

Introduction:

The Rio Grande is almost 2,000 miles long, beginning in the mountains of Colorado, winding through New Mexico, and eventually emptying into the Gulf of Mexico. Today, millions of people depend on the Rio Grande for drinking water, agriculture, and traditional ceremonial purposes. With so many people living along the river, it now faces an uncertain future. Climate change, population growth, damming, and agricultural runoff have threatened the Rio Grande; in 1992 it earned the dubious award of being the most endangered river by the nonprofit American Rivers (American Rivers, n.d.). A vivid example of this is the fact the river sometimes fails to reach its end in Mexico (Howard, n.d.).

Today, the river is polluted, eroded, and dried out. It is easy to look at the river today and dream of returning the Rio Grande to its natural state. The truth is humans have never left the Rio Grande alone. Whether the work of small groups of Native people, Spanish settlers, the US Army Corp of Engineers, or large-scale agriculture, humans have altered the Rio Grande for thousands of years. However, prior to permanent dams and rapid population growth, human impact causing severe degradation to the Rio Grande was minimal. Today, the building of permanent dams has altered the river so much it is no longer free to flow as nature intended.

Modern water management practices have led to the growth of a forest along the banks of the Rio Grande in the last 15 to 20 years. It is an almost entirely new ecosystem that would most surely look completely foreign to the Native people who inhabited the area as well as the Spanish who “discovered” the region.

How can today’s residents of the Rio Grande Valley manage their resources going forward? One way is to look to the first inhabitants of the region for inspiration based on the effective way they utilized and managed their water. A history of the valley highlights that sustainable water management is possible, in fact, it’s been happening for thousands of years.

Native History up to Spanish Arrival:

The history of New Mexico was rich well before the arrival of Fray Marcos De Niza – the first Spaniard to reach present-day New Mexico. Combining archaeological evidence with Pueblo oral traditions gives us the best understanding of pre-European arrival.

Humans arrived in the Southwest about 25,000 years ago, towards the end of the Paleolithic period. They were small groups of nomadic people who hunted the megafauna during the tail end of the Pleistocene era (Black et al., 2011). The end of this period of time resulted in the creation of lakes and rivers throughout North America where huge mammals gathered - Paleoamericans, the first people in the region, would follow them to these waterways to hunt.

Hunting sites were discovered dating to about 7500 BC, which marks the decline of these Paleoamerican cultures. By this time, early hunters had made their way to the Rio Grande, Rio Puerco, and San Juan rivers and tributaries (Black, et al 2011).

The archaeological record suggests that another big movement of people, Archaic people, into the Southwest happened around 5500 BC (Black, et al 2011). The high temperatures that drove the bison from New Mexico in previous years cooled off from 5500 BC to 3500 BC, which made

hunting easier for these groups. A corresponding jump in population numbers at this time demonstrates a steadier food supply was available (Black, et al 2011). By the end of this time period, Archaic people developed extensive knowledge of plants, seeds, and farming which would have led to an increased reliance on consistent and abundant water sources (Black, et al 2011).

As knowledge of planting and farming increased, so did village size. The next big move of people shows small houses and shelters in the area from the Rio Grande to the Pecos River and from Santa Fe to Albuquerque around this time (Nelson, 1917). In addition to the creation of more permanent housing structures, maize cultivation and high-water-table farming developed for the first time during this time period. In the Rio Grande Valley, the earliest evidence of maize being cultivated was between 1030 and 1170 BC in San Luiz de Cabezon and Jemez Cave (Vierra, 2007), located west of present day Albuquerque.

In order to sustain larger villages, grow maize, and use high-water-table farming techniques, it was necessary for Pueblo people to manage water sources. Rather than changing water flows, crops were only planted where tribes could take the most advantage of rainfall and runoff in watering crops (Black et al., 2011). This period of agriculture establishment allowed populations to grow large enough that foraging and hunting were not enough to sustain the community. The reliance on corn grew as the population did and tribes began focusing on storing grains and crops (Black et al., 2011). Planting and storing crops and seeds and utilizing runoff are some of the first pieces of evidence of communities along the Rio Grande altering their environment. Still, these practices did not change the flow of the Rio Grande as emphasis was placed on utilizing rainfall and the natural flow of the river.

