the environment is reflected through annual religious festivals to honor the river, seasons, harvest,

animals, and essentially all that surrounds the Pueblo de Cochiti (R. Garcia, personal communication, October 11, 2012). According to oral tradition, the Pueblo Indians created their own natural river diversions (manmade wells, pipelines and canals) to store water and for irrigation purposes, which led to many successful harvests. Even though the natives viewed water as a resource, other than regular prayers and positive thoughts, they understood that it was a natural centerpiece of the valley beyond their real control (Phillips, Hall and Black 2011:3).

The religious, spiritual lifestyle of the Cochiti Pueblo encountered resistance from different cultural groups. Located along the river, Cochiti Pueblo attracted attention from foreign invaders and colonizers. In spite of these cultural and military intrusions, the Cochiti Indians adapted to the dominant cultures, while still remaining true to their traditions. The Cochiti Pueblo had historically dealt with much oppression and struggle, including Spanish imposition in the mid sixteenth century, Hispanic pressures on the Cochiti's water supply in the 18th and 19th centuries, and water development projects in the late 1900's. Cochiti Pueblo was eventually part of the common governance of the entire watershed (Phillips, Hall and Black 2011: 5). The Rio Grande Valley in New Mexico was a region increasingly sought-after, and the Rio Grande Valley has since become New Mexico's most populated, fastest growing and most urbanized region (United States Census Bureau 2012). The Cochiti Pueblo has depended on the river physically and spiritually for centuries, but now, having been forced to share these water resources with powerful interests groups, the Cochiti community is vulnerable and affected the economic development due to housing developers and high-tech industries in the region.

COCHITI PUEBLO AND THE DAM:

Today, the Rio Grande River flows through numerous villages, towns and cities in the region, and is a main supplier of surface and ground water used residentially, commercially and agriculturally in these areas (Rivera 1944: 49). The Pueblo's, however, have a different understanding and familiarity with the land and water. According to Mike Blakeman, natural resources are managed by values, not by science. Science doesn't make a decision for us. The final decision may integrate science in order to understand potential implications of our actions, but our actions are rooted in values (M. Blakeman, personal communication, October 21, 2012). Therefore, when it comes to disputes over land and water, all parties truly *do* care, as we all are humans doing our best and we all care about our motives. Nevertheless, our different philosophies and values make us take different sides and focus on different aspects of the issue, leading to conflict.

This conflict of values has been misinterpreted as a cultural identity crisis for the Cochiti people, as they are one with the landscape. In the case with non-Cochiti, the Rio Grande water has a different cultural value. For example, it is very complicated and nearly impossible to define a single owner of the water that flows through so many different communities and lifestyles. There are more people who use the water than there is water in the river, and often times the uses are of conflicting interests. Due to the central location of the Cochiti Pueblo, situated precisely between the lower and upper halves of the river and offering additional water to the middle Rio Grande, the U.S. government was hungry for water authority along that specific river reach. Consequently, in the first half of the 20th century, the

federal government gained control of the Cochiti region and as a result, the Cochiti Pueblo was made a part of the Middle Rio Grande Conservancy District (MRGCD). This meant that the Pueblo de Cochiti was included in both the federal benefits but also the limitations and federal regulations (Phillips, Hall and Black 2011: 5).

In 1932, there were a number of "fixes" to the Rio Grande in Cochiti, including the first small dam controlling river flows and diversions, but also it was the first time that the river was reconfigured, to make it straighter, deeper or narrower. Sixteen dams have been implemented along the Rio Grande, all in an attempt to provide energy, control flooding, encourage leisure activities or assist with irrigation and water diversions (Abeyta 2009). The river has since been constantly changed based on values and personal perspectives, so it has physically varied over time depending on whose hands hold the control. With irrigation technologies from the regional water district, the agriculture of the Cochiti Pueblo expanded to mirror other farms along the river with diverse crops and Cochiti was successful. Nonetheless, and without a doubt, the natives held true to their roots and continued to grow their traditional blue corn alongside the commercial yellow corn (Phillips, Hall and Black 2011: 7).

