Traditional Ecological Knowledge: Informing Bosque Restoration at Tesuque Pueblo

by
Ian Mion,
Janice Herrera,
Travis Vigil,
Allen Duran, and
Gary Moquino
Pueblo of Tesuque

National Community Forestry Center
Southwest Region Working Paper 15

October 2004

The Southwest
Community Forestry
Research Center*

&

Forest Guild

*The Southwest regional program of the National Network of Forest Practitioners' National Community Forestry Center. The Center is a decentralized network of four regional centers in the Southwest, Southeast, Pacific West and the Northeast. This work is supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 9936200-8704. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not reflect the view of the U.S. Department of Agriculture.

Preface

The Southwest Community Forestry Research Center partnered with the Four Corners Institute to conduct a participatory research project with San Juan Pueblo. The focus of the project was to incorporate traditional ecological knowledge into the restoration and monitoring of the bosque ecosystem of San Juan Pueblo.

Martha Schumann
Southwest Community Forestry
Research Center

Traditional ecological knowledge is a body of information that indigenous people have acquired about their natural environments over long periods of time. In designing forest restoration projects, this knowledge has been largely neglected, and objectives for restoration projects have been based on scientific principles. This is a problematic approach in southwestern riparian ecosystems, where riparian forests are essentially cultural landscapes, occupied and altered for over a thousand years. Such systems lack reference conditions, benchmarks of unchanged structure and process, which can be used as target conditions for restoration work. There are no 'pristine' southwestern riparian ecosystems. Restoration then must reflect the cultural landscape that has been created by use and valuation of plants and animals in the ecosystem by pueblo people. Traditional ecological knowledge is a complementary set of knowledge that is crucial to restoration management in such settings.

The following report is a summary of a project that explored traditional ecological knowledge and values at the Tesuque Pueblo, a small indigenous community located on the Tesuque River drainage, a river branch just off the Rio Grande in northern New Mexico. The gallery forest of mature cottonwood trees, with an understory of native olives and herbaceous plant species, is now choked by a dense understory of exotic trees. To design restoration goals for this ecosystem, community members were interviewed by staff from the Tesuque Environment Department, to explore and record their past and present use and concerns about the riparian ecosystem.

The knowledge base in indigenous communities must be treated with care. This report is a summary of a larger document that was created solely for Pueblo use, which contains confidential information about plant use and sacred sites. The knowledge contained in that report will be used by the Pueblo to help design restoration treatments. The document, and audio recording of interviews, will form part of the Pueblo archives for management activities in the future. Capturing the memories and present valuation of the bosque environment at Tesuque will enrich and inform the restoration work, and provide a link from the past to present cultural landscapes.

Melissa Savage
The Four Corners Institute
1477 1/2 Canyon Road
Santa Fe, NM 87501
505-983-8515
forests@ucla.edu

BACKGROUND

The Pueblo of Tesuque is located approximately 10 miles north of Santa Fe, New Mexico, and is nestled in the soft red-brown foothills of the Sangre de Cristo Mountains. This tranquil setting obscures what has become an environmental problem of epidemic proportions. An historic drought is currently ravaging the entire Southwestern United States, with recorded impacts that have not been seen since the dust bowl in the late 1920's and early 1930's.

Many tribal elders cannot recall drier times since they were young children. The soft red-brown hills of the Pueblo have been subject to massive sheet erosion, which has left the land in a critical state. This very traditional Pueblo respects the words of its elders. This survey project is an effort to use the historical perspective of these elders and other community members to gain a better idea of how restoration projects should be designed and implemented.

The Pueblo of Tesuque Environment Department has made an extraordinary effort to develop an environmental enhancement project that will make a positive impact on tribal members and on Pueblo lands. The Pueblo community understands that long-term efforts must be made now to maintain and improve the land, water and vegetation so important to Pueblo life and well-being. To summarize this restoration work briefly, the goals are to evaluate Tesuque watersheds and develop management plans for environmental characterization, monitoring and protection activities based on this evaluation.

Remediation plans and multi-dimensional environmental monitoring and data base collection partially based on the results of this survey will lead to dramatic on-the-ground improvements in water levels, soil stability and reduced turbidity. Community awareness programs such as this will inform and educate the people on how they can restore the environment and the land to its traditional healthy condition. This survey project forms the foundation of an ongoing restoration work that will re-establish the ancient consciousness that was and is so prevalent among the Tesuque people. The results of this project, including this document, will be made available to all interested parties.

INTRODUCTION

The Pueblo of Tesuque Traditional Knowledge Project (PTTKP) was developed by the Pueblo of Tesuque in collaboration with The Four Corners Institute in order to get a better understanding of the relationships and attitudes between native persons of the Pueblo of Tesuque and the Rio Tesuque and its associated environs. The results of the project will assist the Pueblo of Tesuque

Environment Department (PTED) in designing, implementing and updating current and future restoration and community projects for the Rio Tesuque. These are projects that benefit the river ecosystem as well as the persons within the Tribe that revere, respect and utilize the river area.

The survey project consisted of a ten question survey (see attached) was given to approximately 8% of the population ranging in age from 14 to 90 years. The survey was conducted by Tribal members of the PTED over a period of two months in the spring of 2004.

