World Monuments Fund Conservation at Taos Pueblo
Conservation at Taos Pueblo
New Mexico, USA

November 2012

World Monuments Fund
San Geronimo Mission Church, Taos Pueblo, photographed by Ansel Adams, 1941. The Spaniards built mission churches at most of the pueblos from the seventeenth to nineteenth centuries as part of their effort to convert the Native American population to Christianity. Like the pueblos themselves, these buildings were constructed of adobe. San Geronimo Mission Church, at the entrance to Taos Pueblo, was built in 1847 after the destruction of an earlier church nearby in the rebellion of 1847, following the United States' possession of New Mexico. More recently, two towers were added to the church, radically changing its appearance.
**Introduction**

World Monuments Fund (WMF) has always been deeply involved in preserving traditional construction and establishing programs to train craftsmen in these methods. Much of this work has focused on vernacular and earthen architecture around the globe, including projects in Haiti, Egypt, Peru, and Cambodia. WMF’s work at Taos Pueblo brings these spheres of interest together at one of the United States’ most ancient places, an enduring community built of adobe at the foot of the Sangre de Cristo mountains in present-day New Mexico that has been continuously occupied for almost a thousand years.

The northernmost and most isolated of the approximately 20 pueblos built along the Rio Grande in the first few centuries of the second millennium, Taos Pueblo is a designated National Historic Landmark, and is one of only 22 sites in the United States inscribed on UNESCO’s World Heritage List. Its distinctive appearance, strong cultural traditions, and physical integrity have made Taos Pueblo a constant subject of study, photography, and documentation since the nineteenth century.

The pueblo was nominated to the 2010 World Monuments Watch by the U.S. National Park Service (NPS) pursuant to the need to develop a World Heritage Site management plan to maintain its status as a World Heritage Site. Subsequent conversations between WMF, the Taos Tribal Government, and NPS led to an expansion of the scope of work for the nomination, focusing on developing a training program for 10 tribal members and conserving an 11-unit dwelling adjacent to the entrance of the pueblo that was in a state of partial collapse. Additionally, the scope of work included documenting the entire pueblo using laser technology to provide a baseline for the conservation work.

The laser documentation was undertaken in two stages by CyArk, and completed in the fall of 2010. From December 2010 to June 2012, the team of trainees, overseen by two supervisors, worked on the conservation and partial reconstruction of the building, which is now complete. The Tribal Government was able to leverage the WMF support into an $800,000 grant from the Department of Housing and Urban Development (HUD) to continue similar work on other pueblo buildings following the model of the WMF project.
History

The high plains geography surrounding Taos is defined by the Rio Grande Gorge, the result of a tectonic shift similar to the one that created the Great Rift Valley in East Africa. Anthropologist Elsie Clews Parsons, who studied Taos Pueblo in the 1930s, correlated the appearance of the Rio Grande Gorge with one of the formative legends of the Taos Tribe. The deep shadows of the gorge, she suggests—a result of its narrowness and depth—were the source of the pueblo myth of the emergence of the “First People,” who “came up through the nether dark into a new world, sunlit and uncrowded.” Most archeologists now agree that the Pueblo People are descended from the Anasazi, who occupied the Four Corners area until a prolonged drought at the beginning of the second millennium forced them to seek the waters of the Rio Grande and its tributaries to the east.

Current Puebloan culture was established along the Rio Grande around 1100 A.D. By the time of the Spanish arrival in the 1530s, there were more than 20 pueblos stretching from Isleta south of Albuquerque upwards to Taos, the northernmost, largest, and most isolated of the pueblos. Another group of nine Hopi pueblos dating from approximately the same period are located in northwest Arizona, perched on narrow fingers of the First, Second, and Third Mesas. While the Hopi pueblos are constructed primarily of stone with a mud coating, the Rio Grande pueblos are built almost entirely of adobe.

Made of materials gathered from the land—stone, earth, water, grass, cedar logs, and willow branches—earthen pueblo buildings are dependent on constant cycles of renewal and rebuilding tied to the natural rhythms of the seasons, without which they quickly erode. Thus, while portions of the underpinnings and internal walls of the buildings may date back almost a thousand years, the external walls and overall shapes seen today are more likely two to four hundred years old, and the exterior coatings only a year or two.

