

Ecology and Management of Pinyon-Juniper Ecosystems in the Bureau of Indian Affairs Southwestern Region

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Abstract—The large acreages of the woodland forest cover type on tribal lands continues to post challenges to this agency's overall management strategies. The development of management plans, evaluation of growth study plots, and anticipated biomass utilization can help resolve some of the challenges.

Overview of the BIA-SW Region Woodland Management Program

BIA/Tribal Forest Resources in the Southwest Region

The Southwest Regional office of the Bureau of Indian Affairs (BIA) is located in Albuquerque, NM. Twenty-six Native American tribes reside in New Mexico, Southern Colorado and Texas. Total tribal lands encompass 4,832,161 acres, of that 2,805,545 (58%) are designated as forest acres, and 1,946,873 (69% of forest land) acres are considered as woodland forested acres. Tree species include: pinyon pine (*Pinus edulis*), and Utah (*Juniperus osteosperma*), Rocky Mountain (*J. scopulorum*), oneseed (*J. monosperma*), and alligator (*J. deppeana*) junipers. The Bosque riparian zone is also included within our woodland acres; therefore cottonwood (*Populus fremontii*) is part of the species mix.

The management of such vast acreages is accomplished by foresters, technicians, and/or natural resource officers working at BIA facilities located at specific sites within the region. Approximately 1.3 million acres are considered as manageable, accessible acres.

Woodland Management Planning

Currently 11 tribal management plans are either in place or are in the process of being approved. Also, an additional 11 plans are being revised or developed. In order for a tribe to manage woodlands for any set goal, a current management plan is required. Without one, the agencies can only provide minimal assistance towards the management of Native lands, such as, fire management measures, trespass protection and prosecution, insect and disease control, to name a few. Therefore, it is the goal of this Region to update all management plans.

On-going efforts to quantify woodland forest on Native lands have enabled this region to initiate and complete a Woodland Continuous Forest Inventory for one of the larger Native Indian reservations comprised of approximately 126,397 acres of unreserved, accessible, commercial woodland forest. Using ArcGIS, a

In: Gottfried, Gerald J.; Shaw, John D.; Ford, Paulette L., compilers. 2008. Ecology, management, and restoration of piñon-juniper and ponderosa pine ecosystems: combined proceedings of the 2005 St. George, Utah and 2006 Albuquerque, New Mexico workshops. Proceedings RMRS-P-51. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

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grid was superimposed over the reservation and points were established over commercial stands. Using this information and the CFI field manual for the Southwest Region Reservations, the project is now complete. For analysis purposes the BIA, Branch of Forest Resource Planning (Central Office, Washington, DC) will begin to merge this data with existing data allowing the agency planners to begin modeling for growth, disease and insect infestation, vigor, species numbers, and other information.

Woodland Growth and Yield Studies

About ten years ago, the Southwest Region established the Uneven-aged Woodland Growth Study on four Native Indian reservations within New Mexico and Colorado. The purpose of these plots was to determine the optimal growing stocking levels (in square feet of tree basal area per acre) for different productivity regimes and/or habitat type groups. These growth study plots consist of 2.4 acre (4 X 6 chains) rectangular plots cut to specific residual basal area levels. Within each plot fifteen regeneration fixed plots were also established. These plots were re-measured in 2004 and the data are being processed at our Washington Office. As soon as the data are made available, they will be analyzed with the help of Gerald Gottfried, a research forester with the U.S. Forest Service.

On Zuni tribal lands where one of the growth study plots are located, an ambitious tribal wildlife biologist, Steve Albert (1994), decided to study the use of the plots by deer, small mammals, and songbirds. In summary, a number of species present increased significantly on the treatment plots. Composition of the plant species also changed. Deer use increased in correlation with the amount of trees removed. Overall, small mammal abundance increased on all treated plots. His results indicated that "small thinnings in pinyon-juniper woodlands have less drastic effects on wildlife than chainings and are a viable management tool for multiple-resource managers."

Wood Utilization

For several years, the Division of Forestry and Fire has sought options to deal with challenges in finding viable utilization opportunities for vast amounts of small diameter timber and thinning material generated as a result of forest treatments and fuels management projects on many of the region's tribal forested reservations. Forest stand improvement treatments and fuels reduction projects, taking place across the region, generate vast amounts of nonmerchantable woody material that continue to be a fire hazard problem unless removed from the treated site.