STATEMENT OF NEED

Indigenous peoples throughout the world often communicate traditional knowledge through a variety of verbal and non-verbal pathways. Story telling, dance, art and song are some of the means through which elders can pass their knowledge on to younger generations. The PTTKP is an effort to gain a better knowledge of how the river has changed and the uses and significance of the Rio Tesuque as it pertains to the Tesuque Tribe. The Tribal elders have seen the river change over the years. Those elders that were willing to participate in this project did so based on the understanding that their responses to the survey would help the environment department at Tesuque develop restoration plans that best reflected the needs of the community.

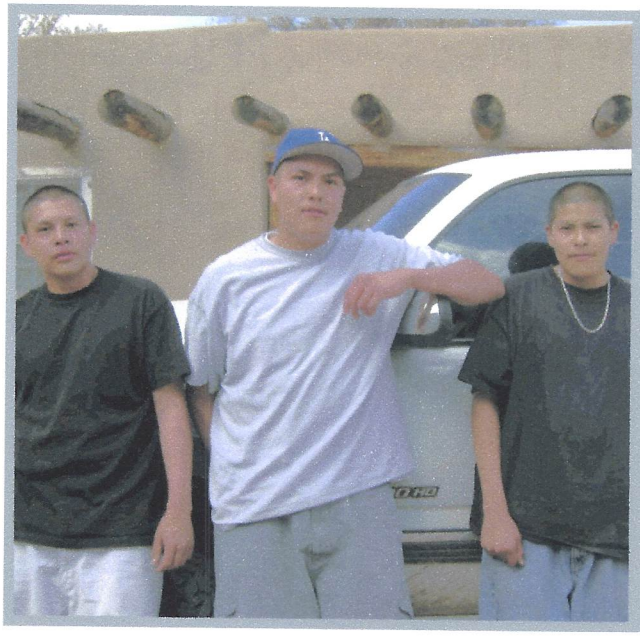
The survey project will also be useful because it takes this traditional knowledge and puts it into a format that can be used by non-Tribal persons that share an interest in restoring the Rio Tesuque and its riparian habitats. The results of this survey will also be distributed to the public. This action will allow the surrounding communities a glimpse of how their activities, particularly water consumption from well use, have changed the river area and affected the lifestyle of the Tesuque people.

METHODS

The PTED in conjunction with The Four Corners Institute chose to have the Tribal members of the PTED conduct the survey due to their familiarity with those persons being surveyed and their ability to communicate on the same cultural level.

The surveys were conducted in person over a period of one month using a survey questionnaire, a digital camera and a hand-held recorder to verify the responses. The questions were designed by the PTED to garner a variety of responses over a large spectrum of river uses and perspectives. The results of the survey were then compiled and analyzed to determine the most significant changes to the river and how they have affected the Tribe and the river environment. The responses were then broken down into percentages in order to more easily interpret the survey responses and determine the best overall conclusions. The number of respondents makes up approximately 8% of the population of the Tesuque Tribe.

The age of the respondents ranged from 14 to 90 years, this gives us an idea of how the river looked from as early as 1930. While we were most interested in the responses given by the elders due to their ability to describe the changes to the river over a long period, younger persons were interviewed as well in order incorporate a broad range of views.



SURVEY RESULTS

The general information obtained by the survey is summarized here.

Tribal persons conducting survey:	Travis Vigil Janice Herrera Allen Duran Gary Moquino
Number of respondents:	39
Male:	16
Female:	23

A LIST OF THE QUESTIONS AND THE RESPONSES IS LISTED AS FOLLOWS:

Question 1. **How do you remember the river in the past?**

100% of the respondents said that the river had high flow levels throughout the year.

Question 2. **How do/did you use the river?**

Respondents listed these activities associated with the river and its uses.Gardening; irrigation; laundry washing; bathing; cooking; drinking; swimming; ice skating; collecting rocks and driftwood; water for livestock; fishing; religious uses; collecting clay for pottery.

Question 3. **What types of flora and fauna do you remember and what has changed?**

Flora and fauna remembered by respondents: fish; cottonwoods; willows; sage; spinach; asparagus; parsley; cherry, apricot and apple fruit trees; wildflowers; amphibians; snakes; sunflowers; beaver; trout; raccoon; bobcat; badger; coyote.

What has changed? More elm trees; wider river; less water; no wild asparagus; more Russian olives; less open areas.

Question 4. **In what seasons do/did you use the river the most?**

Seasons	# of Responses
Winter	6
Spring	12
Summer	23
Fall	1
All seasons	13

Question 5. **In the past do you remember the water flow in the river?**

100% of the respondents stated that the river used to flow year-round

Question 6. **How has the water flow changed?**

100% of the respondents stated that the river has no constant flow.

Question 7. **Why do you think the water flow has changed?**

Cause	# of Responses
Upstream water users	23
Drought conditions	24
Exotic species	3
Other uses	1

Question 8. **Do you know if there are any traditional names to all or certain parts of the river?**

Poe-Tse Bu, Kon Bugeh, Poe Heygen.

