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Forest Restoration across the U.S.

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Watersheds, Forestry, and People: A Hayfork, California Restoration Partnership

by Nick Goulette

As director of the Watershed Research and Training Center (WRTC), a small local conservation and community-development organization, much of my work focuses on forest and watershed restoration. Restoring resilience to the ecosystems of Big Creek and forging community and institutional relationships to provide for its long-term stewardship have been long-standing personal and organizational goals.

I was trained as a forester and I can't help but think about silvicultural prescriptions when it comes to strategizing around forest restoration. That feels so much like seeing the trees for the forest. However, searching for fungi, scanning the understory, noting the patterns of understory plant communities, the runs of small mammals, tracks and scat, seedlings and duff, and the complexity and connections of it all, always helps to bring me back to seeing the forest for the trees. And for the watershed, for that matter.

Humans have long interacted with the forests and streams of the Big Creek watershed that have provided subsistence for the local Nor-Rel-Muk people and, later, livelihoods for Euro-American immigrants. Unfortunately, the latter group (of which I'm a part) may have taken more in so short a time frame than the system could sustainably provide. Spotted owls and salmon aside, the ability of these forests to accommodate natural disturbances such as wildfire and climate change and still provide minerals and fiber for society and water for the people of Hayfork has been compromised.

Since 2005, WRTC has been coordinating an effort to plan for and restore the Big Creek watershed. With funding through the North Coast Regional Water Quality Control Board, we have taken a unique approach to watershed restoration, making the case for restoration of upland forest communities to reduce the risk of stand replacing wildfire. WRTC believes that wildfire risk reduction is at least as important as more traditional

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forest **GUILD**
P.O. Box 519
Santa Fe, NM 87504
505-983-8992
505-986-0798 (f)
www.forestguild.org

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Dear Forest Guild members and friends,

February was a good month for 20 landscape-scale forest restoration projects that received funding through the Collaborative Forest Landscape Restoration Program. The commitment of funding from the USDA Forest Service is a strong signal that landscape-scale forest restoration is an agency priority. The funding is also recognition of the countless hours and tireless effort on behalf of the collaborative groups who put these projects together.

These forest restoration projects were selected for funding in part because the restoration activities are based on best science and the collaborative partners have achieved a zone of agreement on what forest restoration is for the affected forest types.

Forest Guild staff in New Mexico were fortunate to work as part of the collaborative that developed the Zuni Mountains Collaborative Forest Restoration project funded this year. The Zuni Mountains collaborative dates back almost ten years, and project partners have largely figured out what needs restoring in ponderosa pine systems and how to do it. The process of reaching consensus on restoration didn't happen overnight but was forged over time using the best available science.

Ecological restoration is the practice of renewing and restoring degraded ecosystems. It is important to get forest restoration right ecologically. For forest restoration to be successful, it often has to be economically and socially acceptable as well.

This issue of *Forest Wisdom* explores forest restoration from different perspectives and geographies and provides insight into balancing ecological restoration with the social and economic needs of forest management. As several authors point out in their articles, the task of identifying appropriate ecological restoration is challenging when presented with less than ideal scientific and historical information. It is the role of the forest manager to utilize the best information available, make informed decisions, and then assess to what extent the restoration goals have been met.

Forestry is an art and a science and not a perfect science. One of the principles of the Forest Guild that seems appropriate in the context of ecological forest restoration is the recognition that human knowledge of forest ecosystems is limited and that responsible management that sustains the forest requires a humble approach and continuous learning.

Michael DeBonis, Executive Director

road decommissioning, culvert replacements, fish passage projects, and water delivery system upgrades. In our grant proposal, we cited the now well-documented example of the City of Denver's trials with the impacts of high-severity wildfire in their municipal watersheds, first with the Buffalo Creek Fire in 1996 and the Hayman Fire in 2002 (Colorado's largest on record at 138,000 acres).

The resulting damage from the two fires forced the Denver water utility to spend more than $31 million on water-quality treatment, sediment and debris removal, reclamation techniques, and infrastructure projects (Santa Fe Watershed Association, 2009). As recently as 2010, Denver Water dredged the Strontia Springs Reservoir to remove more than 625,000 tons of sediment that had flowed into it following the fires at an additional cost of $30 million.

Much like our own Big Creek, Denver's forested watersheds are composed of primarily National Forest system lands administered by the U.S. Forest Service (USFS). Could Denver's watershed have been more resilient had managers focused on reducing forest density and restoring fire-resilient structure at the stand and landscape levels through strategic thinning and controlled burning? I believe the answer to that question is yes.

Big Creek Integrated Watershed Management Planning

In late 2005, WRTC initiated "integrated watershed management planning" for Big Creek. At 20,000 acres, the upper 80 percent of the watershed is managed by the USFS, while the lower reaches are comprised of smaller private holdings and one small subdivision. Since Hayfork's water is diverted into a smaller adjacent sub-basin, we included it in our planning process as well, bringing in local water district lands and small tracts owned by the Bureau of Land Management (BLM). We began by forming a multi-stakeholder partnership known as the Big Creek Watershed Management Collaborative made up of a diversity of local landowners, land managers, and interested residents. Over the course of the three-year assessment and planning process, this group helped us to prioritize assessment needs, vet findings, settle on watershed and forest management goals and objectives, and educate the community about the importance and value of the watershed and its ecosystem.