The pueblos were situated for practical and religious purposes. Taos Pueblo, for example, is located at the foot of the Sangre de Cristo Mountains, with views of sacred peaks and landscape formations in all directions. It straddles the Taos River, which provides water for the village and irrigates the fertile plains to the east. The shape of the pueblos also reflect their surroundings. Referring to Taos and its relation to Taos Peak, architectural historian Vincent Scully observes that it “echoes the mountain and abstracts it to the measure of human units.”
Change is a constant in pueblo buildings, which grow and shrink as new dwelling units are added and unused ones erode away. Taos Pueblo, one of the largest and most architecturally complex of the Rio Grande pueblos, is unique among them for the preservation of most of its upper floors and the overall massing of its structures. One can imagine that the character of its appearance remains much as it was when Spanish conquistadors came upon it in 1540. In the early twentieth century, as mass-produced building materials became available in New Mexico, tribal government, adhering to tradition, chose not to allow the introduction of electricity, plumbing, or machine-fabricated materials into the pueblo. The preservation of its multi-story massing and the prevailing lack of modern material intervention give Taos Pueblo its singular appearance. All the other Rio Grande pueblos, many of which had multi-story configurations similar to Taos, have lost their upper floors and now rise no more than two, or occasionally three, stories. Concrete block additions, metal or asphalt roofs, and contemporary doors and windows—plus an overhead web of electrical lines and telephone poles—have also changed their appearance.

San Geronimo Feast, 1895. Remudding the façades of the buildings at Taos is tied to the end of the harvest season and the feast of San Geronimo, Taos’ patron saint, on September 29 and 30. Traditionally, a footrace is run on the early morning of the 30th, witnessed by crowds perched on the buildings.

Taos Pueblo showing the Sangre de Cristo Mountains and Taos Peak, 1880. By the time this photograph was taken, Anglo culture in New Mexico, which began with the first settlers in the 1840s and ‘50s, had taken root. In 1912, New Mexico became one of the last states to join the Union. As a defensive measure, pueblo buildings were designed without doors at grade; access to the dwelling units was through a hatch in the roof, accessible by a ladder. Comparison with the cover photograph shows that in 1880 ladders were still in place and grade-level doors had not yet been introduced.
Twentieth-Century Taos

In the first quarter of the twentieth century, Taos and its ancient traditions attracted the attention of Mabel Dodge Sterne, a wealthy matron deeply involved in New York’s Greenwich Village avant-garde, who relocated to Taos in 1918. Mrs. Sterne married a Taos tribal member, Antonio Luhan, who built their home, Los Gallos, at the edge of tribal lands in the village of Taos. For the next 40 years, Mrs. Luhan invited her artistic coterie to visit for long stays, including Ansel Adams, Georgia O’Keeffe, D. H. Lawrence, Leopold Stokowski, Martha Graham, and Carl Jung. These enormously talented and creative people—inspired by the dramatic landscapes around Taos, the rituals of the pueblo, and the forms of its vernacular, organic architecture—incorporated their surroundings into their own artistic endeavors. Some of them, like O’Keeffe and Lawrence, settled permanently in New Mexico.

The work created by Mrs. Luhan’s guests was widely disseminated, adding to the legendary character of both New Mexico and Taos and putting the region squarely at the center of the artistic world. The romanticized vision of Taos that emerged from these artists’ dances, paintings, music, and writings often captured the amalgam of Indian, Spanish, and Anglo cultures that was ever-present in New Mexico, but generally overlooked the realities of poverty and separation that had overtaken the pueblo by mid-century; pueblo lands appropriated from the Indians by the Anglos in the nineteenth century were only returned to them by the Pueblo Lands Act of 1924, and New Mexico Indians were not allowed to vote in state or national elections until 1948.