In 1960, Congress passed the Flood Control Act of 1960, granting the Core of Engineers the consent to compile and evaluate information regarding inundation patterns and engineer support to respond to the potential flood hazard (Pinel Sandra Lee 2010). This was the initial legitimate action highlighting the need for a dam in Cochiti to offer flood protection for the bustling metropolis of Albuquerque (Phillips, Hall and Black 2011: 7). Plans proceeded and not long after, the Cochiti Dam

construction was complete by 1970. Initially, the dam was solely intended to regulate sediment and flood control. However, the pattern of exploitation of the water for increasing human needs was only exacerbated and by 1975, a lake was also constructed for leisure purposes. At maximum capacity, the Cochiti Dam project stores 502,330 acre feet of water and controls 11,695 square miles of drainage area (Lee and Suina 2003). Despite the accomplishments of the project, it has had serious consequences that have permanently damaged the Cochiti culture and surrounding ecology, splitting the community agriculturally, spiritually, and politically.

The Cochiti Dam began leaking in 1976, only one year after the final construction of the dam. The Cochiti Pueblo people immediately noticed the rising water table and frequently reported it to the government, but it wasn't until 1988 when the Core of Engineers (COE) finally admitted that there was a concern and responded. The COE installed a 17-acre drainage system that proved once again to be ineffective (Pinel Sandra Lee 2010). When building the Cochiti Dam, the engineers intended to support the Cochiti agriculture with irrigation modifications. On the contrary, experimentation and incomplete research in 1960 led to 615 acres of unsalvageable farmlands, 250 of waterlogged bosque and a twenty-year loss of farming (Pinel Sandra Lee 2010).

During this twenty-year period, the inundated state prevented youth from learning traditional Cochiti farming skills that would benefit them later in life (R. Garcia, personal communication, September 16, 2012). After being sued by the Cochiti public, the Core of Engineers arrived at the pueblo to personally apologize to the community members, only to see a circle of children awaiting them. The Cochiti

Pueblo felt as though the youth deserved the most sincere apology, since they were the ones greatly affected by this agricultural loss, but even more so, the loss of traditional practice and identity (R. Garcia, personal communication, September 16, 2012). As a response, Cochiti youth movements were created, such as involving youth with the framer's market, partnering with the Health Department to focus on farming and crop insurance, and working with First Nation's Development Institute to focus on Native American foods and health through hands-on initiatives (First Nations Development Institute Website 2012). The goal of these programs is to establish agricultural education and promote healthy and traditional lifestyles to preserve the solidarity of the Pueblo community and perpetrate the Pueblo way of life amidst the "Americanized" world (Cochiti Youth Experience 2010).

The implications of the inundation expanded much farther than the pueblo's boundaries. Conditions in the river have changed significantly and 35 years later are still showing repercussions. The construction of the Cochiti Dam incorporated digging out a 90-foot groove in the river (Bestgen and Platania, 1991: 227). The increased water table and lack of sediments drastically decreased the water temperature. The river naturally grabs from the banks on either side increasing erosion and instability when the riverbed has previously been tampered with. The river's response to the man-made "fixes" is a vicious cycle leading to repetitive flooding, which is a reverse effect of the dam's initial purpose. Native species, particularly the silvery minnow, were once abundant and considered a staple all the way from the headwaters of the Rio Grande to the mouth of the river at the Gulf of Mexico. Recent studies have demonstrated a rapid decline of silvery minnows, along

with their ecological niches that are being destroyed by pollution and erosion (Bestgen and Platania, 1991: 227). LaVerne Garcia, a Cochiti native, claimed that another problem is the majority of her friends have been diagnosed with cancer over the last 30 years since the dam was constructed. She and many others truly believe that the flood contaminated the soil, because coincidentally or not, many of the natives fighting cancer are potters who work with the soil along the Rio Grande on a day-to-day basis (L. Garcia, personal communication, October 5, 2012). The negative and life changing effects of the dam are irreversible and the Cochiti people have adjusted their lives to interact with the altered landscape.

