

Cultural Cartographic Archive: empowering communities through archi-digital technology

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ABSTRACT:

This paper will present research that was conducted with the goal of developing a digital archive using interactive media and open source applications to generate a multi-faceted public community database. Based in the Embudo Valley of northern New Mexico this research documents the architectural and cultural landscapes of this historic community.

The data model is a collaborative, interdisciplinary effort that re-examines the boundaries of traditional architectural research and moves towards a working model incorporating a faculty-student team whose expertise lie in a variety of disciplines. Areas of expertise include landscape architecture, historical preservation, architecture, community and regional planning, economics and demographics, informatics and digital visualization.

This demonstration project evolved into a multi-media data repository intended to both empower and enable the community to take control of their future by engaging in conversations with local and global communities.

INTRODUCTION

The project site, Embudo/Dixon, New Mexico, evolved from previous research that focused on documenting the architectural and urban evolution of Albuquerque, New Mexico. The Virtual Albuquerque Project [VAP] (Castillo 2007) was conceived around a digital media format that used a GIS (Global Information Systems) core to investigate a broad spectrum of topics related to the evolution of the urban context. A beta database formed through definition of a series of layers that created a holistic overview of the environment. The categories (or layers) that were documented in the database included architecture, infrastructure, culture, history and geography.

Based in the rural context of the Village of Embudo, New Mexico, this new research has been built on the core data structure of the urban VAP. However, with new technological evolutions, more efficient communication tools have been created that redirected our research to an open source platform. This framework allows for community input and greater flexibility in populating the datasets and documenting cultural evolution of people and place.

HISTORY OF SAN ANTONIO DEL EMBUDO

Northern New Mexico represents the remote periphery of the Hispanic New World. First explored in the late 16th and early 17th centuries by conquistadores seeking riches, these explorers instead found an arid high-desert landscape filled with indigenous people, some living in permanent and architecturally sophisticated villages or pueblos, as the Spanish called them, while others, like the Navajo and Apache, lived as hunters and gatherers. Nevertheless, the story is the same as that of the entire Western Hemisphere, that is, the land was claimed for God and the King by the dominant European group, which in this case was Spain. The first Spanish expedition to establish a settlement was that of Juan de Onate, who arrived at the Tewa-speaking Pueblo of *Ohke* (renamed San Juan de los Caballeros and San Gabriel) in 1598, establishing primarily a settlers compound. As early as 1608 Onate began moving his colonists approximately 25 miles southward to the more defensible location of present-day Santa Fe. Sections of land were identified by settlers and granted by the Spanish governor. In 1680 the Pueblo people of the area banded together and attacked the first group of Spanish colonists, killing many, driving the survivors first to Santa Fe then out of New Mexico

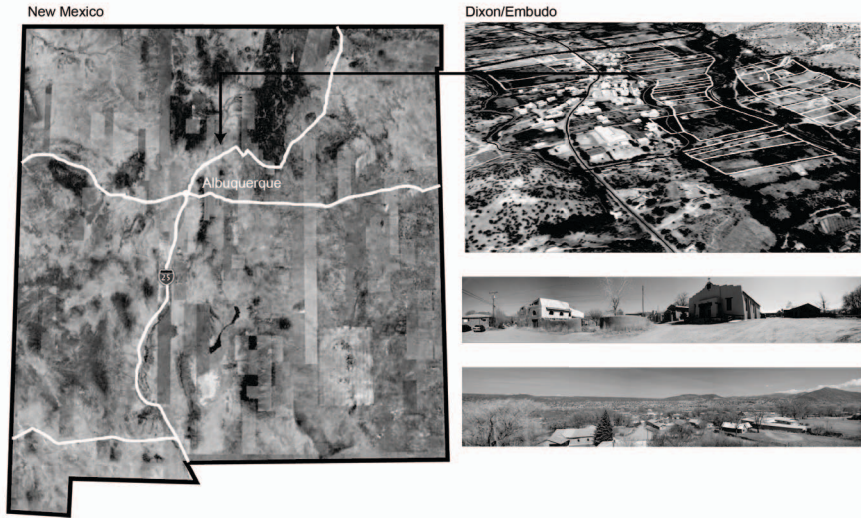


Figure 1: Research Area Map Castillo, (T.B., 2011)

altogether. The Spanish were tenacious and 13 years later another expedition of soldiers and settlers led by Diego de Vargas arrived in northern New Mexico, this time determined to stay. In 1693 de Vargas established a presidio in Santa Fe (Weber 1992) and immediately thereafter settlers were encouraged to establish villages following settlement patterns outlined in the “Law of the Indies” (Rivera 1998). The site for this research, San Antonio del Embudo, was one of a string of these land grant villages established approximately sixty miles north of Santa Fe.

