Seeing the Forest AND the Trees:

a Review of a Collaborative Restoration Project on Rowe Mesa, San Miguel County, New Mexico

by

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Between 2001 and 2005, a collaborative, science-based restoration treatment project – called Rincon Ortiz CFRP – was successfully implemented on three hundred acres of ponderosa/piñon-juniper woodland on Rowe Mesa, near Santa Fe, New Mexico. Equally important was the success of the social goal of the project: to involve local residents in economic and educational activities related to a forest health restoration effort so that the link between cultural continuity and the restoration of natural ecological processes can be strengthened. Combined, the goals yielded two major lessons learned: 1) how to do the work properly, and; 2) an indication that ecological restoration might not necessarily come with significant social cost and conflict.

Trouble In The Woods

Decades of fire suppression by government agencies and overgrazing by livestock, beginning early in the twentieth century, combined with unusually 'wet' years led to the development of thick stands of small trees in many our southwestern ponderosa pine forests. The return of severe drought in the late 1990s, coupled with increased public activity on forested lands, raised both the likelihood and the consequences of catastrophic forest fire.

Today, crown fires – very hot fires that result in high rates of tree mortality – are much larger and more frequent than they were historically, and often threaten human communities as well as ecosystems. As the acreage burned in destructive crown fires has increased across the West, a broad consensus that something must be done has emerged among scientists, public land managers, landowners, politicians, and members of the public, thanks to widespread media coverage of the big fires. This consensus was translated into action.

Congress, for example, has responded to this crisis by: 1) maintaining and increasing fire suppression activities across the region; and 2) funding the implementation of restoration projects on public land, especially in those areas located in the urban-wildland interface. Restoration of ponderosa pine forests includes the reintroduction of frequent, low-intensity fire. This usually requires fuel reduction through thinning and burning in prescribed fires.

But restoring southwestern forests presents agencies with a variety of challenges.

In the first place, fire suppression is becoming increasingly difficult, ineffective, and costly, especially as human encroachment into the woods expands in the form of new and enlarged homes. There is also the public's concern that prescribed fires might burn out of control. Linked is a growing concern about air pollution among the public – all of which reduces the ability of land management agencies to set prescribed fires or manage for natural (lightning-sparked) fire regimes.

Secondly, there is now a scientific consensus that we need to work at a scale that will make a difference across large landscapes. "We can no longer constrain our thinking to hundreds

of small, independent fuel-reduction projects," writes Dr. Tom Sisk and others. "We need coordinated, strategic efforts linking individual projects to the larger objective of managing landscapes."

But working at a landscape scale means more than simply knowing which tool to pull from the restoration toolbox; it means collaboration, education, and communication. For example, working across jurisdictional boundaries – federal, tribal, state, county, municipal, and private – requires a complex democratic process where diverse values drive decisions.

Lastly, successful ecological restoration will require the integration of scientific knowledge with local traditions, wisdom, and economic activities. While we have today a wealth of forest management experience, sound ecological understanding, and increasingly powerful tools for landscape planning, the main challenge is implementation – which requires a wholly different set of skills and depends as much on economics, politics, culture, history, and human relationships as it does on geology, ecology, and precipitation.

This is where a three-hundred acre restoration project on a mesa southeast of Santa Fe, New Mexico, comes in: to explore the blending of science and culture in a successful demonstration of implementation.

Scientific Underpinnings

The science behind the Rincon Ortiz Community Forest Restoration Project (CFRP) represents a consensus of decades of research on ponderosa pine forests in the Southwest. This consensus falls along two lines: first, that these pine forests have been radically altered by human activity which has resulted in dense populations of young trees increasingly vulnerable to destructive crown fires; and second, that there a strong sense of urgency that these forests be restored to an ecological condition called the 'natural range of variability' (NRV), as quickly as possible.

Young pinyon pine and juniper trees have recently encroached into natural meadows.

Much of this consensus is summarized in a paper "Ecological Restoration of Southwestern Ponderosa Pine Ecosystems" by Dr. Craig Allen, and others.

According to the authors, anthropogenic change in forests over the past century-and-a-half, due to the effects of overgrazing, fire suppression, logging, and road construction, have substantially altered the ecological structure, composition, and the fire regime of southwestern forests.

For thousands of years, prior to these changes, southwestern ponderosa pine forests were shaped principally by frequent surface, or "cool," fires, as well as periodic droughts, wet spells, and insect infestations. After the arrival of the railroad to the Southwest in 1880, which opened national markets for local meat, wood, and wool, major alterations of forest structure and function took place.