The initial blueprints for the dam included economic development, but the pueblo people never truly understood the immensity of the plans (Bestgen and Platania, 1991: 227). Between the time that the dam was authorized and when the shadow of the concrete structure first loomed over the village, the development plan had grown to include an entire retirement community of homes, a recreational lake and a golf course (Bestgen and Platania, 1991: 227). A recent study captures the current demographic breakdown as the following: 880 acres for agricultural production; 4,443 acres of lakes and wetlands; 7,042 acres dedicated to economic development consisting of residential and commercial properties and a golf course; and 41,424 acres of rangeland and woods and Pueblo lands (Lee and Suina 2003). The demographic is considerably different than it was historically, but as human behavioral patterns suggest, the Cochiti people have once again adapted. The construction of the dam, along with many other dams throughout the world, have had positive effects for particular economic interests groups and remain a very important

economic construction project.

DAMS, HISTORY, CULTURE AND ENVIRONMENTAL IMPACT:

The first known dam to exist was the Sadd el-Kafara Dam built in 2950-2750 B.C in Ancient Egypt. The shear weight of the dam ensured temporary stability, because only a few years after it was constructed, water overflow was the cause of its failure (Yang et al 1999: 1). Even from the beginning of time, poor, hasty manmade attempts to control nature led to immediate failure. Despite impending health risks, safety issues, and effects on native people, humans have ignored historical patterns and continued to build dams, intending to control or change a natural cycle. Looking at global examples for each of these consequences of dams in Chile, Egypt and China respectively, demonstrates the gravity of these dam issues.

Across the globe, dam building or even just the initial blueprints for dams, has faced much opposition. The international movement, "Patagonia Sin Represas" was launched in 2008 to stop the projected construction of five dams in Patagonia, one of the only untouched landscapes left in the world today (Patagonia Defense Council 2011). The powerful Pinochet dictatorship from 1973-1990 privatized water rights throughout Chile, so in a sense, these dams are a relic of that era (Long 2012). The purpose of these dams is to provide energy to the mines in the north of Chile, which means building thousands of miles of power line throughout the longest country in the world. This project is not only inefficient, but it is also detrimental to one of the world's most alluring landscapes. These large-scale hydroelectric dams may provide a clean source of energy, but the ecological destruction they cause outweighs any benefits (Patagonia Defense Council 2011). There are other renewable energy

alternatives, such as geothermal, wind and solar, that Chile must consider in this stage of our planet's deteriorating environment (NREL 2012), not to mention that the driest location in the world is the Atacama Desert in the north of Chile where the mines are situated (Vesilind 2003)! Chile is only one of many countries negatively affected by dam building. Similarly, on the other side of the globe, Egypt is facing health-related consequences of dams.

When looking at one particular case study in Egypt, we see that there is adequate research that supports that hydroelectric dams have had negative impacts on the health of indigenous people. Dr. Robert J. Goodland, a World Bank ecologist, calculated the health impacts on the indigenous people in the particular region of Egypt where the Aswan High Dam was built. Before this dam's reservoir flooded, only five percent of the children in the region were infected with schistosomiasis, an incurable disease transmitted by snails that populate stagnant water. This is relatively minor when comparing to the 90 percent of children in that area that are infected with schistosomiasis today. Around the world, there are a variety of other regions surrounding dams that have suffered the health impacts of hydroelectric dams, including the Kariba Dam in Zambia and Zimbabwe, Volta project in Ghana and Tembling Dam in Malaysia. (Michaels and Napolitano 2010)

The planning and construction of large dam projects is frequently rushed through due to time and economic limitations. An expert from *40 years of Cultural Survival* notes that, "inadequate planning, poor design and improper construction have resulted in a one percent structural failure and collapse rate of dams worldwide" (Pinel Sandra Lee 2010). The Three Gorges project in China, currently the world's

largest hydroelectric project, is vulnerable to landslides as there is little confidence in the landslide protection plan for that specific dam (Wines 2011). History has already witnessed a violent landslide causing a dam catastrophe in Italy in 1963. The landslide targeted the reservoir of the Vaiont Dam, creating a tidal wave that flooded the dam, and killed about 2,000 innocent people (Michaels and Napolitano 2010). There are countless cases throughout time and space that capture the disastrous hidden costs of dams on the well being of communities and the landscape.