Analyzing fire risk and hazard in the upper and lower watershed by using existing data-sets combined with targeted field validation,

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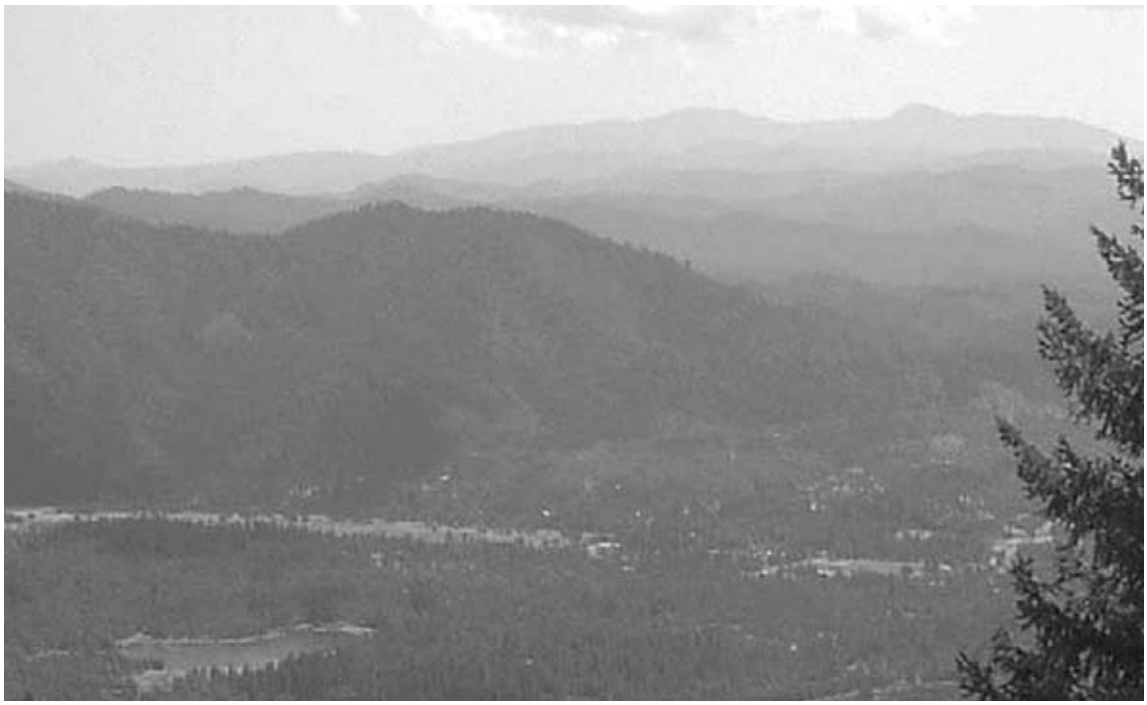

Nick Goulette
Nick is executive director of the Watershed Research and Training Center in Hayfork, CA. A professional Guild member, Nick is a Maine native and graduated with a degree in forestry from the University of Vermont in 2004.

At left, seen through the dense mixed conifer forests of upper Big Creek, Ewing Reservoir's small footprint is tucked into the meadows, oak woodlands, and wildland/urban interface of the Hayfork Valley.

Cover photo at top, partners and local citizens tour lower Big Creek to develop collaborative recommendations.

Cover photo at left, WRTC Watershed Program Manager Josh Smith completes a channel survey for a permanent monitoring station as part of the Big Creek Watershed Assessment Project.

Photos by Ben Letton.

At right, pine plantations can be restored to diverse, mixed forest. Photo by Josh Kelly.

Not All Restoration Projects in the Southern Appalachian National Forests Are Equal

by Sarah A. Francisco

Sarah A. Francisco

As senior attorney and national forests and parks program leader for the Southern Environmental Law Center, Sarah works primarily to protect and restore the national forests and other public lands in the Southern Appalachian Mountains. She is a graduate of Mary Baldwin College and the University of Richmond School of Law.

The U.S. Forest Service (USFS) is increasingly engaged in ecological restoration of national forest lands. In the Southern Appalachian Mountains, these efforts range from landscape-scale assessments to site-specific projects. The Southern Environmental Law Center (SELC) is one of many conservation organizations working in this region that generally support valid ecological restoration on national forests. However, "restoration" is a popular term that sometimes is misapplied, and we may challenge actions we believe are wrongly labeled as restoration and that we think would be damaging to the ecosystem in question.

Definitions and Criteria

SELC uses the Society for Ecological Restoration (SER) International's definition: "Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed."[i] The USFS also adopts this definition and elaborates on it to recognize that restoration promotes ecosystem sustainability and resiliency.[ii]

These definitions coupled with SELC staff observations of individual "restoration" projects gone awry have led us to develop several criteria that we believe are useful for screening restoration proposals on national forests. Several of these factors were informed by SER's *International Primer on Ecological Restoration* and the instructive article, "A Citizen's Call for Ecological Forest Restoration: Forest Restoration Principles and Criteria".[iii] This is not intended to be an exhaustive list of relevant factors nor a litmus test.

1. Restoration projects should be located on sites that are ecologically appropriate for the desired ecosystem.

A reference condition – a description of the desired ecosystem which is the goal for restoration – should be identified.[iv] This should be based on the natural conditions formerly existing at the site. For Southern Appalachian national forests, we firmly believe that natural conditions, i.e., those prior to European settlement and the resulting massive alteration of the landscape, are the appropriate reference. Reliable conclusions about

those conditions can be drawn from historical and other sources, and, perhaps most importantly, the site's characteristics (slope, aspect, elevation, soils, precipitation, etc.), which often point to certain forest communities associated with those site types.