If these conditions and trends are allowed to continue, they argue, serious ecological damage to ponderosa pine ecosystems will accumulate. Restoration efforts to date have not been sufficient so far. "Although prescribed fire programs have been underway for several decades," they write, "the scale and intensity

of these restoration efforts have been inadequate to reverse the overall trends of degradation in Southwestern pine forests."

The key to effective ponderosa pine forest health is the restoration of the key ecological process of frequent, low-intensity fires, to what is called the 'natural range of variability' – or the degree to which a system can absorb disturbance before it shifts into a fundamentally different behavior.

To the authors, there are two keys to restoring the NRV in Southwestern ponderosa pine forests. The first is to aim at heterogeneity, which they describe is a diverse, mosaic-like landscape of variable tree densities, including some areas of relatively high densities, which can accommodate a diversity of wildlife species.

The second key is getting fire back on the land.

"In the long term," they write, "the best way to align forest conditions to track ongoing climate changes is to restore fire, which naturally correlates with current climate. Some stands need substantial structural manipulation before fire can safely be reintroduced, but in many cases fire can then do the preponderance of the work of ecological restoration, recreating the natural interaction of structure and process."

They consider a successful restoration to be one that sets ecological trends in the right direction, which in ponderosa pine forests means reducing tree density and ladder fuels, protecting large trees, restoring surface fires, and increasing ground cover and overall biodiversity levels.

The need for action at the landscape scale is urgent. The consensus on the "why" of restoration is clear. Now the question is: how does implementation actually work – while acknowledging that there is no single way to achieve restoration?

Community members harvest small-diameter trees for fuelwood.

While the foundation of scientific knowledge about restoring pine forests in the Southwest to health is strong enough now "to get started," the challenge is to mesh this knowledge with local culture and economics in order to create long-term benefits for all.

On this front, northern New Mexico has both an advantage and a disadvantage. Its advantage is that much of its rural population maintains a strong link, both economically and culturally, to the land.

For example, in a recent report on livestock ranching in the region, researchers Carol Raish and Alice McSweeney wrote: "The permittees with whom we spoke consider the ranching way of life vital to maintaining their cultural heritage and traditional values, as well as to passing those values on to future generations. There is a strong sense of responsibility to land, livestock, family, and community, with land often viewed as part of the family and upholding traditional values are regarded more highly than material possessions or monetary gain."

The disadvantage is a century of hard use of the land – overgrazing by livestock after 1880, for instance. This is precisely the type of anthropogenic change that the scientists say contributed to the disruption of natural fire conditions in the region's ponderosa pine forests.

As historian Bill deBuys has pointed out, overgrazing was not the only woe afflicting the land.

"The mountain forests also suffered destruction on a large

scale," he writes, "often with severe damage to soils and watersheds. Loggers...cut the timber from tens of thousands of acres, with no thought for regeneration, in order to satisfy the territory's ferocious appetite for railroad ties, mine props, and sawtimber."

This historical condition is not peculiar to northern New Mexico, however. Short-sighted hard use, he observes, has a long history around the globe.

Nevertheless, the lesson he takes from the mountains of northern New Mexico is this: "Self-restraint was self-punishment: it inevitably allowed someone else to reap the harvest, and the riches, first. Until the government stepped into the business of land management, the western commons were harshly abused, both by those who cared nothing for the land and by those who loved it."

For Rowe Mesa, the era of federal management began in 1906 when Forest Assistant H. O. Stabler officially proposed including the mesa in an expansion of what was then called the Pecos National Forest. He listed two reasons principle reasons for the additions: 1) proper regulation of the range for livestock interests; and 2) the conservation of timber resources.

It is worth quoting some of his observations here:

"On the northern part of Glorieta Mesa some of the piñon is large enough for ties and in a few years it will certainly pay to cut it. In many places it seems probable that a thinning of the juniper and piñon would lead to reproduction of the pine. When stumpage prices become still higher and the private holdings are exhausted there will be a demand for this timber."

"There have been no fires of any consequence in any part of the proposed addition, at least, there have been none for a great many years. Evidence of light ground fires is occasionally seen but these covered only small areas."

There is some controversy about the cultural bias built into these, and other, observations made by non-indigenous foresters of the era. What is beyond dispute, however, is how they reflect the growing mood in the early twentieth century across the nation for protection of natural resources by the federal government for regional, and national, constituencies.

What is also beyond dispute is the conflict that arose eventually from the clash of interests of local villages, the federal land agencies, and urban-based recreational and environmental groups.

Meshing the historical and economic needs of an area in which poverty persists while achieving natural resource sustainability and protection remained an elusive goal. And too often, the natural resources themselves took the brunt of the conflict.