In the 1970s, life at Taos Pueblo, however financially constrained, was profoundly changed by the relocation of almost the entire population to newly constructed, government-funded HUD housing outside the historic
pueblo walls. The major impetus for this was the lack of plumbing and electricity in the historic pueblo (stemming from the tribe’s adherence to traditions of construction and cultural beliefs) and HUD’s wish to ensure that “safe, decent, and affordable housing is available to all Native American families.” From that point forward, the living units within the historic pueblo have only been used for ceremonial purposes. As a direct result, the level of cyclical maintenance on many dwelling units has been substantially reduced or in some cases—when family lines died out—abandoned altogether. The tribal government continues to maintain the North and South Houses, the touristic focus of the pueblo, but some of the secondary buildings have fallen into serious disrepair or collapsed outright.

*HUD House, 2011. When the HUD houses at Taos were originally constructed, they were designed “pueblo style,” with flat roofs and a cement finish on the exterior walls to imitate the traditional mud coat of the pueblo. When the roofs leaked, shallow metal gable roofs were added, giving them a “ranch house” appearance.*
The outstanding significance of Taos Pueblo and its surrounding tribal lands—homeland of *Tuabtab Dainah*, the Taos Pueblo People, and the Place of the Red Willow—has been duly recognized nationally and internationally. A sovereign nation governed by the Taos Tribal Council, Taos Pueblo was designated a National Historic Landmark, the most elevated status bestowed by the National Park Service, on October 9, 1960. In 1992 it was inscribed on the World Heritage List by the UNESCO World Heritage Centre, one of only 22 such sites in the United States. In 2006 the pueblo was included in the Northern Rio Grande National Heritage Area.

It has not always been a highly regarded place, illustrated by the struggle over Blue Lake, whose waters feed the Taos River that flows through the pueblo. For this reason, among many others, Blue Lake is sacred to the Taos People, and the area surrounding it contains many significant ceremonial sites. Taos religious leader Juan de Jesus Romero put it this way: “Our Blue Lake Wilderness keeps our waters holy, and by the water we are baptized. If our land is not returned to us, if it is turned over to the government for its use, then that is the end of Indian life. Our people will scatter as the people of other nations have scattered. It is our religion that holds us together.”

Despite the lake’s cultural significance, in 1906 Theodore Roosevelt issued an executive order declaring Blue Lake and 48,000 acres of the Sangre de Cristo Mountains surrounding it part of the Carson National Forest. This put the area under the control of the Forest Service of the Department of Agriculture, taking it away from the tribe and legalizing public recreational use and logging. By the 1930s, the lake was stocked with trout and four new access trails were cut. Camp areas and garbage pits were constructed along the lake shore, fouling the river used by the pueblo. This led to a 64-year effort by the tribe to regain the land. On December 2, 1970, the U.S. Senate voted 70–12 to return the land; President Richard M. Nixon signed H.R. 471 on December 15, 1970, the bill returning legal title of the land to Taos Pueblo.

Taos Pueblo sits at an altitude of 7,200 feet, surrounded by 99,000 acres of tribal lands, including the Blue Lake Wilderness. The ancient pueblo, roughly trapezoidal in plan and located securely within the tribal lands, is surrounded by an adobe wall originally built as
a fortification. It is dominated by the large, multistory Hlauuma (North House) and Hlaukwima (South House), which face each other across a large open plaza bisected by the Taos River. In addition to the primary structures, there are 15 secondary structures called sub-houses—mostly one story with some two-story additions—within the wall. Like the North and South Houses, the sub-houses contain additional dwelling units, and in recent years souvenir and gift shops. The current population of Taos is about 1,900 people, 150 of whom live within the historic pueblo walls, the others in modern houses on the tribal lands surrounding the older pueblo. All of the families use their units in the historic pueblo for ceremonial purposes on a regular basis. The pueblo is governed by a tribal governor and a war chief, who are appointed annually by the Tribal Council, a group of about 50 male tribal elders. Ninety percent of the population is Catholic; Catholicism is practiced along with the ancient Indian rites. The pueblo contains both the Mission Church of San Geronimo, located immediately within the pueblo walls at the entrance and open to the public, and five kivas, underground ceremonial religious chambers. To protect religious privacy, non-tribal access to the kivas is not allowed. Tiwa, the native language of Taos, is intermingled with English and Spanish and frequently heard.

