

Firewood boom of 1970s expected to continue without sapping Arizona supplies in 1980s

Arizona's supply of firewood could satisfy more of the state's energy appetite than it does now, concludes a recent study by the UA School of Renewable Natural Resources and the Arizona State Land Department.

Within 75 miles of five cities that burn appreciable amount of wood, cutting of firewood more than quadrupled between 1973 and 1978. The study predicts another three-and-a-half-fold increase in demand by 1988. Even then, supplies in those five regions "should greatly exceed demands." Continuing increases in firewood

use could, however, put uneven pressure on wood gathering areas closest to cities.

Two faculty members of the University of Arizona School of Renewable Natural Resources, Dr. Peter F. Ffolliott and Dr. William O. Rasmussen, prepared the report with State Land Department foresters Thomas K. Warfield and David S. Borland.

For Ffolliott and Rasmussen, the work was a component in a larger project designed to estimate the energy content of all of the vegetation in the state. They and graduate student Jeffrey G. Patterson

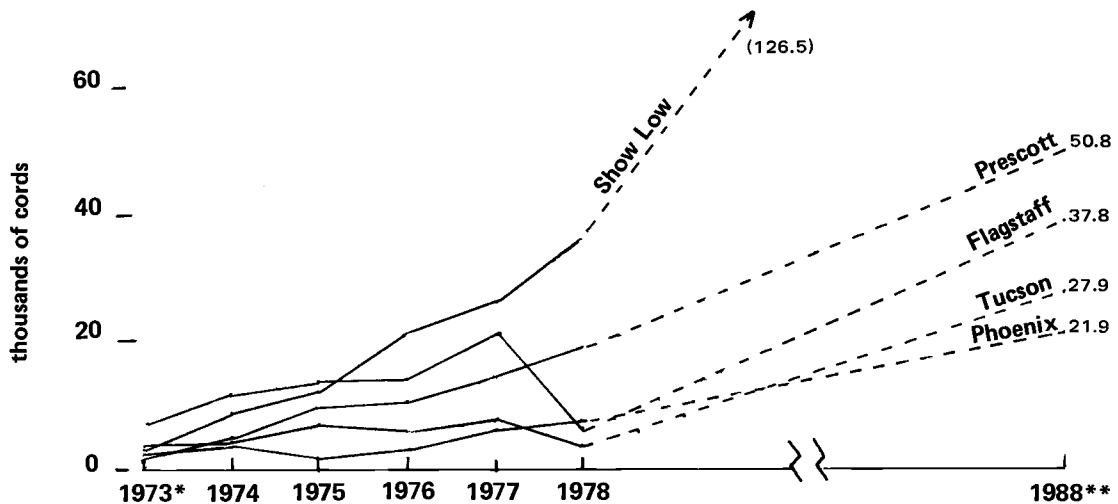
estimate that the annual growth of dominant tree and brush species contains about 10 percent as much energy as the people of Arizona use each year. Use of land for other goals prevents harvesting that much energy, though.

"Obviously, we are not proposing that all this biomass be harvested and burned," said Rasmussen. "But these kinds of baseline figures are necessary for assessing management choices that are possible." The information about energy content can improve management of public lands where fuel harvesting is just one of many uses for the land. Other

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FIGURE ONE

Fuelwood cut on public land for use in selected population centers, in thousands of cords. (One cord is a 4 x 4 x 8 foot stack of firewood.)



*Information for 1973-1978 compiled from records of U.S. Forest Service, U.S. Bureau of Land Management, and Arizona Commission of Agriculture and Horticulture.

** Estimate based on continuation of 1973-1978 rates of increase.

Adapted from "Supply, Demand and Economics of Fuelwood Markets in Selected Population Centers of Arizona," published by Arizona State Land Department.

TABLE ONE

Standing wood within specified distances of selected population centers, in thousands of cords.*

	Within 25 miles		Within 50 miles		Estimated annual demand by 1988
	Present volume	Annual growth**	Present volume	Annual growth	
Phoenix	4,049	40.5	15,085	154.4	21.9
Tucson	3,135	32.2	10,226	106.6	27.9
Flagstaff	1,377	28.9	8,212	169.4	37.8
Prescott	1,041	21.9	12,226	222.4	50.8
Show Low	1,770	37.2	8,878	186.0	126.5

* Volumes are totals of pinyon-juniper, oak and mesquite types only, estimated from acreage and average density of each type.

** Estimated annual growth: 2.1 percent for pinyon-juniper woodlands
1.3 percent for oak woodlands
1.0 percent for mesquite communities

Adapted from "Supply, Demand and Economics of Fuelwood Markets in Selected Population Centers of Arizona," published by Arizona State Land Department.

benefits from the same public lands include wildlife habitat, livestock production, lumber, water and recreation.

Such baseline data are useful in efforts to establish or re-establish forests in many fuelwood-starved countries in Latin America, Africa and Asia, Rasmussen notes (see accompanying article).

Renewable Resource

The selling point for reverting to wood energy is that trees are a renewable resource. "To take advantage of wood's renewable nature, its use must be managed for sustained yield," said Ffolliott. "In the past, fuelwood has been more mined than managed. That is, the wood has often been removed without any specific plan to renew the supply of wood for future use."

The State Land Department report is titled, "Supply, Demand and Economics of Fuelwood Markets in Selected Population Centers of Arizona." This report estimates the use and growth of wood within 75 miles of Phoenix, Tucson, Flagstaff, Prescott and Show Low. It translates acreage of mesquite, pinyon-juniper or oak woodlands into cords of firewood and Btu (British thermal units) of energy. The researchers developed a computerized mapping system that helps analyze interactions of tree types, soils, land

contours, land ownership patterns and distances to fuelwood markets in the cities.

The report suggests that harvesting schedules be calculated to retain a desired mixture of tree sizes. Removal of overgrown and crowded trees can increase the growth rate of remaining trees. It also recommends that management for sustained yield of firewood concentrate on areas where the trees regenerate themselves naturally, "as artificial regeneration may be too costly."

On some land, trees and brush are cleared for management goals other than firewood. The major example is control of mesquite or pinyon-juniper to increase forage production where trees and grasses compete for water. The report suggests that the wood residues from such practices be harvested for fuel. An estimated five to seven percent of the pinyon-juniper woodlands and seven to ten percent of the mesquite communities in the state have been treated to kill trees. The computer mapping system used for the fuelwood study can help identify areas where one management goal, such as forage growth, can complement another, such as firewood harvesting.

Hot Commodity

More firewood is cut in the Show Low area than any of the other

population centers studied (see Figure One). Rising petroleum prices will keep fueling the increase in firewood use during the 1980s, the study predicts. Even so, the annual growth of mesquite, oak or pinyon-juniper trees within 50 miles of each population center should outpace rates of use (see Table One). Some areas may be using firewood faster than it grows within 25 miles, though.

Forest management aimed at improving firewood production can speed up growth of trees left standing. For example, thinning the overstory in pinyon-juniper woodlands has increased annual growth by up to 15 percent. Selective harvesting of mature trees for firewood can accomplish such thinning.

Energy contents vary for the three tree types considered in the State Land Department report. The pinyon-juniper category, which includes pinyon, Utah juniper, one-seed juniper and alligator juniper, contains about 20 million Btu per cord (a cord is a four-by-four-by-eight foot stack of firewood). The oak woodland types, emory, Mexican blue, Arizona white, silverleaf and netleaf oaks, vary from 30 million to 38 million Btu per cord. Mesquite contains about 30 million Btu per cord.

By comparison, 100 gallons of fuel oil contain about 15 million Btu