2. Restored ecosystems should be as self-sustaining as their references.[v]
Sometimes ecosystems need maintenance, for example, prescribed fire in fire-dependent natural communities where fire has been suppressed. However, SELC is skeptical about so-called restoration of ecosystems that will require frequent maintenance in perpetuity. If there is little chance that the desired ecosystem can be self-sustaining, it probably signals the project would not result in a naturally existing ecosystem.

3. Restoration projects, particularly experimental ones, should begin at relatively small scales.
Management activities may have adverse impacts, and the benefits of experimental restoration projects may be unknown. A pilot scale provides opportunities to test trade-offs and to learn with lower stakes.

4. Outcomes must be measurable.
As the USFS recognizes, "Adaptive management, monitoring, and evaluation are essential to ecological restoration."[vi] By definition, adaptive management requires "clearly identified outcomes and monitoring to determine if management actions are meeting desired outcomes and if not, to facilitate management changes…"[vii] For example, a proposal to restore a particular forest community should set specific objectives for vegetation structure and composition and should commit to project-level monitoring and evaluation to determine whether those objectives have been met. In some circumstances, a restoration project may have adverse impacts outweighing its benefits, e.g., if new road construction in mountainous terrain is needed to access a restoration site, that may well adversely affect soil and water resources, increase ATV/OHV use, and spread non-native invasive species; and so may do more harm than good.

5. Restoration should not be confused with two entirely different terms – regeneration and collaboration.
A regeneration timber harvest may serve other legitimate purposes, such as producing wood products. However, it will not be ecological restoration if proposed, for example, in late-successional or old-growth forest exhibiting few or no signs of ecological damage or departure from reference conditions, and if the goal is to reproduce a similar stand. Regarding the project planning process, a collaborative process involving all interested stakeholders is usually best. However, collaboration and restoration are not synonymous. A collaborative process does not automatically result in sound ecological restoration.

Three examples

SELC and Georgia ForestWatch (GFW) have been involved in a series of open woodland restoration projects undertaken by the USFS in the Chattahoochee National Forest in north Georgia. These projects involved creation of open woodlands via commercial timber harvest to remove the majority of the canopy, followed by prescribed burns every three-five years, indefinitely, to prevent regeneration.

The first project was originally proposed as open woodland restoration on about 740 acres. SELC and GFW thought the scale was too large, particularly given the experimental nature of woodland restoration in this region. Moreover, the site was not ecologically

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Above, this northern red oak is typical of those found on the first woodland project site.
Photo by Darren Wolfgang, Georgia ForestWatch.

"SELC uses the Society for Ecological Restoration International's definition: 'Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.'"

Restoration plans based solely on a review of relevant literature implicitly assume that the published results from similar or nearby sites provide an appropriate model for the site to be restored.

At right, collecting a core sample from an American Beech for forest history analysis. Photo by Megan Buchanan

On facing page, fire scar on an oak tree. Photo by Stacy Clark.

Forest Restoration: The Importance of Place-Based Ecological Histories

by Justin Hart, PhD and Megan Buchanan

Forest restoration is typically defined as returning a forest ecosystem to a prior state. The decision to restore a forest is value laden as it assumes the site has been degraded, that the degradation was anthropogenic, and that the prior condition is more desirable than the current one. Thus, when a restoration project is implemented, the decision has been made that direct human management is needed to recreate an ecosystem that has been degraded by human actions. Certainly an increasing number of forest managers are deciding that a prior ecosystem state is more desirable and are opting to implement restoration activities.

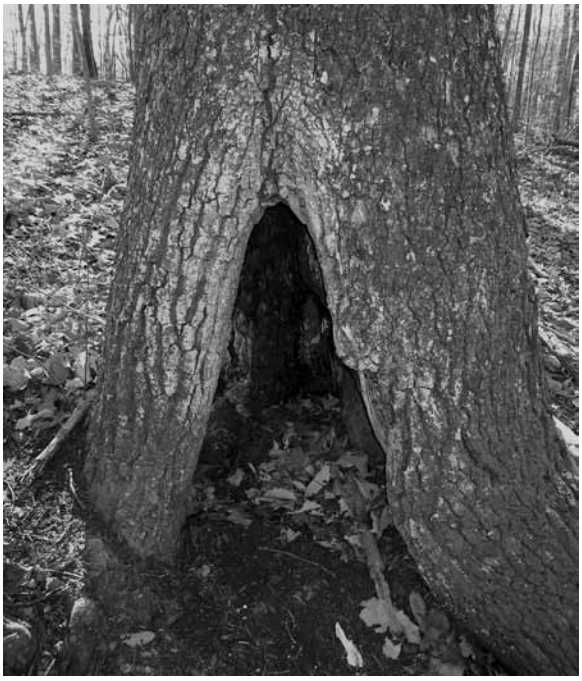
Some forest restoration projects have relatively simple and straightforward goals. Examples from the eastern U.S. include the reintroduction of American chestnut, the removal of Chinese privet or other alien species, and the conversion of even-age loblolly pine plantations to complex structures containing more diverse species assemblages. Although the success of these projects can be quite complicated (e.g. establishing viable populations of a functionally extinct species), the goals of the projects are basic, in large part because they are supported by a known history of the site. In the American chestnut example, the site types on which the species occurred within its historic distribution are known. Therefore, the appropriate locations for out plantings are readily identifiable. In the Chinese privet example, the species is not native to the U.S. and it negatively influences native tree regeneration and ecosystem functioning. Thus, eradicating the species from an ecosystem is necessary in restoring the ecosystem to a prior state (the restored site will, at the least, resemble the pre-invasion condition). Although loblolly pine in the Southeast certainly historically occurred in even-aged stands, loblolly pine stands with higher tree species richness and more structural complexity certainly existed as well. Thus, silvicultural treatments designed to increase diversity in loblolly pine plantations can be considered restoration activities.