Whether dams store water, promote leisure, provide energy, control flooding, or assist with irrigation, it is impossible to avoid the fact that dams represent human's power to exploit nature, by changing habitats and ecosystems. Without human interference, nature has its own rhythm of change. This flux happens over time with natural cycles, but also with human's unintentional and intentional interactions with the environment. There is seasonal change and weather-driven change in the form of natural disasters. The aftereffects of these natural disasters are not always negative. For instance, river flooding is inevitable every few years, as it regenerates the soil and nutrients for new plants and habitats. Man-made dams inhibit this natural cycle, as without the natural disturbance, the environment is static and doesn't promote healthy cycles of change. The installation of the Cochiti Dam is part of a dynamic domino effect leading to the deterioration of the natural world, killing water and riparian habitats, agricultural lifestyles, and contaminating lands for future generations. Joe Gallegos expresses his concern for "fixing" a natural phenomenon:

> Technologies only last for a few years before they are improved. Tearing away trees and communities to "modernize acequias" and to "fix a ditch" is where the problems have occurred. There is also a loss of property value without the trees. (Joe Gallegos, Acequia Conference, October 20, 2012)

This captures the recurring repercussions when using new technology and modifying nature to one's values and motives. New technological advances are often driven by the desire to find an immediate solution, rather than taking the time and energy to research to avoid possible irreversible consequences. For instance, dams may be able to divert the water, inspire leisure, and if built correctly, control flooding. However, ecologists have come to a general consensus that there are clear disadvantages of dams and reservoir building.

CONCLUSION:

Nature responds to its natural cycles without human control speeding up the process. At this point, after countless acts of human intervention, there are so few free-flowing rivers left (Colorado Water Conservation Board 2012). Furthermore, many of the currently standing dams are outdated and lack efficiency, but it is cheaper to maintain them than remove them (Colorado Water Conservation Board 2012). There is some room for innovative alternatives to dams for hydroelectric energy, flood control, water storage, or leisure, but nothing covers all the needs that are met by dams (Bureau of Reclamation 2012). For instance, the southern delivery system from Pueblo to Colorado Springs is a closed pipe system, preventing evaporation, which is crucial when taking climate change and precipitation decrease of our near future into account (BLM 2011). There are also off channel dams, which have become increasingly common over the last decade. They are built in dry

canyons or valleys and situated away from the central flow of the river, and therefore have less of an effect on the main course of the river (Zaffos 2008). “Smart dams” have also proven to be environmentally friendly alternatives, as they convert gravel pits into off-channel water-capturing systems that are beyond the era of large, disastrous dams. Although they are a relatively new phenomenon for water management strategies, smart dams still suck from the ecosystem (Huzjak and Kappus 2012). Even though there are alternatives for some of the functions of large-scale dams, nothing has completely positive results. Dams may provide a cleaner source of energy, but the costs outweigh the benefits. This is when human value comes to play and humans pick and choose by what is of individual importance. In spite of these alternatives, the key is to shift our values and stop demand.