As an example, deBuys cites

Spreading the word on forest restoration was an important part of the project.

the issue of fuelwood gathering. By the late 1960s, he says, the woodlands of the Sangre de Cristos had been devastated by centuries of unrestrained firewood cutting and range conversion activities (chaining, for instance).

In the late 1970s, the Penasco District of the Carson National Forest inventoried its woodlands and determined that 250 cords of green piñon-juniper wood could be harvested sustainably each year. Then they checked the permits being issued for fuelwood and discovered that over 1700 cords were being cut annually, almost all of it by local villagers. Almost certainly, an additional amount was being cut unofficially.

In sum, deBuys drew two lessons from the history of land use in northern New Mexico.

"The first is that in some instances a measure of ecological harmony and stability can only be won at the painful cost of cultural and social conflict. It is also clear, however, that a society cannot long preserve its culture without also conserving the resources that give it life."

Thus, the question of "sustainability" – as well as ecological restoration – in northern New Mexico is inextricably intertwined with issues of economic necessity, history, regulation, protection, and land health, as it is in many other parts of the globe.

CFRP

In 2000, partially in response to an escalating clash of interests in the forests of northern New Mexico, Congress passed the Community Forest Restoration Act, sponsored by Senator Jeff Bingaman (D). The purpose of this Act is to fund projects on public lands that restore forests, improve the use of small trees, collaborate with multiple stakeholders, implement best management practices, monitor results, reduce the threat of wildfire, improve watershed conditions, and create jobs and training for local communities.

In 2001, a proposal from the Four Corners Institute and the Conservation Fund, owner of the Valle Grande Grassbank on which the restoration project would be located, was approved by the CFRP Review Committee. The goals of the project included:

- Estabish conditions that will sustain low-intensity fire on a regular, frequent basis similar in effect and timing to those that occurred within a range of natural variability before significant fire suppression activities.
- Reduce excessive fuel loads in ponderosa pine stands in order to create more natural structures and reduce the risk of crown fire.
- Provide a scientifically-guided fuelwood program for local community users.
- Bring together people with a wide variety of perspectives on forest use, including people from neighboring villages and ranches.
- Create training opportunities for members of a youth

Thinning small trees left large amounts of slash on the forest floor. Fuelwooders and control fire were needed to remove the slash.

crew who will participate in the restoration by preparing the site for prescribed burning after fuelwood collectors have thinned the site.

- Burn the treated site in a prescribed fire to remove slash and create conditions for a natural low-intensity fire.

The methodology included: the creation of a treatment design based on ecological principles, including the retention of big and old trees; thinning and slash clean-up implemented by local crews directed by Forest Guild; removal of downed wood by local community fuelwooders; a prescribed burn in the appropriate season conducted by the Forest Service; and educational outreach conducted by The Quivira Coalition.

"The greatest benefit of the project lies in the potential to inform and educate stockmen and residents of northern New Mexico villages about the pathways of forest degradation," wrote Melissa Savage in the project proposal "and to persuade them that forest rehabilitation is the most important tool for creating a defensible space for protection from crown fire and the most secure basis of a sustainable livelihood."

There were other benefits. Environmentalists would be exposed to the real needs involved in making a living in small northern NM towns, and the collaboration would bring together rural and urban cultures in a way that can foster a common understanding of healthy ecosystems supporting sustainable livelihoods.

"The project has the potential to change fuelwooding behavior and to persuade fuelwooders that they can be a positive force for landscape renewal," Savage concluded. "The project will demonstrate that ecologically sound treatment can occur in the context of resource use and economic benefit."

Rincon Ortiz

At 7500 feet in elevation, Rowe Mesa is characterized as a woodland environment interspersed with upland meadows. The project area was a woodland environment consisting of stands of pinon-juniper and young to middle-aged ponderosa pine, dense scrub oak, and sagebrush meadows. The overstory is composed of piñon pine, oneseed juniper, mountain juniper, ponderosa pine, and Gambel oak. The understory consists of blue grama, sideoats grama, ring muhly, snakeweed, cheatgrass, prickly pear, sagebrush, and cholla.

The climate is semiarid and arid continental with low humidity. The area experiences moderate to strong winds and most of the precipitation falls in the summer monsoon season. Warm summers and cold winters predominate, with large diurnal temperature swings. The average annual precipitation is 17 inches.

Culturally and historically, Rowe Mesa has been the site of human activity for over 10,000 years. A recent archaeological survey of Pecos National Historical Park, located below Rowe

A prescribed fire burns beneath the canopy of a restored ponderosa pine stand.