Steps for implementing successful restoration plans have been provided by a number of authors and typically include:
1. Developing pre-modern reference conditions for the site through the use of multiple archives

with a goal of quantifying the historic range of variability;
2. Identifying the desired future condition from the reference conditions;
3. Developing prescriptions to move from the current prevailing conditions to the desired future conditions; and
4. Establishing tangible criteria for measuring restoration success.

From our experiences with restoration planning on private, state, and federal lands, issues that typically arise are related to the selection of the desired future conditions and the silvicultural prescription that should be implemented to achieve the future conditions. As previously stated, the desired future conditions should be selected based on reference conditions or a pre-modern model of a given site. These reference conditions can be developed using the body of scientific literature or through environmental reconstructions using the analysis of biological archival data (e.g. forest stand structure, tree-rings, palynology) and/or cultural (e.g. General Land Office surveys, old maps, explorer accounts, tax records).

Limitations to environmental reconstruction-based models include time, funding, and expertise in specialized fields of study. Furthermore, many sites may lack the long-term biological or cultural proxy records necessary to reconstruct pre-modern site conditions. Nonetheless, data derived from a site-specific multi-proxy environmental reconstruction provide a more accurate depiction of a given site's pre-modern conditions than does a review of relevant scientific literature. Restoration plans based solely on a review of relevant literature implicitly assume that the published results from similar or nearby sites provide an appropriate model for the site to be restored. Given the site-specific nature of many disturbance regime characteristics (e.g. fire frequency and extent on xeric and mesic sites or wind storm frequency and magnitude on protected and exposed sites), restoration plans based solely on relevant literature should be undertaken with caution.



Debates focused on the silvicultural prescription(s) used to create the desired future conditions seem to typically arise from the distinction between structure- and process-based restoration approaches. In structural restoration, the goal is to restore stand composition and structure to values within the historic range of variability, and targets are then based on these measures. In process-based restoration, the goal is to restore prior disturbance regimes which will, in turn, restore stand composition and structure to historical conditions. In many U.S. forests, process-based restorations mean implementing prescribed fire. We believe the debate about these different restoration approaches has largely subsided and was mainly focused on large public landholdings in the western U.S. This issue should possibly be revisited with regard to restoration in eastern U.S. forests so that these different approaches are acknowledged during the restoration planning process.

The restoration of oak stands in the eastern U.S. provides an excellent example of the potential pitfalls involved in planning restoration activities without the appropriate, site-specific historical data and without acknowledgement of the specific restoration approach. Throughout the eastern U.S., many oak stands are failing

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Justin Hart

Justin is an assistant professor and director of the Forest Dynamics Laboratory at the University of Alabama. His research is focused on development patterns and disturbance ecology in hardwood forests. Most of his work has direct implications for forest restoration and forest ecology.

Megan Buchanan

Megan is a student Forest Guild member and PhD student at the University of Minnesota. Her research is focused on disturbance ecology in deciduous forests of the eastern U.S. with the goal of providing ecologically informed guidelines for land management.

The CFRP Story: Ten Years of Successful Collaborative Forest Restoration in New Mexico

by Walter Dunn

Walter Dunn
Walter is the program manager for the Collaborative Forest Restoration Program and the Southwest Ecological Restoration Institutes for the Southwestern Region of the USDA Forest Service in Albuquerque, NM. He holds an MS in Watershed Management from the University of Arizona and a BS in Natural Resource Management from the University of Montana.

In 1998, Senator Jeff Bingaman (D-NM), concerned with the effects of large, catastrophic wildfires in New Mexico as well as the conflict and impasse associated with forest management throughout the West, initiated a series of workshops known as the Bingaman Roundtables. Stakeholders in New Mexico were convened to develop a common vision of a desired future condition for forests and forest-related employment and to describe what would need to happen to attain that condition. The workshops created the framework for the Community Forest Restoration Act (the Act), authorized under Title VI of the Community Self Determination Act of 2000 (Pub.L.No 106-393), that established the Collaborative Forest Restoration Program (CFRP) in New Mexico.

Since 2001, the CFRP has provided grants for collaboratively developed and implemented forest restoration and small-diameter tree utilization projects in New Mexico. The program encourages federal land management agencies to work with partners to plan and implement projects on public forest land to:

- promote healthy watersheds and reduce the threat of large, high-intensity wildfires, insect infestations, and disease;
- improve forest ecosystem functions and enhance plant and wildlife biodiversity;
- improve communication and joint problem-solving among individuals and groups who are interested in restoring the diversity and productivity of forested watersheds;
- improve the use of, or add value to, small-diameter trees;
- encourage sustainable communities and forests through collaborative partnerships; and
- develop, demonstrate, and evaluate ecologically sound forest restoration techniques.

The Act authorizes $5 million annually to implement the program and award cost-share federal grants for up to $360,000 each over four years for projects that include diverse and balanced groups of stakeholders in project design, implementation, and monitoring. Grantees are required to involve youth groups where appropriate and provide a multi-party assessment upon project completion describing on-the-ground accomplishments and improvements to local management skills.

The Act established a technical advisory panel (the Panel) to evaluate CFRP proposals and make recommendations to the USDA Forest Service (USFS) on which projects best meet the purposes of the program. The Panel is composed of federal, tribal, and state land managers; independent scientists; and conservation, commodity, and local community interests. It uses a consensus-based decision-making process to develop those recommendations. The annual Panel meeting is open to the public. This open, transparent process has built trust among the Panel members and observers. The Panel rewards collaboration by recommending the projects that best reflect the purposes of the CFRP. The USFS then adopts the Panel's recommendations. This has given Panel members ownership in the program. Traditional adversaries who came together to plan and implement CFRP projects feel ownership in what they have accomplished, which in turn, facilitates joint problem solving and reduces conflict.