The fertile land in northern New Mexico is very shallow and primarily exists in narrow riparian bands along rivers or in valleys adjacent to high mountain areas. The Embudo Watershed is formed by the steep Sangre de Cristo Mountains, the tallest peaks of which receive significant snow, enough to maintain some modest year-round snowpack. This watershed is broadest near the high peaks on the eastside of the Rio Grande gorge and narrows like a “funnel” (*embudo* in Spanish) as the tributaries drain westward towards the Rio Grande. Existing in this watershed when the settlers arrived, and inhabited still, is the indigenous Pueblo of Picuris.

The original settlers of the Embudo valley were subsistence farmers who set about the task of broadening the arable land of the valley by designing a system of *acequias* (gravity-flow irrigation ditches) that divert water at various points from the Rio Embudo to irrigate cultivated fields. This system is in use to this day.

ACEQUIAS

Both the native Puebloan people and the Tlaxcaltecan settlers who arrived with the Spanish were familiar with water harvesting techniques and dryland agriculture. However, it was the Arabic influenced Spanish who introduced their acequia tradition and with it the concept of repartamiento, that is, the system of water sharing and common ownership among the *parciantes* (irrigators) (Rivera 1998). The acequia infrastructure reshaped the New Mexican landscape and established a socio-political structure for its villages. No one owned the water, rather it was managed by the community of owners and users. Water was allocated based on its availability and the size of the *parciante*'s property. When, in 1848, New Mexico Territory found itself within the U.S. borders, its relationship to water governance changed. The system became one appropriated by priority, “first in time, first in right”. In 1907 a Territorial Water Code supported the commodification of water by allowing water rights to be severed from the land, thus furthering the erosion of community water rituals (Santistevan 2008).



Figure 2: Historical Map Dixon/Embudo 1910

Still in many New Mexican villages, and more specifically in Embudo, water distribution and maintenance of the acequias is managed by a group of community volunteers (*Comision de Acequia*) and supervised by a *mayordomo* assigned to each acequia. The mayordomo supervises the annual spring *limpia de la acequia* (ditch cleaning) as well as the schedule for and quantity of water available to each *parciante*. Along both sides of the acequias are community easements available to the mayordomo and *parciantes* 24 hours a day (Crawford 1998). Property in this region is characterized by the long lot, with a building/agricultural land ratio of 1/3 - 2/3 and an acequia system that delivers water on the property's high side. Thus water in this region shapes ritual, relationship, common and private space. Sacred space in New Mexico, as in all of New Spain, was shaped by the church and supported by the Laws of the Indies (Rivera 1998). No matter how small, nearly all of the villages in this region have a plaza with a Catholic church on one side and a *sala filantropica* (community hall) on the other (Rivera 2010); Embudo is no different. Interestingly unique to Embudo is an easement, now overgrown, linking the two spatial anchors of the valley, the plaza and the river. It is for this reason that the research team chose to center its study area on Embudo's historic plaza expanding outward approximately one-quarter mile in each direction. In doing so the study area also embraced the Plaza's adjacent acequias, the Acequia de la Plaza and the Acequia del Llano.

ARCHITECTURAL DOCUMENTATION AND THE UNEXPECTED

Developing a team that would include students from various disciplines was essential to address the broad range of topics articulated at the project's inception. Selected team members had backgrounds in historic preservation, architecture, community and regional planning, landscape architecture, economics, demographics, informatics and digital visualization. The team was well prepared to research the village's history, survey and map the landscape and the acequias in order to identify ways to assist the villagers with contemporary problems facing the acequia system. The team did find some structural issues primarily caused by invasive plant and animal species and some unfortunate engineering decisions, however, as the project progressed the team became convinced that the architecture of the waterways was endangered by a series of economic and sociological changes in the village that has unraveled the "community of interest and ethic" that until the mid-20th century had maintained an agrarian lifestyle supported physically, politically and spiritually by the acequias. The team began to recognize recurring themes, previously undocumented, that surfaced only in



Figure 3: 3d Interactive Interface , (T.B., 2010)

conversation for example 1.) the effects on the village's labor-force when the men from Embudo began commuting daily 11/2 hours each way to work at the Los Alamos Laboratory, 2.) the effect that World War II and television had on a generation that was no longer satisfied with the isolation of a small village dependent on subsistence agriculture and, 3.) the loss of cultural identity Embudo (now called Dixon) experienced when a group of newer residents initiated an art studio tour, re-imagining the village as an artist enclave. In order to identify and verify these and other historical and sociological indicators the team determined it was necessary to conduct oral interviews with the longtime residents of the area.