An example of a group of people moving to follow resources is highlighted in an origin story from the Pueblo of San Ildefonso. This story shows how they arrived at the Rio Grande:

The ancient people of Galisteo had a snake, a big one and a black one, which they kept in the kiva. When they went hunting and got game of any kind, they fed it to him. Mule deer, buffalo, white-tailed deer, antelope, elk, rabbit, jackrabbit, birds - all these they fed him. In return he gave them anything that they wanted. Corn, squash, chokecherries, berries, yucca fruit, cactus fruit, Tewa berries, moccasins, leggings, deerskin shirts he gave them. One morning they went to look at him and did not find him. At midnight he had gone out. Nobody had seen him issue, nobody knew in which direction he had gone. They found tracks leading to the arroyo - big tracks, and they followed them. They followed his track along Galisteo creek, where he went along the bed. They followed them to the mouth, where the tracks went into the waters of the Rio Grande. They went back to their pueblo and they held a meeting that next night. And the old men said to the old men: "The snake has gone. What are we going to have of those things which he gave us? He has gone away. Now we also must be going away." And they all went down to Santo Domingo pueblo, where they settled. (Hewett, 1945)

With depleted resources, the members of the community had no choice but to listen to what the natural world was telling them so that they could find a new area to live in where they could thrive. This story shows the importance of following the water and how important it was for the

people to settle along the river.

The Three Sisters and Permanent Villages:

Archaeological evidence from 600 – 900 AD shows an increased dependence on agriculture, resulting in changes in diet, and a decrease in infant mortality in the Rio Grande Valley (Vierra, 2007). By about 1000 AD permanent villages were established in the region, crops such as maize, squash, and beans were harvested, and trade with tribes in present-day Mexico was established. Planting, cultivating, and harvesting maize would be a large commitment for a previously nomadic people, and undoubtedly put a higher demand on water sources.

Village size grew as farming practices did – with more food you could feed and house more people. Excavations at Bandelier National Monument in the early 1900s show some ingenious uses of water irrigation. One technique was the development of grid gardens, also called waffle gardens, due to their square shapes. Grid gardens (below, Bandelier National Monument) were constructed by making small depressions in the ground and building a rock wall or bricks made from the earth around them to catch rainwater (Bandelier National Monument, n.d.). The soil in the area had a high concentration of pumice which was used extensively in the fields as the rock acts like a sponge and would release water over time to provide moisture for the soil (Bandelier National Monument, n.d.).

A curious thing began happening around this time. Archaeological records show evidence of these larger villages being abandoned after 50 to 100 years. One theory is that as woods and vegetation used in the building of homes were depleted, the people would abandon the area as resources became too far to carry



without the assistance of horses, which were not yet introduced to North America. (Riley, 1995).

This evidence of moving due to depleted resources by early Native tribes emphasizes the impact they were having on their environment. The cutting of timber and stripping of vegetation may seem like a modern development, but clearly these practices were happening well before the arrival of the Spanish. However, this altering of the landscape still happened on a small environmental scale. Native tribes were working within their natural environment and the impact they had through agriculture and building permanent structures did not have a long-lasting impact.

Between about 1000 - 1200 AD foraging groups in the northern part of the Rio Grande Valley disappeared. A couple of outcomes are likely: these groups either established farming practices, were forced out of the area, or were absorbed into other groups (Vierra, 2007). This

abandonment of the San Juan valley was likely caused by a major drought, which suggests these agriculturalists depended heavily on agriculture.

With the settling and resettling of different parts of the Rio Grande Valley, there is a boom and bust cycle that allowed populations to grow then decrease based on environmental factors. This cycle shows that Native groups were able to use their environment to feed larger and larger groups of people, but were still at the mercy of natural fluctuations of resources. Between 1000 - 1250 AD we see tribes reestablished more permanent structures near reliable water sources over and over again (Black et al, 2011).