Mesa, documented sites from every significant period of northern New Mexican history, including hunter-gatherers of the Folsom Period (10,000 B.C.), the rise of village formation in the early Puebloan Period, (600-1100AD), the rise of the imposing Pecos Pueblo (1100-1600AD), the period of Hispanic colonization and homesteading (1600-1846), the Anglo-American period (1846 to present), as well as Santa Fe Trail ruts, a Civil War battlefield, a historic archaeological excavation at Pecos Pueblo, and modern activity.

By its proximity to Pecos Valley, as well as its abundant game, fuelwood, and other natural resources, Rowe Mesa felt the collateral effects of all this human activity. For example, during the early, and often violent, contact between Spanish conquistadors and native populations (1540-1598AD), the inhabitants of Pecos Pueblo often fled to Rowe Mesa for refuge.

The Rincon Ortiz CFRP began in 2002 with the issuance of the Scoping Notice by the US Forest Service, as required by the National Environmental Policy Act (NEPA). Here is an outline of subsequent activity:

- Baseline archaeological and biological assessments were conducted (2002)
- A forest thinning prescription was written (2002)
- Thinning was implemented by a commercial crew (2002-2003)
- A YCC crew scattered slash and raked needles away from big trees (2003-2004)
- Fuelwood gatherers removed downed wood (2003-2004)
- A prescribed fire was successfully implemented in the project site (Spring 2005)
- Pre- and post-treatment monitoring was conducted (2002-2005)

In 2005, Steve Harrington, of Forest Guild, which coordinated much of the thinning work, conducted a review of the project's economic outcomes. They include:

- Service contracts were filled by commercial operators from the towns of Mora and Tres Piedras. Local crews treated 165 acres by felling trees according to a restoration prescription. The thinning work totaled $220/acre. Slash treatment on 80 of the 150 acres was conducted by two crews...the total cost was $125/acre. Slash treatment on the remaining 70 acres was done by A YCC crew, for $46/acre.
- Seven youths in the YCC crew were trained in restoration activities and performed slash treatment.
- A locally-based ecological restoration curriculum was also developed for use in local elementary and high schools.
- Public meetings, workshops, tours and field days engaged roughly 60 stakeholders, from adjacent communities and Santa Fe and further afield.

While an exact count of individuals participating in restoration practices on the ground is impossible, it can be assumed that between the various crews and fuelwooders there were roughly 150 or more. About 200 newsletters were distributed.

A restored forest stand, with an open, sun-dappled forest floor.

Harrington concludes:

"The Project was clearly successful in achieving a number of its goals. The Project provided work and resources to several work crews and over 100 fuelwooders and grazers, as well as consultants and other professionals. Dozens of rural families were provided with an important source of heat and fuel. The project also provided understanding and experience with restoration practices to dozens of rural stakeholders."

Monitoring specialist Will Barnes conducted both pre-treatment and post-treatment monitoring assessments of the ecological conditions. They include:

- Pre-treatment data show tree density to be between 240 and 308 stems per hectare. Mean diameter at breast height was 4.7 inches for piñon and 9.6 inches for ponderosa.
- The majority of the piñon and juniper trees in the forest were less than 100 years old.
- Pre-treatment grass cover ranged between 15% and 18%, while forb cover was less than 1%. By contrast, grass cover in 2001 in the piñon-juniper savanna across the road from the Rincon Ortiz project area ranged from 43% to 46%, while forb cover ranged from 5% to 6% (Barnes 2004).
- Data collected in June of 2005 from the control sites describe a system in continuing decline. Forest density increased from 308 to 352 stems per hectare.
- The treatment sites present a marked contrast. Estimated forest density in the declined significantly from 240 stems per hectare to 95 stems per hectare.
- In the overstory, the changes are more dramatic, and where piñon pine had been the dominant plant by almost three to one over ponderosa, now ponderosa outnumbers piñon by two to one.

Barnes concludes: "This series of treatments was clearly effective at re-structuring the overstory in this forest. The overstory canopy is now dominated by widely spaced mixed age ponderosa. The size of the trees has increased, while the density has decreased substantially. There are now wide gaps in the canopy, more space and light for understory production."