CULTURAL MEDIA ARCHIVE

Utilizing the information acquired from the VAP, a digital model was developed that had potential application in rural settings. The majority of the population of New Mexico still resides in rural environments providing the opportunity to recalibrate the research model to articulate and positively impact the evolution of a community. Embudo, New Mexico was selected as a rural location to pursue because of its historical diversity and the relationship of the people to the land. Primarily an agrarian community, the residents have maintained a strong cultural tradition based on a communal infrastructure of water. The acequia is a complex system of waterways that forges a democratic social network. The relationships associated with this infrastructural network provided an opportunity to use digital mapping and digital media techniques as a means of analyzing the many sociological complexities of this historic community. The map (or cartography) is a series of impressions in the form of an image seen from an extra-corporeal viewpoint-that is an opportunity for shared knowledge (Holmes 2006).

CARTOGRAPHY: MAPPING THE LAND, MAPPING THE CULTURE

One of the primary goals of this project was to create a repository of data that could demonstrate an evolution of the community and become a global forum for social interaction. The Virtual Embudo model deviated from our previous work in that *open platform* technologies would now be a primary component of the interface. The move to *open platform* emerged in a post evaluation of the VAP

project. From the community's perspective the main concern with the VAP was that it allowed for little interaction with the source data and many felt that the interface was counterproductive as a tool for social and cultural development.

The team understood these challenges and in researching open platform applications, a series of technologies began to emerge that would allow users to upload and interact with the data. Of particular interest was the use of Google Earth as a primary foundation, thus deviating from the GIS platform. GIS technologies can be problematic because information is difficult to manipulate, the interface is not user friendly and the static environment is not conducive to communal dissemination.

ORGANIZATION AND DATA COLLECTION

The primary visualization component centered on two data sets: the landscape in transformation, and the community in evolution. In establishing a documentation format, the research was divided into three major foci. The first was collecting information to support the creation of a Google Earth core. This included establishing the geographical reference point, inclusion of aerial imagery, topographic information and supported importing shape files. The second major form of data collection included establishing a bibliography, researching the literature relevant to the region, and collecting historical photographs available from various libraries throughout the state. The third initiative established a format for oral/video documentation, postproduction and video stream dissemination.



Figure 4: Google Earth Web Interface

FIELD METHODOLOGIES

The visualization data acquired early in the project was assembled to produce a virtual core structure for subsequent field research visits. Of critical importance to this research were ongoing conversations with key community members, including Estevan Arrellano, Katya Crawford, and Levi Romero, who identified assets that they felt were geographically and/or culturally important and thus warranted documentation. Understanding the political, cultural and environmental complexities within the community was a priority for all the site visits.

We began by assembling a team that would document the landscape photographically and utilize Global Positioning Systems to articulate placement in Google Earth. This was critical in defining the exact location of key built structures and the exact geographic location of the acequias. This data, which included latitude, longitudinal and elevation coordinates, was then imported directly into Google Earth and articulated in vector form to create a stand-alone 3-dimensional model in 3d Studio Max.

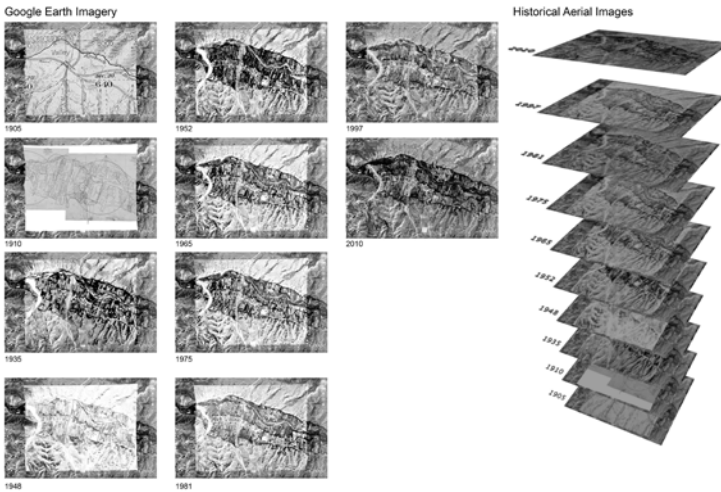


Figure 5: Historical Aerial Images , (T.B., 2011)

Photographic documentation was created in panoramic format to expand on the environmental immersive qualities of Google Earth. Each photograph was G.P.S. tagged to be geographically located and imported into the interactive interface. The Acequia del Llano and the Acequia de la Plaza were photographed in an animated series to demonstrate the relationship of the land to the water.