From the beginning of time, civilizations were built around water sources, and the natural cyclical nutrient flooding of the river is what the settlers relied on for their agricultural lifestyles. When flooding occurred, the wetlands along the riparian zone instantly responded by catching the water flow (Cohen 1997). However, due to the era of Westward Expansion and the Homestead Act, promising endless open land and resources, the desert has been transformed into a sprawling oasis. Relatively recent urban developments, such as the big metropolis of Albuquerque, have filled wetlands with impermeable surfaces, such as concrete and pavement (NPR November 3, 2012). Our society works on a reactionary system, rather than a precautionary one. The natural disasters will inevitably occur despite our efforts, but the United States government would rather pay the cost of recovery, than plan ahead and prepare for natural disasters. A current example is the flooding in New York

City, as even though the hurricane would have happened regardless, we are now facing the aftereffects of flooding within a huge city of pavement. Development is hampering the natural processes and cities are only growing with time. Projections for the future suggest that the world population is to double by 2050 (NPR November 3, 2012). In Colorado alone, the population is projected to double to approximately ten million people, who will require an expected 600,000 to 1 million acre-feet per year (AFY) more water to sustain the communities (Colorado Water Conservation Board 2011).

There is no clear-cut alternative, because there is no way to ensure water without the use of dams, especially in the growing Southwest, the most arid and dry climate in the United States (Oborne 2012). However, it is evident that constructing large dam projects is becoming dangerous, difficult, expensive and unpredictable. In this day and age, successful water management must strike a balance between environmental sensitivity and societal pressures (FJH Consultants 2012). The people in Albuquerque rely on water, seeing that this was the initial argument for the Cochiti Dam. This puts a huge strain on water supply in the Southwest and poses a threat to our future, especially in the realm of global climate change having a major impact on our future availability of water. We can do all that we can to mitigate this harm by putting a cap to the amount of people or water in a region, recycling water, and by acknowledging the impracticalities of green lawns and golf courses in the desert and instead utilize zero-scaping. New technologies may have resulted in failure, but they may also hold the key to building “smart dams” or other technological advances that respond to global climate change and growing

populations (NPR November 3, 2012). In sum, if supply cannot be increased, then we must take measures to lessen the demand, because our natural response to satisfying the needs of all is obviously not working towards a sustainable future.

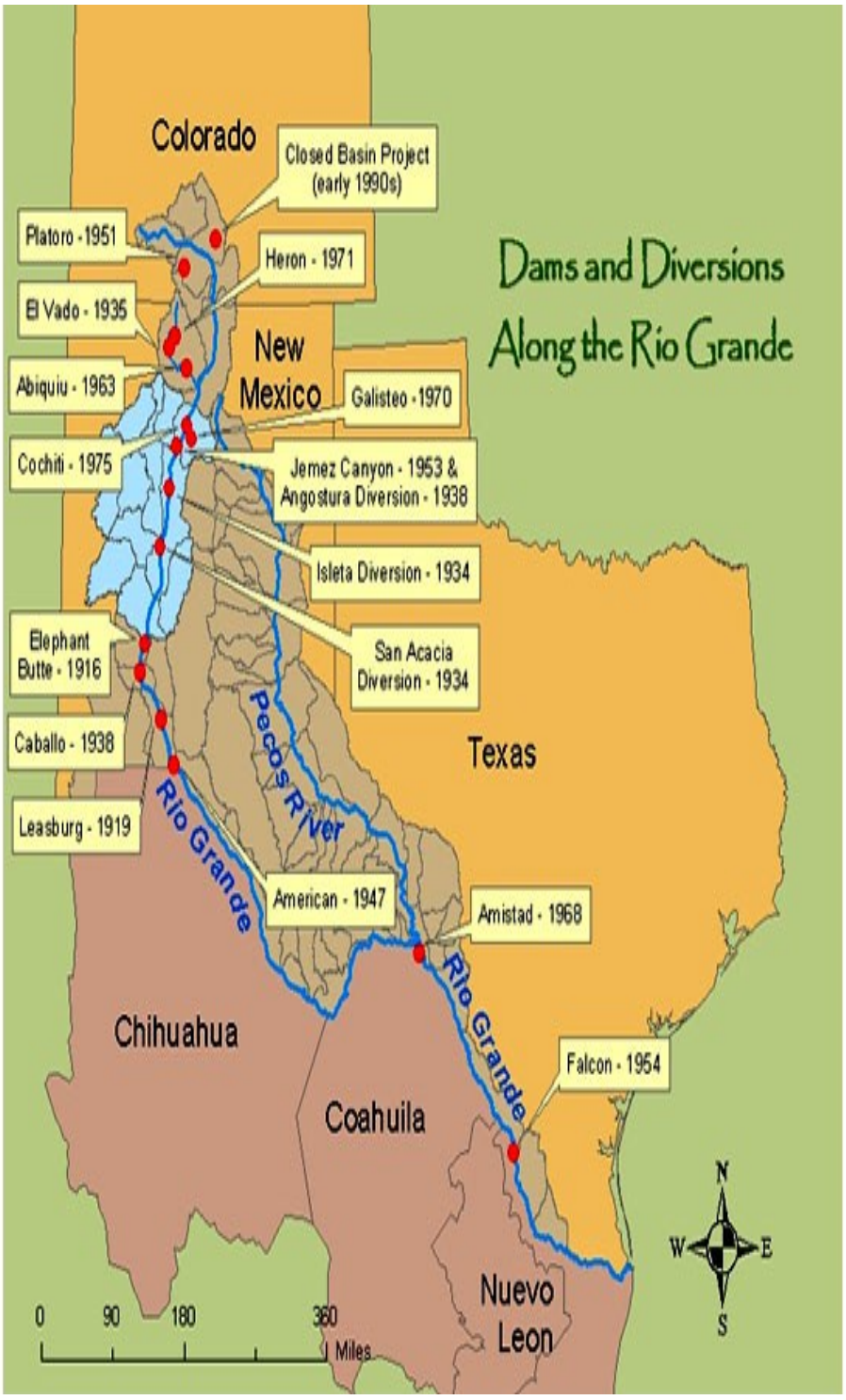
Historically, the Cochiti people have been constantly under siege: first by the Spanish, then by Mexican, and finally the US Government. The natives were once in control of their own land and farming resources, but the promise and erroneous belief of Western Expansion that "rain will follow the plow" has only led to ruthless competition for water usage throughout time (Berkes 2003). Despite the oppression, indigenous people have managed to thrive in this arid community because of their great understanding of their natural surroundings and ability to adapt. On the other hand, the earliest settlers took a different approach and tried to modify the landscape to fit their greedy needs. This trend has been consistent throughout time and it is now apparent that we are headed to a future of water crisis.