Local Impressions

In the summer of 2004, Armando Nieto, a graduate student at Colorado State University and an intern with The Quivira Coalition, conducted interviews with nineteen grazing permittees and sixteen free-use-permit fuelwooders about the educational effectiveness of the project. Some of his findings include:

- The majority of respondents recognized the role of restoration treatments in the health of the ecosystem and in the maintenance of their livelihoods, and expressed strong support for further treatments with continuing community involvement.
- By their own estimates, 50% of respondents gathered one-and-a-half to two cords of free fuelwood in the fall of 2003. 25% (four) collected three cords. The remainder either collected one cord, or were not sure how much they collected. Nearly all (15) reported using the wood exclusively for personal or family use.
- Only six out of 15 interviewees reported having been informed about any forest restoration projects being carried out on Rowe Mesa. Two said they learned about the CFRP project when they obtained their permit at the Ranger office. One learned from a sign at the project site.
- Thirteen respondents agreed that there was a link between the wood collecting they did under the free-use permit and the health/condition of the forest. Five interviewees commented that the wood collecting helped reduce fire threat in the area; three thought it helped improve grass production and grazing. Ten saw room for improvements to the project.

Nieto concluded: "The Rincon Ortiz project succeeded in changing perspectives and informing the stewardship ethic of public land users in the community. Still, opportunity abounds for in-

creasing the involvement of the stakeholders in future restoration projects."

He also recommended that for these projects to continue functioning in a way that meets their goals and has a beneficial effect on their stakeholders, multi-party monitoring of socioeconomic and ecological effects should remain an integral part of all forest and range restoration projects.

"As an element of adaptive management," he writes, "monitoring is the only way to know where to take the next step, and without effective monitoring, restoration projects run the risk of losing sight of their mission, neglecting their intended beneficiaries, and allowing the continuance of the socioeconomic and ecological trends they originally sought to halt."

Lessons Learned

First and foremost, there is an important lesson to be learned from the Rincon Ortiz CFRP about how to do restoration. The science of forest ecology has a great deal to tell us about potential prescriptions for restoration: ideas about how many trees to remove, what size trees to leave behind, what to do with the slash, when to burn, how often to burn, how and what to monitor. But it is often at a loss about how to go about doing the work in a way that engages both local communities and the profit motive.

The Rincon Ortiz project addressed both successfully. The prescription employed in the project successfully reversed the degradation of forest function, as the initial round of post-treatment monitoring demonstrated. It is probably safe to say that the threat of catastrophic crown fire has been significantly reduced as a result of the treatment. Whether or not a 'natural' fire cycle can be restored over the long-run remains to be seen, but early indications suggest that it is on the right track.

The social element of the restoration work seems to have been successful too. In a sense, the main goal of the project was not simply to treat a patch of forest but to develop local capacity to do restoration work. This was accomplished by the employment of local crews in the thinning work, including a youth corps. The role of the fuelwooders in the project also demonstrated a successful blending of cultural tradition with scientific prescription.

The successful combination of the two, social and scientific, leads to a second lesson learned: that "ecological harmony and stability," as author and historian Bill deBuys has described it, might not necessarily come with significant social cost and conflict.

Forest rehabilitation and social stability, and social justice too, are not zero-sum activities – for one to advance, the other must retreat. On the contrary, the integration of centuries-old economic activity with the latest scientific thinking about forest health can be accomplished relatively smoothly.

Which brings us to the third lesson: the key to success is education, mutual respect, collaboration, and the willingness to learn among the partners. In our experience, the value of collaboration primarily lies with its diversity – each person or organization involved will bring a unique perspective to bear on the problem at hand. For these perspectives to be effective, however, mutual respect needs to be in operation, especially a willingness to consider ideas that challenge set opinions.

Fourth lesson: on public land, restoration must be a collaborative effort. The capacity of the Forest Service to do restoration work is inadequate to the scope and scale of the challenges. The Rincon Ortiz CFRP demonstrated that a public/private partnership can work smoothly when everyone brings a part of the solution to the table.

Fifth lesson: monitoring must never stop, even if the project does. But the money for this type of work is always short.

Despite the project's successes, however, it needs to be noted that there is no 'silver bullet,' or set prescription, for restoration work in ponderosa pine forests. Local variability – socially, economically, and ecologically – will necessarily influence the restoration activity. Restoration

should be placed-based. While we have a great deal of ecological knowledge now it is by no means complete. As a result, all implementation actions need to be reviewed and modified as local conditions warrant. In other words, restoration is a process, not a product. It is an open-ended learning experience, and as such requires humility, flexibility, and, above all, perseverance.

In its experimental blend of jobs, science, culture, outreach, and implementation, the Rincon Ortiz CFRP opens a small, but important, window on the potential of future restoration work in ponderosa pine forests. The main challenge will be developing strategies for 'scaling up' the project to a point where treatments can be effectively conducted at a landscape level. And it is only at this scale that serious progress can be made on the ecological and economic fronts.

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