The CFRP has funded 154 projects involving over 450 partners in 20 out of 33 counties in New Mexico. CFRP grantees have restored over 30,000 acres of forests and woodlands on federal, state, land grant, tribal, county, and municipal land and created 600 jobs. Over 90 percent of the projects involve youth organizations and local schools in training, monitoring, and a range of forest restoration activities.

A number of those young people are now employed in the forestry sector, and public schools in New Mexico have developed courses in natural resource management designed around CFRP project monitoring. As a result, many young people have a better understanding of natural resource management issues, which will increase their effectiveness as citizens to engage in the public land management process.

An important contribution of the CFRP is the atmosphere of collaboration and joint problem solving that now exists among groups that were locked in conflict a decade ago. Through the CFRP, New Mexico Land Grants are working with Tribes, the USFS, and the U.S. Department of Defense on National Environmental Policy Act (NEPA) planning projects to implement cross-jurisdictional forest restoration projects. Forest industry is working with conservation organizations to plan and implement projects, and small local industries have been established that use small-diameter trees from restoration projects to create wood products for markets around the world. For example, one planning project conducted an assessment on the feasibility of collecting a fee for watershed services by the water utility of the City of Santa Fe that led to the passage of a city ordinance. Another is evaluating the feasibility of ecosystem services payments by the Village of Ruidoso to the Mescalero Apache Tribe for watershed management services to mitigate future flooding.

Early CFRP grants implemented restoration projects under existing NEPA decisions that may not have included the level of collaboration envisioned by the CFRP. In some places, there were not enough NEPA-cleared acres to support the CFRP projects envisioned by the applicants. That was especially true of cross-jurisdictional projects. When planning and implementation activities

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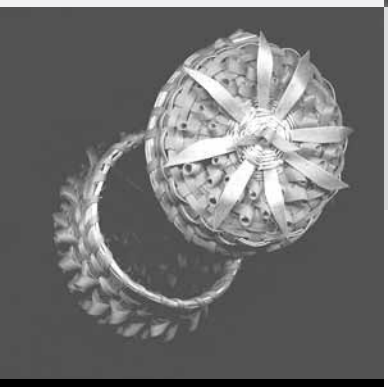
CFRP photos from top to bottom: Taking a core sample to determine the age of the tree. Measuring DBH of ponderosa pine. Post-thinning on a piñon-juniper site. Small-wood utilization project. Top three courtesy of Forest Guild. Bottom photo courtesy of USFS.

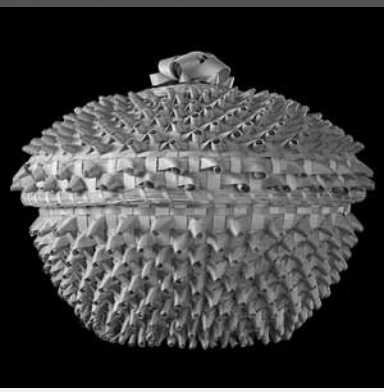
> ***"Stakeholders in New Mexico were convened to develop a common vision of a desired future condition for forests and forest-related employment and to describe what would need to happen to attain that condition."***

At right, black ash. Courtesy of Aitkin County (MN) Land Department.

Below: Denise Jock strawberry basket. Courtesy of Akwesasne Museum.

Mary Adams strawberry basket. Smithsonian Institute.





Black Ash Restoration: Preserving a Cultural Tradition

by Les Benedict

Fraxinus nigra (Marsh), or black ash as it is called in the English language, was a pretty insignificant and obscure tree to many but not all. Because of its special qualities, black ash is the tree of choice for producing splint basketry for Northeast Native American tribes including mine, the Akwesasne Mohawks. Black ash growth rings are easily separated by pounding with the back of an axe; the splints produced are flexible when moistened and become very strong once woven into a basket and dried. Black ash is important from a cultural perspective because it is the foundation for much of our unique basketry, especially the strawberry basket, a symbol of a culturally significant plant to our tribe.

A 2009 article co-authored by myself, Tim Baxter, and D.J. Monette describes the black ash as "a swamp hardwood species that often grows on seasonally flooded and usually very wet sites. It is typically not noted as a valuable commercial species, since harvest by mechanized logging equipment is usually impossible due to the wet site conditions where it grows. Not every black ash tree can produce basket material; it is a rare tree that has the quality to be a "basket tree." In order to produce good splints, the tree must be a very high-quality specimen, one with a perfectly straight trunk free of branches and any defect. It must also have evenly spaced, consistent-width growth rings. Good basket trees are hard to find."

The project that I have been involved with over the past 20 years began as a request from tribal elders to restore black ash in the community as there was little remaining locally for harvest. Logs were being harvested some 180 miles away in southern Quebec and in nearby state forests but in very limited quantities. The restoration project began as a literature search, grew into a seed collection and replanting effort, and developed into a management project. Most literature had little to say about the tree except that it was found in lowland swamps and had some minor uses in commerce; but it didn't capture the attention of many foresters and it certainly wasn't managed.

At that time, there was little black ash management information available from which to formulate management plans. A lot has been learned through hard work, trial and error, and study plots. As the project grew, it caught the interest of experts from academia, state, and federal agencies and also inspired a number of student researchers to study and add to the knowledge base of black ash so that management strategies could be developed. Along the way, the project also managed to bring in a number of private foresters, including Forest Guild member Ehrhard Frost, who are now utilizing black ash management strategies as part of their services to their clients.