This region is lacking typical value-added forest product processing or utilization industries; the woody material must be removed or disposed of on-site though various secondary processes (i.e. burning, mulching, or trampling). These secondary processes are either environmentally sensitive and/or cost prohibitive which does not lend themselves to reducing treatment costs nor promoting their implementation. In seeking a solution to this large dilemma, one of the options considered has been to remove and utilize the material and capture minimal value to generate heat and/or electricity for local consumption. In essence, this low-value woody material would become the fuel for heat/energy production, a process commonly termed biomass renewable energy.

The production of heat/energy options has the potential to provide other beneficial aspects that promote its study and possible development on tribal lands in the Southwest. Possible benefits include producing heat/energy for local tribal consumptions thereby reducing energy costs, possible heat/energy production for BIA owned and /or managed facilities, and providing biomass fuel material to other entities reducing costs for forest hazard treatment. Accordingly, forest

hazard treatments and other processes will create additional jobs and stimulate local tribal economies, and provide opportunities for tribes to become less energy dependent utilizing tribally derived renewable resources. Currently the Southwest Region, Forestry and Fire section is supporting the research of the Forest Service's Southwestern Region's mensurationist to quantify volume inherent in small diameter sized classes. The current direction is to (with help from the Forest Service's Southwestern Region) quantify volume of small diameter trees on tribal lands for anticipation of biomass industries.

Management Projects

Pinyon-juniper health projects can only be accomplished through the intervention of other programs due to the limited funds within the woodland program. Both tribal, Bureau, and other federal programs have allowed for on the ground accomplishments within the woodland type. Most of the tribes within this region are reaching out more to other government agencies for assistance, and to private entities for addition funds. Other federal programs include EPA, U.S. Forest Service; without their connection to the tribes, it would have been difficult to get some of the work done.

Rehabilitation projects, especially along the Bosque would have been minimal to non-existent without the intervention of the Burned Area Emergency Stabilization and Rehabilitation program to reduce the impact of wildfires.

The attitude of stewardship of their lands for present and future members has influenced the Native Indian tribes who are actively pursuing the direction of management of their woodland forests and other natural resources. This can be detected by the reorganization of internal programs (i.e., natural resources and environmental protection agency departments are being staffed by professionals holding degrees in wildlife management, forestry, hydrology, and GIS specialties). These not only aid the tribes but also complement what the BIA is trying to accomplish, especially toward the management of woodland acres. Some of the priorities that the tribes have completed or are near completion pertain to wildlife habitat enhancement, reducing density levels of current woodlands stands from 100 square feet or more of basal area to residuals of 20 to 30 square feet, replanting of native willows along riparian zones, and transporting fuelwood to tribal wood yards.

Hazardous Fuel Reduction Program

The BIA Hazardous Fuels Reduction Program—with its priorities to focus on wildland-urban-interface and hazardous fuels projects—has not only reduced the potential risk from wildfires, but also has helped enhance the woodland forests. When fuels projects are proposed within pinyon-juniper forest types, it is to the advantage of agency personnel to work closely with fuel reduction specialists to foster forest management strategies such as, application of uneven-aged silvicultural systems using individual tree or group selection methods, and providing a means (woodland program funds) to help remove a majority of the fuelwood before the mastication process begins.

Wildfires have had an enormous impact to both standing commercial timber and woodland forests within Native lands. Within dense stands of the pinyon-juniper types, thousands of acres have completely burned leaving “moonscapes” and hydrophobic soils, which may open the area for invasive weed species to invade and dominate these burned over areas. With the aid of the fuels program, this type of scenario will hopefully become less likely to occur.

Insect Mortality Assessment

The mortality of pinyon pine throughout the Southwest by the pinyon ips (*Ips confusus*) is very evident on tribal lands. During the months of March through September 2003, the USFS completed a comprehensive aerial assessment of approximately 6.6 million acres of pinyon-juniper woodlands. Initially, the total tribal acres affected by the *Ips* beetle were 29,265 acres for the State of New Mexico and 285,438 acres for the State of Colorado.

Tribal members were very concerned about the high mortality of pinyon trees. Two of the Northern Pueblo tribes requested funds through the woodland program to establish plots to assess the amount of remaining live trees in the forests. Trees in all size classes from seedlings to larger trees were sampled. On the San Ildefonso and Picuris Indian lands approximately 51 and 95 percent, respectively, of the pinyon were still alive. These two examples depict varying degrees of mortality that occurred within this cover type. There were other instances where only juniper trees are left standing, and places where pinyon pine is still thriving and growing well.

Conclusion

The Native American has always used, and will continue to use, these forest types as a place to acquire food sources and building materials. However, most important are the cultural and traditional values associated with the woodland forests.

References

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