In 2009, the National Park Service, which has had a long association with the pueblo, nominated the site to the World Monuments Watch for the purpose of creating a World Heritage management plan, required of all World Heritage Sites to maintain their status. Along with issues of maintenance and deterioration, the integrity of the pueblo and its surrounding tribal land has been threatened by encroachment from the expansion of the village of Taos, increased use of the Taos airport and flight patterns over the pueblo, the construction of tall structures such as cell towers visible from tribal lands, nearby highway construction, and other pressures. In discussions between WMF and the Tribal Council during the nomination process—in light of the deteriorated condition of the sub-houses—the nomination was expanded to include the creation of a training program in traditional construction methods for tribal members, focusing on the conservation of Sub-House 2, a highly visible 11-family dwelling in a state of partial collapse.
The Conservation Project: Restoring Sub-House 2

Sub-House 2 is located at the public entrance to Taos Pueblo directly across from the San Geronimo Mission Church, and is seen by all visitors. The central portion of Sub-House 2 had suffered a fire and was in danger of collapse, and the bulk of the building was no longer usable. Many of the vigas (large structural beams) and latillas (smaller logs placed above the vigas to support the earthen roofs above) on the interior of the building had been damaged by fire or rot.

The first task was to document all of the buildings at Taos Pueblo—including Sub-House 2—using laser technology, an extremely accurate form of documentation especially useful in recording irregular structures like adobe buildings. The last time the pueblo had been documented was in 1973, since which it had undergone considerable change. With funding from WMF and the U.S. National Park Service, the California-based firm CyArk was engaged to undertake the documentation. CyArk also trained a group of tribal members in documentation methodology and data retrieval techniques. The documentation yielded a base set of drawings to guide the conservation and reconstruction of each building.

Location of Sub-House 2 within Taos Pueblo

These digital scale drawings of the south wall of Sub-House 2 are accurate to within an eighth of an inch. The photographic drawing shows the actual colors of the building, while the colored drawing distinguishes between different textures and finishes. The gray areas are sections that were not captured in the initial documentation and were filled in from data captured by the drone.

The initial documentation in 2010 was accomplished using cameras on tripods placed on the ground or, where permissible, on building rooftops. Additional data was gathered in 2012 using a computer-guided drone containing a camera that flew over the pueblo on a pre-determined flight path. The raw data was digitized and used to create plans and elevation drawings of the buildings. As this type of activity was unprecedented at Taos, consideration and approval by the Tribal Council was required.
Laser-scanning data was collected with ground-based scanners (left) and a computer-guided drone.
Following completion of the documentation and the production of drawings in the late fall, conservation work began in December 2010. A group of 10 trainees, supervised by tribal members Louis Zamora and Phillip Martinez, was assembled. Since the cold weather prevented outside work, the trainees began by building wood elements, such as doors, windows, skylights, and ladders in the newly built workshop, located on tribal lands not far from the historic pueblo.

The new Taos Preservation Project Workshop was built specifically to fabricate materials for the preservation and conservation of buildings in the pueblo, and is fully equipped with new woodworking machinery. In addition to the ladder in the foreground, window and skylight frames for use in Sub-House 2 can be seen in the photo below. The workshop also served as a lecture and discussion space for the trainees, who were brought together on a regular basis by the job supervisors and on field visits by WMF. A typical discussion might include the rationale for using uniformly dimensioned machine-cut lumber for the window frames rather than hewn planks as might have been used centuries ago. Through this process, the trainees were introduced to issues of preservation philosophy and how decisions are made during the restoration of historic buildings.

Trainees in the workshop, Taos Preservation Project
Logs were harvested on tribal lands to provide replacement vigas and latillas for Sub-House 2.

The logs were trimmed, peeled, and stacked outside the workshop.
In early spring 2011, demolition of the damaged portions of Sub-House 2 began. This included removing the entire second story and the first story ceiling beneath it, as well as some unstable first-story walls.