Question 9. **What would you like to see in the river?**

Desired Conditions	# of Responses
More native species	8
Fewer non-native species	4
More water	30
More wildlife	3
More flood control	2
Structural changes	1
More erosion control	1
Fewer dead trees	1
Less garbage	8
Less use as a road	2
Children playing	1

Question 10. **How would you contribute to the rehabilitation of the river?**

Rehabilitation Activities	# of Responses
Keeping it clean	17
Offer prayers	4
Conserving water	1
Help with restoration projects	16
Offer suggestions	1
Not sure	3

RESULTS BASED ON PERCENT OF QUANTIFIABLE RESPONSES:

Question 1 - 100% of respondents said that the Rio Tesuque had year-round, measurable flows.

Question 4 - 59% used the river in the summer
33% used the river year-round
31% used the river in the spring
15% used the river in the winter
3% used the river in the fall

Question 5 - 100% of the respondents stated that the river used to flow year-round.

Question 6 - 100% of the respondents stated that the river has stopped flowing year-round.

Question 7 - 62% believe that the change in flow is the result of drought conditions
59% believe that the change in flow is the result of takings by upstream water users.
8% believe that the change in flow is the result of invasive species taking water.
3% believe that the change in flow is the result of other causes.

Question 8 - 77% would like to see more water in the river.
20% would like to see more native plant species.
10% would like to see less non-native species.
8% would like to see more wildlife in the river.
5% would like to see more flood control measures.

Question 9 - 21% would like to see less garbage within the river.
5% would like to see the river not used as a road.
3% would like to see structural changes within the river.
3% would like to see more erosion control measures within the river.
3% would like to see less dead trees within the river.
3% would like to see children playing in the river.

Question 10 - 44% would contribute to the river by keeping it clean.
41% would contribute to the river by helping with restoration projects.
10% would contribute to the river by offering prayers.
8% were unsure how to contribute to the river.
3% would contribute to the river by conserving water.
3% would contribute to the river by offering suggestions.

CONCLUSIONS

The Rio Tesuque has changed dramatically over time. The river area was used for a variety of activities that can no longer be conducted due to the diminished water flows. The outdoor activities such as washing, cooking and bathing are now being done indoors with the use of water supplied from wells instead of water taken from the mountain watersheds. This causes a depletion of limited underground water resources and increases reliance on non- Tribal government water allocations.

Some flora and fauna associated with the river have also been lost or significantly altered. The fish that once flourished are now gone, other food sources such as fruits, herbs and vegetables no longer grow without irrigation by Tribal members. The habitat and resources for a variety of animals no longer exists. These particular depletions have had a strong cultural effect because the animal hides and meat have to be procured from other sources further from the Pueblo, which requires hunters to spend more time traveling longer distances to find the necessary animal products for their Tribal feasts and ceremonies.

When asked why the river has changed, the majority of respondents claimed that long-term drought and upstream water users were the cause. While the effects of these occurrences are difficult to quantify there is a definite connection between the effects of drought, the depletion of ground water resources, and the current condition of the river. A depletion of ground water causes the soil to drain more easily and therefore retain less of the surface water that aids the growth of native plants and animals. Drought conditions mean less rainfall and therefore less water accumulation that creates substantial surface water flows.

The depletion of water from the river has also led to an abundance of non-native plant species such as Russian Olive and Salt Cedar that thrive in drought conditions. These invasive plants have forced the Pueblo to invest considerable time and resources in order to eliminate and control the unwanted species. The measures used to control these species, which includes the use of tractors and brush rakes, has led the destruction of native plant and animal habitat and increased the likelihood of catastrophic wildfires originating from the living and the dead and downed plant material.

The PTED is considering the desires of the Tribal members for changes in the river bosque and plans to incorporate those desires into the overall Rio Tesuque restoration projects. The main concern is adding more water to the river. More water and consistent flows would, over time, eliminate most of the problems listed above. However due to the accelerated conditions caused by drought and water takings, there is little that the PTED can in the form of remediation, rather the PTED's focus is to maintain the current conditions and attempt to keep things from getting worse.
With assistance and contributions from Tribal and non-Tribal government agencies as well as the people of Tesuque there is the potential to restore the Rio Tesuque to a state that the Tribal members find pleasurable. The people of Tesuque have shown enthusiasm for contributing their time and effort to existing restoration projects and their input is extremely relevant when it comes to designing new projects for the future.

RECOMMENDATIONS

With guidance from Tribal members, government and non-government agencies, the PTED will pursue plans to restore the Rio Tesuque to an acceptable and desirable condition. Some restoration is currently being conducted through the use of outside contractors and employees of the PTED. The perspectives and recommendations of the Tribal members is extremely important because it is their land and they will be here acting as stewards long after the current restoration projects are completed.

We recommend continuing these projects which include non-native species removal and native species planting, based on survey suggestions of Tribal members, as well as continued monitoring of new plant growth and animal populations and habitat. With regards to water depletion as a result of wells dug upstream, this is an issue that must be settled by the courts through extensive litigation. The best possibility for a resolution is to ensure that as many stakeholders as possible have a clear understanding of the issues and how their actions affect those downstream.