Villages continued to grow even larger after 1400 AD, and in kind, the impact on the environment increased. The cutting of timber for firewood and building material led to erosion and some flooding in the woods near the river, but large-scale destruction of the environment was minimal as grazing animals were not present and populations were still relatively low (Riley, 1995). At this time, the river was not “controlled” and the changes made to it did not last long and allowed the river to return to its natural flow (Black et al., 2011).

The Arrival of the Spanish:

By the time the Spanish entered New Mexico, these large Native American villages had existed for 300 to 400 years (Riley, 1995). Before Spanish arrival in New Mexico, an estimated 100 pueblos were found along the Rio Grande Valley and beyond.

In *Conflict on the Rio Grande: Water and the Law 1879 - 1939*, Douglas Littlefield explains:

“The Pueblo Indians have, since long before the coming of the Spanish, occupied the approximate present sites of their villages except when they were forced from them at the point of the sword or because of devastations by fire or flood or the failure of the water supply. Archaeological remains along the Pajarito Plateau reveal that the Indian homes hugs the diminishing water supply of the springs in ever-narrowing circles before the people moved into the valley to take advantage of the life-giving water of the river. There the Spanish, upon their arrival, found extensive and ingeniously developed Indian irrigation systems already in existence.”

As the above first person account emphasizes, Spanish records corroborate that Native people were establishing their villages along the river because they were using it for agriculture. Additionally, Spanish witnesses noted that Native people utilized water so much that they frequently uprooted themselves to find more favorable locations with more dependable water sources.

In addition to a growing population, the Spanish found a wild Rio Grande that flooded every spring when the snow from the mountains melted. This swelling of the river was so intense some years that the river would change course (Black et al, 2011). Unlike today’s river, many parts had swamplands filled with aquatic grass, willows, and cottonwoods, and the waterways teemed with twenty-four species of fish (Black et al, 2011). Whooping cranes, jaguars, beaver, and other large birds and rodents were also supported by the river (Black et al, 2011).

Droughts were frequent the first years after Spanish arrival and they and the Native people often had to contend with either too much water or too little. Between 1550 and 1650 an estimated twenty to fifty Pueblos were abandoned, mostly on the southern Rio Grande, the Galisteo and Estancia Basins, the Middle Rio Grande, and Jemez (Schroeder, 1979). Droughts had a severe impact on the residents of the Rio Grande Valley and out on the plains. If the residents of the Pueblos had the ability to store water for long periods of time, droughts might not have led to such frequent migrations and would not likely have had such a drastic impact on these populations.

With the arrival of the Spanish, irrigation and water management became more complicated. In addition to the irrigation they witnessed the Native tribes conducting, the Spanish also brought their own heritage of irrigation. "Acequias" or Spanish irrigation canals were built in the upper portion of the Rio Grande. These canals diverted water from the Rio Grande and its tributaries so the Spanish could grow and water their crops, as well as control stream flows (Black et al, 2011). These irrigation canals, first built in the late 1500s, are still utilized throughout New Mexico.

The arrival of the Spanish altered Native life forever, but this did not stop them from continuing their agricultural practices and the need to move to make farming possible as the environment changed (Cameron, 1995). Evidence of continued movement based on available water supplies and the need to farm - even in the face of a conquering nation - suggests a strong dependence on the Rio Grande and its tributaries to make life possible for various tribes.

While Native tribes continued to farm and move based on resources, the Spanish also continued their own farming practices and water management techniques. Studies estimate that between 1590 and 1846 Spanish settlers built four hundred irrigation ditches in the upper portion of the Rio Grande Valley. These acequias were able to irrigate an estimated 55,000 acres or about 130 acres per community (Black et al, 2011). While the acequias allowed the Spanish to divert a large amount of water, there were no dams so water was not stored and a great dependence was placed on snowmelt and summer monsoons (Black et al, 2011).