The shaded areas in this sketch floor plan show the second-floor areas that were removed. Most families own one-room units that are now used almost entirely for ceremonial purposes, though some of the units have two or three connected rooms. Following the building upgrades, it is anticipated that more families will use the rooms for occasional daily living.
Sub-House 2 with the second story almost removed.

Reconstruction of the building began with new foundations of cobblestone and mud. Wood formwork rather than a traditional trench was incorporated to make the foundations more uniform and stable.

The return of warm weather allowed the trainees to start mixing adobe mud and casting it into bricks that were then sun-dried and stacked for use.
As the first-floor walls were completed, they were topped with new hand-hewn bond beams, onto which the new vigas and latillas were secured. Note the double-width wall in the center of the photograph. Interior walls are often two or more adobe bricks thick, either to support walls above, or as a result of new rooms added against exterior walls.

The new walls started going up in late spring and the work progressed quickly through the summer of 2011. Because traditional construction methods require the use of Taoan terms, the trainees learned both traditional building techniques and new expressions in Tiwa, the traditional Taoan language.
New vigas and latillas in place. Traditionally, a layer of rushes or small branches would have been placed above the latillas; this was then covered with about nine inches of earth.

In another concession to practicality, the vigas and latillas were covered with a layer of plywood and a waterproof bituminous membrane to prevent leaks and dirt from falling into the new dwelling units. None of the modern materials are visible from inside or outside the building. Note the ends of the vigas resting on top of the bond beam, anchored in place by the adobe bricks between them. In the case of this Sub-House 2 unit, the ends of the vigas are flush with the face of the wall, and were covered with the final mud coats. In other units, some or all of the vigas project from the wall, sometimes at different lengths.

By late fall 2011, most of the second story of Sub-House 2 had been rebuilt.
Earth was hauled up onto the roofs and tamped down to receive a mud coat.

Metal-lined roof scuppers, known by their Spanish name, canales, were fabricated in the shop and placed in the parapets to drain the new roofs. This led to another discussion with the trainees. Traditionally, canales were made of halved and hollowed cedar logs. Placing the inside end of the canale into the mud roof was problematic because of the semicircular shape of the log; they often filled with mud and clogged. While the new metal-lined canales function better, the work crew decided that the glinting of the metal in the sun was detrimental to the traditional appearance of the building, so they decided to paint them brown. In the restoration of sub-houses in the future, the work crew plans to experiment with other methods of constructing canales, including finding a better way to place the inside ends of traditional split-log canales into the earthen roofs. One of the reasons WMF and the Tribal Council chose to begin the preservation project with a sub-house was because teaching involves allowing room for error. The sub-houses, being less significant than the iconic North and South Houses, therefore seemed better places to teach traditional construction techniques to the trainees.
With the coming of winter snows, the old cyclical maintenance patterns of the pueblo returned to Sub-House 2: earthen roofs have to be regularly shoveled or the melting snow finds its way inside, bituminous layer or not. The trainees shifted back to the shop for the winter, fabricating more materials for phase two of the work on Sub-House 2, to begin in the spring.

In late November 2011, Taos Governor Nelson Cordova and the Tribal Council inspected the work completed to date with WMF representatives and guests from other pueblos, the University of New Mexico, and the University of Texas. Following the site inspection, everyone was invited into the Tribal Council chambers for a half-day discussion about the tribe’s vision for the future of Taos Pueblo, including the continuation of restoration work on the balance of the pueblo, funding mechanisms to cover the related expenses, working within the context of government-funded project guidelines and regulations to make them better coincide with tribal requirements, and the production of a World Heritage site management plan.
The second phase of work began with the reconstruction of the porches on Sub-House 2 in March 2012. Porches were a nineteenth- and twentieth-century addition to the pueblo buildings. Originally, rather than porches, the buildings had racks for drying meat, vegetables, and hides built immediately adjacent or in nearby open areas. Sub-House 2 had a drying rack adjacent to the north side of the building, but on the south and west walls eight porches had been built over the years, only occasionally with traditional materials. Because the unit owners wanted to keep the porches for practical reasons, it was decided to reconstruct them using traditional materials.