The most recent and most comprehensive black ash management effort to date was a project funded through the U.S. Fish and Wildlife Service under the Tribal Wildlife Grant program. The project involved a collaborative effort drawing on the expertise of a team of representatives from The Ranger School at the State University of the New York College of Environmental Science and Forestry, the New York State Department of Environmental Conservation, the Akwesasne Task Force on the Environment, the Mohawk Council

of Akwesasne, the Saint Regis Mohawk Tribe, the South Nation Conservation, the Bureau of Indian Affairs Forestry, and a number of tribal elders, basket makers, and log harvesters.

This project consisted of extensive survey and inventory of several large black ash stands on the Mohawk reservation and in New York State forests. The data collected was analyzed using the computer-based software SILVAH. Then prescriptions were developed for each of the sites. Each site prescription was carried out using trained tribal loggers. Site work was inspected regularly by Tribal and State foresters. Field meetings were periodically held by agency team representatives.

Inventory plots were established using square plots on 100 ft. transect intervals. The sampling design provided for a 20 percent representative sample size. Plot sizes were 1/10 or 1/20 acre. Data analysis was performed for each site along with specific site prescriptions. Each site was unique in structure and calculated timber volumes. While timber volumes in a commercial sense were not that important to the project, that data provided a good indicator of productivity particularly when trying to understand how black ash compared to the other species.

The goals for each of the sites were:

- Increase the basket log productivity of the black ash by allowing enough spacing for logs to acquire growth rings optimal for basket-grade logs;
- Promote regeneration of black ash by reducing the overstory as black ash is shade intolerant; and
- Manage for black ash while maintaining enough diversity to promote a healthy stand.

The strategies to accomplish these goals were:

- Reduction of basal area where their relative stand densities were higher than optimum for individual tree growth including removal of black ash trees with little growth potential for grade improvement;
- Removal of competing species and poor-quality, main canopy competition;
- Freeing of black ash crowns for only 1.5 m beyond crown perimeter; and
- Identification of male and female black ash trees to ensure future seed production.

Those strategies have been successfully implemented by the Tribal logging crew. Continuous forest inventory plots were established and can be located using Global Positioning System coordinates and are also identified by physical tags. The next step is to begin measuring for response in each stand to determine if the efforts were as predicted.

This black ash restoration effort has an added "preservation effort" component because of the Emerald Ash Borer (EAB) threat to all ash species nationwide. Up until EAB started its invasion across North America, other than the project I was working on to restore black ash, there was not much concern for any other ash species either. In addition to being invaluable for black ash restoration, our twenty-some years of effort will now be even more important for future restoration of all ash. ■

Les Benedict
Les is the assistant director of the Saint Regis Mohawk Tribe Environment Division in Akwesasne, NY. His book *Black Ash Preservation, Reforestation and Regeneration* (2000) has helped hundreds of people to learn about black ash preservation.

At left, black ash stand. Courtesy of Aitkin County (MN) Land Department.

At left, Splitting a black ash strip. Photo courtesy of Eli Sagor.

Restoration Issues from page 5

MEMBERSHIP

Professional Membership in the Forest Guild is open to all forest professionals whose work is directly related to the stewardship and protection of forests, whether that work occurs through on-the-ground management, policy, advocacy, or research.

Other individuals who share a concern for forests and forestry are invited to participate as **Supporting** or **Sustaining Members**.

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appropriate. In this region, woodlands usually are associated with dry, south and west facing ridges and upper slopes, often with poor soils, where these conditions and lightning-ignited fire maintain open stands of primarily small trees.

Yet this site also included lower slopes, riparian areas, and a productive ridge covered by a 100- to 120-year-old hardwood forest, including big northern red oaks. Particularly on this ridge, there was no evidence the area ever had been a woodland. Further, prescribed burning would be needed indefinitely to prevent regeneration on this productive site, so the woodland never would be self-maintaining.

This forest exhibited little degradation in need of repair, and logging and burning would not assist in its recovery to any appropriate reference condition. Instead, SELC and GFW both were convinced that this forest, one of few older forests left in the vicinity, was important to conserve. Following discussions with us and other interested parties, including independent scientists, the USFS significantly altered the project by avoiding lower slopes, riparian areas, and the oldest forest; and by more accurately focusing on improving woodland-type habitat for the golden-winged warbler population there – a purpose we supported.

Above, ecological restoration includes water quality improvement, which helps to support the Southern Appalachian region's exceptionally high levels of aquatic biodiversity.
Photo by Lynda Richardson.

The second proposal involved similar activities on about 500 acres, but the forest there was more obviously altered, consisting primarily of relatively young planted pines and was of lower conservation value. SELC and GFW did question whether a few more productive stands were appropriate, particularly since neighboring sites of lower productivity more closely resembled woodland-type sites. We also were concerned that no environmental assessment had been prepared, particularly given the project's experimental nature. After we filed an administrative appeal with the USFS seeking reconsideration, the agency split the proposal, proceeding with work in pine stands, and is undertaking further analysis of remaining stands.

For the third project in those remaining stands, at our suggestion, the USFS included the less productive neighboring stands in the proposal to "create" (not "restore") woodlands on about 850 acres that are located almost entirely on acceptable sites. Recently, however, the USFS cancelled that project in order to develop new ones elsewhere.