All video documentation was coordinated with community members to identify individuals who had been active in the Comision de Acequias. The format for the video documentation was organic in process to ensure that the conversation was genuine. The team made it a point to create a comfortable environment for each interview and allowed the individual(s) to choose the setting. The point in these conversations was to elicit memories that were shaped by the people, the landscape and the water. These documentary clips were then edited in post-production and uploaded to YouTube open platform for mass dissemination.

ARTICULATION OF THE DATA AND OPEN PLATFORM DISEMINATION

Disseminating selected material to a global environment became a project goal. While it was of primary importance to empower and assist the community of Embudo/Dixon, the team was also interested in allowing the cultural and historical evolution of this environment to be available to a broader audience. Research time was spent determining how best to utilize the Google technologies to disseminate and articulate the data.

The unique structure of Google technologies allowed us to create an interconnected data repository whose seamless interactivity enables navigation. Three major tools offered from the Google platform were primary to the development 1.) the use of Google Earth as a backbone for all layers, including all built environment 3-dimensional models, was established as the main interface 2.) the master model could then be linked to a Picasa photo archive to geospatially relate all photographic data and panoramic sets and 3.) all video documentation could be uploaded into the YouTube interface and linked to the master Google Earth model for specific location and data capture.

The flexibility of this interface allows community members and other participants of the digital environment to create subset information that may be linked to the master model. Open platform creates a new venue for historical and contemporary information to be developed thus promoting an organic growth of information that expands beyond the funded resources of this project.

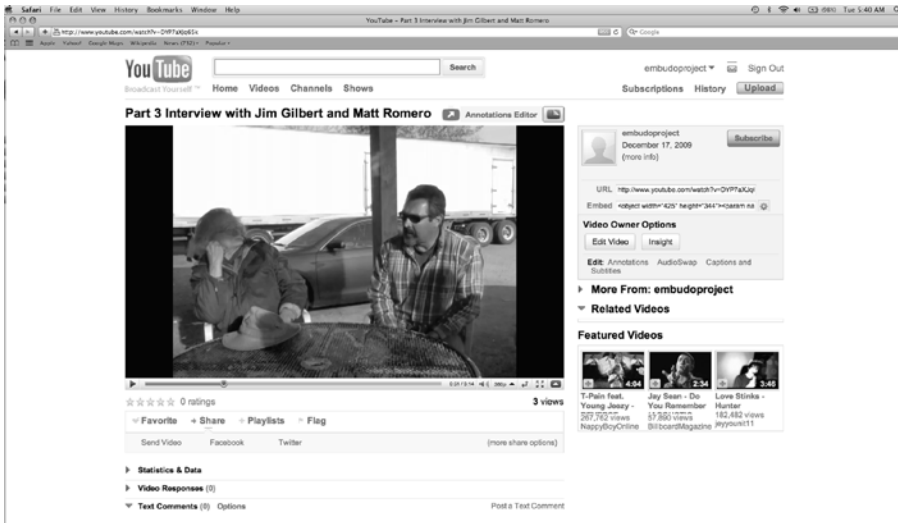


Figure 6: YouTube interview database

CONCLUSION

This model has great potential for documenting culture and historical evolution. The use of new media and technology allows for a more holistic understanding of “place”.

New Mexico is rich with historic communities whose socio-cultural history and built environments can be documented and preserved through a digital model that can migrate to an open source platform. We are interested in testing this model in other environments, thus challenging the team to understand how visual communication can be used to document cultural evolution and unique contexts. This is essential in testing the model’s transportability and capacity to serve, not only as a repository for community knowledge, but as an agent with which to sustainably shape rural environments and the actions of the community for generations to come.

REFERENCES

- Castillo, T.B., 2007, unpublished research, Virtual Albuquerque Project (VAP), Albuquerque, New Mexico.
- Crawford, S., 1998, *Mayordomo Chronical of an Acequia in Northern New Mexico*, University of New Mexico Press, Albuquerque, NM.
- Holmes, Brian, 2006, *Else/Where: Mapping*, University of Minnesota Design Institute, Minneapolis, MN.
- Rivera, J.A., 1998, *Acequia Culture Water, Land & Community in the Southwest*, University of New Mexico Press, Albuquerque, NM.
- Rivera, J.A., 2010, *La Sociedad Guardians of Hispanic Culture Along the Rio Grande*, University of New Mexico Press, Albuquerque, NM.
- Santistevan, M. 2008, *Bend in the River, the Future of Water in New Mexico in Taos Green Guide for Sustainable Living*, Sustain Taos, Taos, NM.
- Weber, D.J., 1992, *The Spanish Frontiers of North America*, Yale University Press, New Haven and London.