Spanish technology was simple but effective. It allowed settlers to utilize the river to grow their crops and establish villages in the upper region of the Rio Grande. With the arrival of the acequias to the Rio Grande, the river continued to be utilized in new ways to make agriculture possible, but even these new practices still allowed the river to be wild and human impact to remain at a minimum.

Acequias were a central part of life for the Spanish from their arrival in New Mexico through the 19th century. One riddle highlights the importance the river played on life: *¿En que es suspendido el mundo? En la voluntad de Dios. ¿En que es suspendido nuestro pueblo? En el rio.* The riddle asks how the world was hung in the universe and how the village was supported. The answers are by God's will and by the river, respectively (Black et al, 2011). This common riddle asked throughout the Rio Grande Valley emphasizes that the river is almost as important, if not as important, as the will of God. Without the river the community would not be able to survive.

United States Resource Management:

The Spanish and Native people continued to use acequias and irrigation technology as they had for hundreds of years up to the late 1800s, even sharing them in some instances. The people living in the middle region of the Rio Grande Valley often had to contend with flooding from snow melt which resulted in rebuilding their diversion systems often while also dealing with drought the rest of the year due to lack of rainfall (Black et al, 2011).

In 1848, the history of New Mexico was forever altered with the signing of the Treaty of Guadalupe Hidalgo which transferred parts or all of present-day California, Arizona, Utah, Colorado, and New Mexico from Mexican ownership to the United States. This treaty also set the Rio Grande as the border between the US and Mexico (Bowden, 1959).

Now a territory of the United States, New Mexico became susceptible to United States laws and goals. In 1878, railroads were built connecting New Mexico with the rest of the Southwest (Black et al, 2011) as well as Washington, DC. The construction of the railroad required large-scale timber cutting in the north, which served as the headwaters for the Rio Grande; this destruction of the forest led to erosion and changed the flow of the river forever (Black et al, 2011).

The coming of the railroads made travel to New Mexico easier, which led to an influx of new visitors and residents from the east. This growing population led to a stretching of the already limited resources.

In 1912 New Mexico became a state, bringing additional changes for the people living there. Soon after statehood, engineers began seeing the oscillation between floods and drought along the Rio Grande as a problem that could be fixed through technology. Given the rise in visitors and population, the need for reliable water sources increased.

The Middle Rio Grande Conservancy District was created in 1923 to provide flood protection to the inhabitants along the Rio Grande. In 1945, the conservancy aimed to control irrigation and flooding on 150,000 acres of land along the river.

A report from 1945 states: “Although this area is extremely rich in certain of these resources, some of them have been only meagerly developed to date... In the semi-arid Rio Grande Basin the waters of this river must be controlled, conserved, and used to the fullest possible extent both for the development of agriculture and water power (Nickerson, 1945).” This passage clearly indicates that utilizing what nature provided would no longer suffice. Water would be used on a large scale for farming and as a way to meet the energy needs of the region’s growing population.

While flooding continued to occur in the spring with the melting of the mountain snowpack, increased erosion, agriculture, and people also contributed to a lack of a reliable water source. Many of the current issues facing the Middle Rio Grande Valley were identified in 1945: “There are indications from all quarters that the seriousness of the watershed problem facing the Rio Grande Valley is not fully appreciated by the residents of New Mexico. The continued use of the valley for agricultural and stock raising purposes, and even for mere habitation, is gravely endangered if conditions on the watershed above the valley continue to accelerate the processes

of erosion (Nickerson, 1945).” Today, agriculture and a growing population remain some of the major threats to the Rio Grande.

Storing and managing water to combat flooding or drought must have seemed like a miracle to some residents in the valley. However, all residents currently living along the Rio Grande are now living with the repercussions. The building of the dams has had a disproportionate effect on the way of life of Pueblo people, who lived in the region for thousands of years without the assistance of dams.