While cities are constantly growing at a rapid pace and straining water quantity and quality, the situation may seem beyond our control. However, there is still hope for local pueblos of farmers, such as those in Cochiti. It requires uniting not only as one community, but merging with outsiders in order to fight in numbers for water rights. The Cochiti people must begin divulging their secretive spiritual rituals that bless the natural world in order for an outsider to understand what the natives are truly fighting for. It is difficult to place concrete value on the native's connection to the landscape, but when installing technological "fixes", such as dams, we must take the traditional lifestyles into account far beyond the superficial inclusions like in the Cochiti development plan. Seeking a balance between

corporate interests, environmental protection and native spiritual practices is far from simple, and final decisions always come down to values. The constant struggle for water rights is never ending, as every party has a different approach and a compromise concerning the complexity of water sharing is nearly impossible. However, there are mechanisms for the small pueblos to build strength and fight for cultural rights and traditions against the "big guys", as seen in Cochiti Pueblo. Cochiti people know that at this point, the water crisis and dam building is far too involved to turn back. As a result, rather than mitigation, these natives focus on the balance between adaptation and remaining consistent with their heritage and traditional values. The temporality of the landscape is cyclical, continually in the process of becoming without an end in sight. This constant change isn't noticeable on a daily basis, but rather over extended periods of time and we must think long-term for the mercy of our environment and local cultures.

APPENDIX:

Image 1.



Source: © United States Fish and Wildlife Service.

Image 2a.

Source: © Bridges on the Rio Grande
http://bridgesonriogrande.blogspot.com

Image 2b.