SELC believes that significant progress can be made on restoring and sustaining national forests in the Southern Appalachian Mountains by clarifying when management activities are "ecological restoration" and by focusing management resources on appropriate ecological restoration where chances for success are most promising. ■

Citations:
[i]Society for Ecological Restoration International, Science & Policy Working Group, the SER International Primer on Ecological Restoration, at 3 (2d ed. 2004) available at www.ser.org/pdf/primer3.pdf.

[ii]U.S. Forest Service Manual (FSM), Interim § 2020.5 (2011), available at www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2000.

[iii]Dominick A. DellaSala, et. al., A Citizen's Call for Ecological Forest Restoration: Forest Restoration Principles and Criteria, Ecological Restoration, Vol.21, No.1 (Mar. 2003)

[iv]SER Primer at 8-9

[v]Id. at 4.

[vi]FSM at § 2020.5.

[vii]Id.

Author's acknowledgement:
"I want to thank the many scientists and conservation organizations who have contributed to shaping these and other theories about ecological restoration in Southern Appalachian national forests, particularly Dr. Ken Smith and Dr. Jonathan Evans at the University of the South, Cherokee Forest Voices, Georgia ForestWatch, the Southern Appalachian Forest Coalition, The Nature Conservancy, the Western North Carolina Alliance, WildLaw, and Wild South."

Placed-based Ecological Histories from page 7

to regenerate and are succeeding to support an increased importance of maple and other mesophytic, shade-tolerant species. The dominant paradigm is that frequent, low-intensity fires (a disturbance regime that was eradicated with the onset of active fire suppression) prohibited the establishment or reduced the abundance of thin-barked mesophytes and facilitated the recruitment and maintenance of oak.

In attempts to maintain or even restore the oak component to such stands, some managers have implemented prescribed burning programs. Most of these prescriptions have been developed to promote oak regeneration (structural approach), but others are clearly more focused on the 'restoration' of fire (process approach).

However, few sites across the region have reconstructed fire histories. In fact, less than 80 sites in the Central Hardwood Forest region have stand-scale fire histories; thus most sites in the region lack direct evidence of the historical disturbance regime. Structural restoration plans are less concerned with the history of fire on a given site than with the effects of disturbance on the forest community. In such scenarios, fire is used as a silvicultural tool to achieve a target composition and structure rather than being used in imitation of the documented historical disturbance regime.

However, the increasingly popular 'return fire to the landscape' process-based approach is predicated on what is often an assumption regarding the historical importance of fire on a given site. Fire was undoubtedly an important historic disturbance mechanism in many oak forests of the eastern U.S. However, where direct site-specific evidence of historical fire regime characteristics is lacking, the implementation of prescribed burn programs could potentially result in creation of a novel ecosystem rather than one that existed prior.

For process-based restorations, we caution that prescribed fire should be based on site-specific reconstructions of disturbance regime characteristics and should be used as a means to an end rather than a means in and of itself.

We recommend that restoration decisions be based, at least in part, on site-specific histories (i.e. they should rely upon place-based historical ecology). We certainly would not recommend that relevant scientific literature be ignored, but we stress that decision makers should ensure that the surrogate site identified in the literature is an appropriate model. Methods to select appropriate reference or paired sites are available (e.g. the NRCS Ecological Site Description System and LANDFIRE biophysical settings), and these techniques should be used in restoration planning approaches that rely solely on the literature. For some sites, restoring a prior condition or a prior disturbance process may not be the best management option, and we stress that restoration does not represent the penultimate management goal for all sites. For other sites, decision makers must acknowledge that restoration is not possible and that the desired conditions may be similar to, but will not recreate, those of a prior period. Whatever the restoration or other management objective(s), we recommend that the goals be defensible and clear thereby making the success of the project measurable. ■

References:
Egan, D and EA Howell. 2001. The Historical Ecology Handbook: A Restorationist's Guide to Reference Ecosystems. Island Press, Washington, DC.

Falk, DA, MA Palmer, and JB Zedler. 2006. Foundations of Restoration Ecology. Island Press, Washington DC.

MISSION

The Forest Guild promotes ecologically, economically, and socially responsible forestry as a means of sustaining the integrity of forest ecosystems and the welfare of human communities dependent upon them. The Guild provides training, policy analysis, and research to foster excellence in stewardship, to support practicing foresters and allied professionals, and to engage a broader community in the challenges of forest conservation and management.

Above, black ash bole. Photo courtesy of Aitkin County (MN) Land Department.

At left, shortleaf pine restoratiaon of a planted loblolly pine stand. Photo by Justin Hart.

Big Creek Restoration, from page 3

Above, WRTC Watershed Program Manager Josh Smith leads a field tour for Shasta College's Natural Resources Summer Camp students to learn about watershed science and restoration in Big Creek. Photo by Ben Letton.

our team was able to map and model the relationships between current vegetation and fuel conditions, soils, and the existing road system. Using modeling tools such as FlamMap, FARSITE, Netmap, and GeoWEPP, we have identified conditions and locations such as sub-watersheds and forest stands that presented the greatest risks to key watershed values including terrestrial wildlife habitat, anadromous fish, and the local municipal water system.

> "While the impact [of the Eagle Fire] on water quality and fish habitat was minimal, it proved a good indicater of the lack of fire resilience in the forests in the Big Creek watershed."

In 2008 with underlying data, analysis, social license, and partnerships, we were able to proceed with our plans to restore upland forest, range, and woodland communities in the Big Creek watershed. As if right on cue, the 2008 wildfire complex (which burned over 200,000 acres in Trinity County) threatened the Big Creek watershed. In September, the Eagle Fire jumped the Hayfork Divide from the Trinity River Canyon, resulting in stand replacing, high-severity fire through 2,500 acres of mid- and late-mature forest (think spotted owl habitat) and montane chaparral in the upper watershed. While the impact on water quality and fish habitat was minimal, it proved a good indicator of the lack of fire resilience in the forests in the Big Creek watershed.