The repercussions of dam building is perhaps most obvious at Cochiti Pueblo which is home to Cochiti Dam, the dam that controls the water of the Rio Grande from north of Albuquerque south to Elephant Butte. The people of Cochiti have lived on their Pueblo - in the same location they are in today - for at least seven hundred years (Black et al, 2011). Oral tradition says the Cochiti people arrived at their present day Pueblo from the west and brought water practices with them that included diverting water to a floodplain for their fields and were able to store small amounts of water in low-constructed dams (Black et al, 2011). Traditionally, the river was unpredictable and the people of Cochiti worked as much as they could within these parameters, sometimes planting corn in the middle of the river on islands that would occasionally develop (Black et al, 2011).

Cochiti Dam was built in opposition to the wishes of Cochiti Pueblo between 1965 and 1975. Throughout the process, the US Army Corps of Engineers flooded sacred sites and fields that had provided the Cochiti people with crops for hundreds of years (Paskus, 2013). At a symposium held in April of 2006, Regis Pecos from Cochiti Pueblo explained that his people refer to the building of the dam as “their nightmare” (Natural Resources Journal, 2006).

Unfortunately, the impact of the dam on the Pueblo did not end when the dam was finished. After construction was completed, a leak flooded the remaining agricultural lands turning them into a wetland, forever altering the lives of the Cochiti people (Natural Resources Journal, 2006).

The tragic consequences of Cochiti Pueblo highlights the destruction dams brought to just one section of the Rio Grande. Prior to the construction of the dam, the people of Cochiti - as well as Spanish settlers and other Native tribes - had utilized the river and water sources in a way that was sustainable for generations. Dam construction not only changed the way of life for almost every tribe in the Rio Grande Valley, but it also forever altered the ecosystem and flow of the river.

Between Cochiti Dam and Elephant Butte Dam the water of the Rio Grande is still controlled by the Middle Rio Grande Conservancy District. This agency bases water flow on the needs of agriculture, the cities along the river’s banks, and the needs of the silvery minnow - an endemic species of fish listed as endangered and under the protection of the Endangered Species Act (Paskus, 2013).

In an interview with John Fleck, longtime journalist at the Albuquerque Journal, Fleck discussed how much of today’s water management is dependent on the needs of the silvery minnow. Ironically, the traditional habitat of the silvery minnow was greatly diminished by the

construction of the dams. According to Fleck, the silvery minnow traditionally had a flexible range where they moved into different streams and tributaries along the Rio Grande depending on the season. After the building of the dams, the silvery minnow went extinct north and south of the dams, and is now trapped in between Cochiti and Elephant Butte. Since the minnow's addition to the endangered species list, the dam that destroyed the minnow's traditional range now dictates the amount of water flowing in the Rio Grande to save it.

The silvery minnow is not the only fish to experience the downside of dam building along the river. Today, there are fourteen endemic species of fish found in the Rio Grande, reduced from an estimated historic number of twenty-four (Sallenave, 2015). The introduction of invasive species - both by humans and by a changing climate - has put further pressure on the river. The introduction of nonnative fish to the Rio Grande is having a profound effect on the state fish - the Rio Grande cutthroat trout. Only a few years ago, the Rio Grande cutthroat trout was on the endangered species list and one of the main threats to its survival was hybridization with nonnative fish (USFWS, n.d.). Low water levels continue to impact the fish left in the Rio Grande - fish kills and salinization have been reported along the Texas portion of the river (WWF, n.d.).

Dams are not the only way human technology and interference have damaged the Rio Grande and hurt the original inhabitants of the area in the process. Industry, agriculture, and waste have also caused great damage to the river.

In an interview with Ted Jojola, current Indigenous Design and Planning Institute Director at the University of New Mexico and member of Isleta Pueblo, he explained how he alerted then-governor of Isleta Verna Williamson to the water quality crises in the mid-1990s. He happened to stop by a science fair in the city of Socorro and asked one of the students about their findings about the quality of the Rio Grande. The student had discovered that contaminants in the river were "off the charts" and many parts of the river were essentially an "aquatic deadzone." This was a result of the wastewater treatment plant upstream of the Pueblo in Albuquerque and was impacting the water of Isleta. The discovery of the poor quality of the water coincided with a number of people at Isleta getting sick after a ceremony that involved drinking water from the river.