Source: © Middle Rio Grande Bosque Initiative

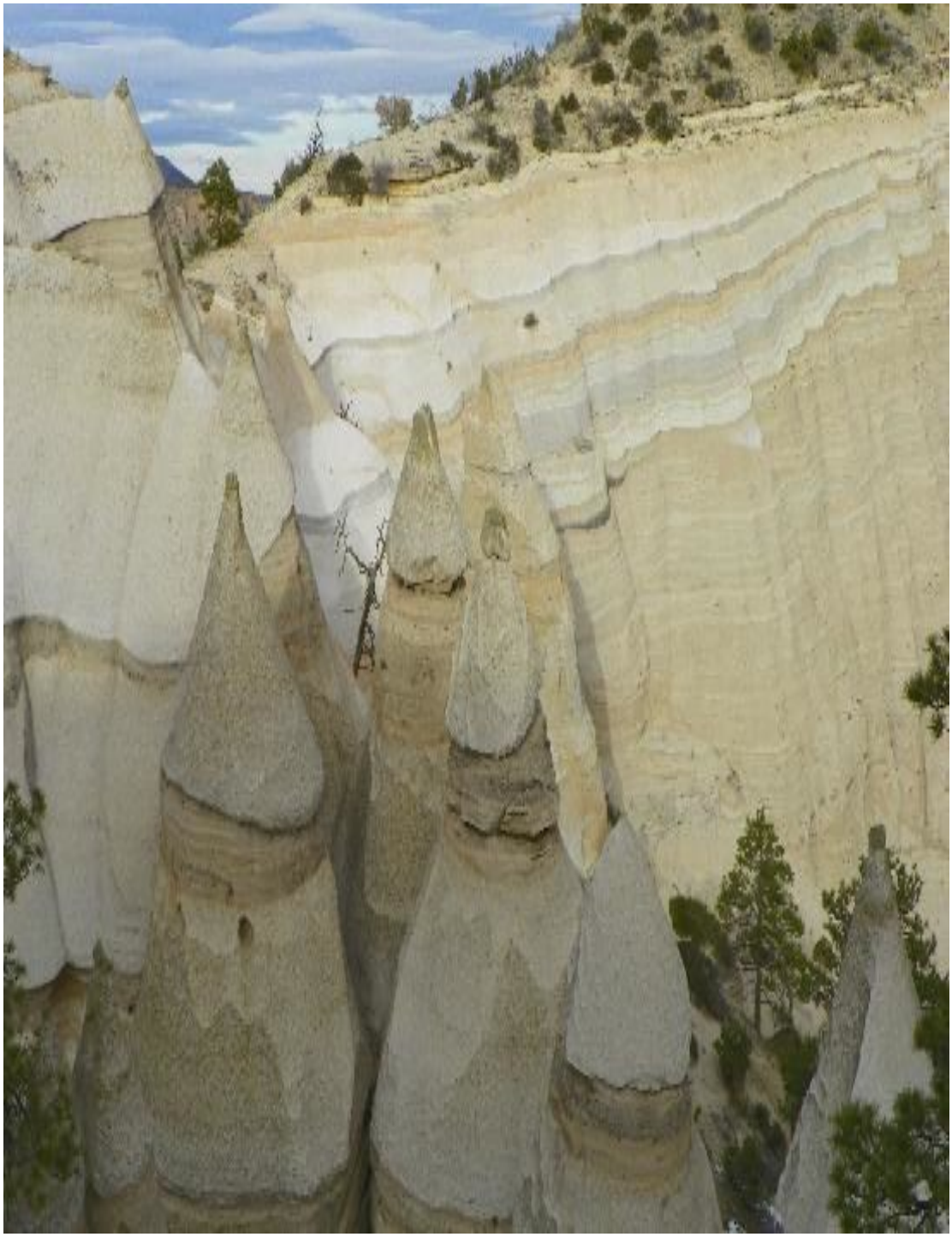
Image 3.

Photo Credit: Kalen Acquisto at the Great Sand Dunes Visitor Center

Image 4.

Photo Credit: Kalen Acquisto at the Rio Grande in New Mexico

Image 5.



Source: © U.S. Department of the Interior, Bureau of Land Management

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