In 2010, the USFS prioritized forest restoration in the upper Big Creek watershed in their program-of-work to initiate environmental planning in 2013. Some local partners and collaborators wanted the Big Creek restoration project to jump to the front of the planning pipeline, given the massive investment in site-specific NEPA-ready data collection and analysis that accompanied our watershed planning process. I take the willingness of the USFS in being responsive to local priorities as a testament to the power of collaboration and partnerships.

In the lower watershed, restoration of forest, range, and woodland is proceeding more rapidly. Just last month through our partnership with The Nature Conservancy's (TNC) Fire Learning Network and their Sustaining People and Ecosystems through Restoration agreement with the USFS and U.S. Department of Interior agencies, we secured funding to begin implementing strategic prescribed burning on private lands working with local ranchers.

We are in the process of completing a 2,500-acre, cross-property burn plan that will allow us to work with BLM, Natural Resources Conservation Service, CalFire, the USFS, and local volunteer fire departments to implement cooperative burning to restore low-elevation oak woodland, grassland, and mixed-conifer forests in Big Creek and adjacent watersheds. The burn plan spans BLM lands and one of the largest ranches in the Hayfork Valley, including more than 1,100 acres of actual burning.

Prepared by WRTC Fire Program Manager Keith Alvord, the plan will receive technical review from BLM and TNC fire professionals and allow partners to implement burns over a five-year period before updates are needed. In an effort to find innovative ways to manage costs and maximize burn windows, we are creating both "cool" and "warm" condition prescriptions. Our first burn is planned for spring 2012.

We plan to use the opportunity to build durable local capacity and partnerships to manage controlled burning and wildfire throughout the Trinity County area into the future. It is exactly these types of relationships, collaboration, and culture that we will need to foster if we hope to be better stewards of our watersheds, forests, and communities going forward. ■

NM CFRP, from page 9

were included in the same project, unforeseen complications in the NEPA compliance process often delayed implementation activities so that they could not be completed within the four-year grant period. As a result, the CFRP began seeing collaborative NEPA planning proposals that were difficult to evaluate alongside implementation proposals; so the CFRP now requires grant applicants to submit proposals in one of three categories: planning, implementation, or utilization.

The multi-party monitoring element of the CFRP was designed as a collaborative, adaptive management tool for project partners, not as third-party monitoring. Many grantees did not have the background to conduct monitoring at sufficient detail or interpret that data to evaluate ecological effects. Each land management agency uses different monitoring protocols. So CFRP developed Core Ecological Indicators that are now required in the multi-party monitoring plans of all grant applications.

The diversity of the objectives of CFRP projects makes it hard to aggregate the results of the multi-party assessments. The Act requires the USFS to monitor the ecological effects of CFRP forest restoration projects for 15 years, but that is challenging given the diversity of forest types, land management agencies, and the lack of consistent or dependable pre-treatment data. CFRP implementation projects are rarely designed with control plots following the scientific method. All those factors make it difficult to draw sweeping conclusions about ecological effects.

CFRP funds forest restoration projects that cross federal, tribal, state, county, and municipal land; but the size of the grants limits the number of acres those projects can restore. In some places, multiple CFRP grants have been awarded over time that fit together like a jigsaw puzzle to restore a larger landscape. That has been effective in building local support and ownership in the projects, but attaining the desired conditions in fire-adapted ecosystems requires a larger, landscape-scale approach. The CFRP is one step in the evolution of legislative and administrative direction on collaborative public forest land management.

As a result of the overall success of the CFRP in New Mexico, Senator Bingaman introduced the "Forest Landscape Restoration Act of 2008" (FLRA). Authorized in 2009 (Pub. L. No. 111-11), the FLRA established the Collaborative Forest Landscape Restoration Program (CFLRP) to address larger landscapes across the nation. The CFLRP requires projects to work at a scale of at least 50,000 acres.

President Obama's 2009 Open Government Directive provided federal agencies with direction to make government more transparent, participatory, and collaborative. In 2010, Secretary of Agriculture Tom Vilsack announced an "All Lands Approach" to build internal and external trust and involve collaborative groups in development, compliance, monitoring, and adapting future actions based on monitoring results. This approach will also expand partnerships to leverage non-forest service expertise to increase agency capacity for landscape-scale work and support sustainable restoration-based economies. The CFRP is one step in the evolution of legislative and administrative direction on collaborative public forest land management. ■

forest **GUILD**
P.O. Box 519
Santa Fe, NM
87504

Nonprofit Org.
US Postage Paid
Alb., NM 87109
Permit No.1029

forest WISDOM

Guild State and Region Coordinators:

Northeast States

Dan Donahue - CT
tel: 860-429-5709
dfdnwf@charter.net

Jeff Luoma - NY
tel: 518-523-9329 x121
jwluoma@hotmail.com

Christopher Riely - RI
tel: 401-225-6135
christopher.riely@gmail.com

Lake States

Peter Bundy - MN
tel: 218-546-7626
ppbundy@crosbyironton.net

Thomas Wyse - WI
tel: 715-682-9651
wyse.14@osu.edu

Southeast Region

Nate & Jessica Wilson
tel: 931-924-4539
jessandnate@blomand.net

Pacific Northwest Region

Mark Miller
tel: 541-602-2180
mark@troutmountain.com

At right, students from the Santa Clara Pueblo measure leaf litter as part of their New Mexico CFRP monitoring component. Photo courtesy of USFS.