Isleta took action by establishing a water-quality standards program and meeting with the city of Albuquerque to get the quality of the Rio Grande up to their standards. Initial meetings with the city went well, but in 1992, Albuquerque sued the Environmental Protection Agency saying the city should not be held responsible for the clean-up since the pollution was coming from industries upstream (Lenderman, 1998). The city also claimed that the water quality standards established by Isleta Pueblo were not based on "science" because the standards required the water be healthy enough to perform religious ceremonies. Jojola said the city claimed these standards were too "esoteric."

In a groundbreaking decision, the Supreme Court ruled against the city of Albuquerque - a huge win for Isleta and tribal water rights (Lenderman, 1998). The city of Albuquerque was forced to update the wastewater treatment plant.

Unlike agricultural practices of the original Native tribes and Spanish settlers, today's agricultural practices are another huge threat to the health of the Rio Grande. With the Southwest facing years of crippling drought, large-scale extraction to meet agricultural needs continues to pose a threat to the river (WWF, n.d.). Despite the fact that water extraction decreased in 2005 from 1999 levels, low snowpacks and continued drought remain a serious concern (WWF, n.d.). Despite the new wastewater plant in Albuquerque, pollution continues to plague the Rio Grande along the entirety of its course (WWF, n.d.).

Conclusion:

For many years conservation focused on the setting aside of land or water for no human to use or touch. Despite the establishment of wilderness areas, parks, and game preserves, biodiversity continues to decline (Kareiva et al., 2012). Many in the conservation movement forgot that humans are part of the environment and have always had an impact on our ecosystems.

Humans have altered and tended to the Rio Grande and its banks for thousands of years. By diverting rainfall, creating irrigation canals, and planting crops along the floodplain, humans had an impact on the environment and the nature of the river. This altering made life possible for the small communities who lived along it, while the river was allowed to continue to change and flow as nature dictated.

While humans have always altered the landscape and the Rio Grande, it is only in fairly recent human history that the river's natural flow was changed permanently. This interference has resulted in the Rio Grande being reduced to a trickle in many places. Today's residents of the Rio Grande Valley should not be afraid to use the river, but should look to do so in a sustainable way.

As climate change continues to result in a hotter and drier world, and residents of the Rio Grande Valley face more serious water shortages, creative solutions will be needed. As the original inhabitants of the region showed us, it will take a hands-on approach for life to continue to be possible in the Southwest.

The West and the Rio Grande are an almost mythical part of American culture. Countless movies, songs, and stories focus on the Southwest and life in this region has shaped how Americans view ourselves for the past one hundred years.

A poem from 1910 highlights the importance and history of the Rio Grande:

Onward rolls the Rio Grande
Sweeping proudly to the sea,
Dreaming oft, yet slumbering never
Clothed in sunshine and mystery.

Speak and tell thy tales, O river!
Tell thy story now I pray,
Whisper me some golden legends
From thy realms of yesterday.

I heard thy ripples murmur
Ghostly songs in rhythmic flow -
As old faces drifted seaward
In the far-off long ago.

Thou hast seen the high mountain snowfall
And heard the lonely seabird cries
Long before the birth of Moses
You have blessed the Gulf Coast skies.

You are the life blood to so many
You are a legend to us all!
Oh you mighty RIO GRANDE
Flowing to the Gulf.

Over one hundred years ago the anonymous author of this poem knew that the Rio Grande had a rich history, provided life for the region, and flowed more wild than it does today. Soon after the writing of this poem the Rio Grande was tamed by dams, and today it no longer “sweeps proudly to the sea” but rather struggles to get there on many occasions.