Adobe walls receive multiple coats of mud to protect the underlying materials, the first coat being quite thick and forced into any open joints between the bricks by hand. Succeeding finish coats are generally thinner and have less straw in them, so the finished exterior coat looks smooth and uniform. This is the coat that washes off most easily in heavy rains and requires frequent replacement.
By the end of June 2012, the work on Sub-House 2 was completed. This included completion of the porches, construction of the north-side drying rack and two missing first-story units that had been destroyed on the west and north sides of the building, and installation of additional doors, windows, skylights, canales, and ladders. While the work on Sub-House 2 was still in progress, the Tribal Government applied for additional assistance from HUD and successfully leveraged the work on Sub-House 2 into a new $800,000 grant to conserve other sub houses following the model of the work on Sub-House 2.
The trainees involved with the conservation project all gained new skills in traditional construction methods garnered from their supervisors. While tribal values guided the approach to their education, an appreciation of integrating modern technology into the traditional methods was also accomplished through discussion and practice. In a Southwestern high-end home construction market, where traditional construction is increasingly sought after and dearly paid for, these skills will position the trainees to acquire more highly paid jobs in construction work outside the pueblo, should they choose to pursue them. As more conservation work is embarked on within the pueblo, with support from HUD and other institutions, new trainees will be brought into the program. There is also the opportunity for the first group of trainees to pass their newly acquired skills on to other trainees and unit-owning families, who can apply them to their annual cyclical maintenance activities.

In addition to continuing the restoration work at the pueblo that began with Sub-House 2, the most pressing need at Taos is the completion of the World Heritage site management plan, the original goal of the National Park Service’s Watch nomination. An abandoned cell tower built just beyond the boundaries of the tribal lands illustrates the need; permitted by Taos Village zoning but erected without consultation with the pueblo, the tower falls squarely at the center of one of the pueblo’s sacred westward views. When the Tribal Government objected, the framework of tower had already been completed, but as a result of the objection, it was never made functional. An important aspect of the plan would be to map the sacred pueblo viewsheds and design zoning that would maintain their integrity. Other important reasons to pursue the site management plan are to control the expansion of the airport and related flight paths over the pueblo and tribal lands, to deal with the encroaching sprawl of Taos Village, to clarify the pueblo’s intentions regarding infrastructure such as public roads that provide emergency-vehicle access to the pueblo, and to codify the conservation methodology used in the WMF project for use on other pueblo buildings.
Donors
WMF gratefully acknowledges the following donors for their generous support of the Taos project:

Ms. Virginia James
Butler Conservation Fund, Inc.
The Friends of Heritage Preservation
Ellsworth Kelly Foundation, Inc.
Mr. Jack Shear
Mr. and Mrs. Edward A. Studzinski
Ralph E. and Alma W. Burnham Fund
The Pacificus Foundation
Seth Sprague Educational and Charitable Trust

Acknowledgments
Thank you to the staff, consultants, and partners who contributed to World Monuments Fund’s work at Taos Pueblo:

WMF Project Team
Frank Sanchis, WMF Project Manager
Amy Freitag, Initial WMF Project Manager
Erica Avrami, WMF Director of Research and Education
Pauline Eveillard, WMF Programs Associate
Mary Kay Judy, Consultant
Ed Crocker, Advisor

CyArk Inc. Team
Elizabeth Lee
Scott Lee
Galen Kovak-Lewis

Taos Pueblo Preservation Program
Preservation Program Director: Luis F. Zamora
Supervisors: Philip Martinez, James Concha
Trainees: Nelson Duran, Brandon Lujan, Daniel Marcus,
David Martinez, Daryn Martyn, Henry Samora
Education Coordinator/Administrative Assistant: Dale Trujillo, Chris Day

WMF is deeply grateful for the assistance, supervision, and cooperation of the Taos Tribal Government Office and the Tribal Council.

Photos
Taos Pueblo, 1898