Human engineering has provided great advances in many instances but in the case of the Rio Grande, humans have used technology to put too much pressure on an already limited resource. Through the history of the Native people and the Spanish settlers we see an example of how to use nature without forever damaging it for future generations.

References

- Albert, S. (2009, March 23). *How to Grow Sweet Corn*. Retrieved from http://www.harvesttotable.com/2009/03/how_to_grow_sweet_corn/
- American Rivers. (n.d.). *Rio Grande River*. Retrieved from American Rivers: <https://www.americanrivers.org/river/rio-grande-river/>
- Bandelier, A. F., & Hewett, E. L. (1937). *Indians Of The Rio Grande Valley*. City, State: University of New Mexico Press.
- Bowden, J. (1959, October). The Texas-New Mexico boundary dispute along the Rio Grande. *The Southwestern Historical Quarterly*, pp. 221-237.
- Cameron, C. M. (1995). Migration and the Movement of Southwestern People. *Journal of Anthropological Archaeology*, pp. 104-124.
- Fleck, J. (2016, October 26). Rio Grande Research Project. (S. Torres, Interviewer)

- Howard, B. C. (n.d.). *8 Mighty Rivers Run Dry From Overuse*. Retrieved from National Geographic: http://environment.nationalgeographic.com/environment/photos/rivers-run-dry/#/freshwater-rivers-colorado-1_45140_600x450.jpg
- Jojola, T. (2016, November 10). Rio Grande Research Project. (S. Torres, Interviewer)
- Jones, E. L. (2015, October). The ‘Columbian Exchange’ and landscapes of the Middle Rio Grande Valley, USA, AD 1300–1900. *The Holocene*, pp. 1698-1706.
- Kareiva, P., Marvier, M., & Lalasz, R. (2012). Conservation in the Anthropocene, Beyond Solitude and Fragility. *The Breakthrough*.
- Lakatos, S. A. (2007). Cultural Continuity and the Development of Integrative Architecture in the Northern Rio Grande Valley of New Mexico, A.D. 600-1200. *Kiva*, pp. 31-66.
- Lenderman, J. (1998, February 2). A tiny tribe wins big on clean water. *High Country News*.
- Nickerson, T. (1945, Summer). That their fields shall prosper and their flocks increase. Problems of the Rio Grande watershed a symposium. *The New Mexico Quarterly Review*.
- Paskus, L. (2013, August 7). A dam’s ‘painful’ history. *New Mexico in Depth*.
- Reff, D. T. (1991, September). Anthropological Analysis of Exploration Texts: Cultural Discourse and the Ethnological Import of Fray Marcos de Niza's Journey to Cibola. *American Anthropologist*, pp. 636-655.
- Riley, C. L. (1995). *Rio Del Norte : People of the Upper Rio Grande From Earliest Times to the Pueblo Revolt*. Salt Lake City: University of Utah Press.
- Rio Grande Reservoir Symposium. (2006). The Utton Transboundary Resources Center, The Natural Resources Journal, University of New Mexico School of Law.
- Sallenave, R., Carrasco, C., & Cowley, D. E. (2015, November). Fishes in the Middle and Lower Rio Grande, Irrigation Systems of New Mexico. *College of Agricultural, Consumer and Environmental Sciences, New Mexico State University*.
- Schroeder, A. (1979). Pueblos Abandoned in Historic Times. *Handbook of North American Indians*, pp. 236-54.
- US Fish and Wildlife. (2014, August). *Species Assessment Report for the Rio Grande Cutthroat Trout*. Retrieved from fws: https://www.fws.gov/southwest/es/NewMexico/documents/RGCT_SSA_Report_2014_Final.pdf
- Vierra, B. J., & Ford, R. I. (2007). Foragers and Farmers in the Northern Rio Grande Valley, New Mexico. *Kiva*, pp. 117-130.

Wendorf, F. (1954, April). A Reconstruction of Northern Rio Grande Prehistory. *American Anthropologist*, pp. 200-227.