

# Integrating fuel reduction management with local bioenergy operations and businesses—A community responsibility

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Received 1 November 2004; received in revised form 11 May 2005; accepted 1 July 2005

## Abstract

In approximately 20,000 US wildfire “at-risk” communities, private citizen awareness and involvement is essential for the effective integration of sustainable fuel reduction programs with the establishment of local biomass/woody materials businesses and bioenergy facilities. The factors that influence local community bioenergy and wood products economic development are mostly social, political, and financial not biological, ecological, or technological. It is the private sector that is the driving force for creating and influencing sustainable forest resources and broadening access to public lands. The many years of no-wood harvesting policies in the United States have caused excessive overgrowth and eliminated local forest products markets. Now with the severe overgrowth, drought and beetle-infested conditions in many Southwestern forests, actions are necessary to reduce fire hazards, improve public safety, and promote forest health. It is the local communities that must take an active role in creating bioenergy facilities and wood products markets to use these fuel reduction supplies. A case in point is Prescott, Arizona, which is enclosed in the south and west by the Bradshaw Mountains and Sierra Prieta range. In 1990, under companion resolution of the Mayor of the City of Prescott and the Yavapai County Supervisors, the Prescott Area Wildland/Urban Interface Commission (PAWUIC) was formed to address the continuing growth of urban population into the wildland areas surrounding the Prescott basin. This organization of private volunteers and cooperating government agencies has the objectives to provide community fire safety education, wildland/urban fire hazard removal, and to promote the local markets for materials harvested from the wildland areas.

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*Keywords:* Prescott, Arizona; PAWUIC; Bioenergy; Fuel reduction; Woody biomass; Wood products; Wildland/urban interface; Wildfires

## 1. Prescott and surrounding basin

Founded in 1864, Prescott, Arizona (geocoordinate 34.5°N 112.467°W) is nestled in the Prescott Basin, which has over 50 square miles of wildland/urban interface and is formed on the south by the Bradshaw Mountains and the west by the Sierra Prieta range. Prescott was the first territorial capital of Arizona. The original courthouse and tree-lined plaza remain as the center of the city. There are 525 buildings on the National Register of Historic Places [1] in Prescott. Located in the Central Highlands of

Arizona at an elevation of 5000 ft, Prescott originally grew from mining, ranching and logging for local construction.

Recently, there has been rapid growth around the town center and into the forest and wildland areas. The tri-city area of Prescott, Prescott Valley and Chino Valley has grown to over 70,000 residents. Several publications have indicated that Prescott is one of the best places to retire [1]. As a result, the recent population growth has been mainly from retirees and the supporting infrastructure businesses—retail, real estate and health care. The area has three higher-level educational institutions—Prescott College, Embry-Riddle Aeronautical University, and Yavapai College. The strongest activities driving the local economy are retirement migration and tourism. Retail trade (35%), services (32.8%), and public administration (10.9%) are the top employers. Manufacturing only employs 6% and

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there are virtually little or no bioenergy facilities or wood products businesses in the area [2]. Though public officials and citizens seasonally express concerns about forest conditions, it is not a driving economic priority in the area.

There are over a million acres of woody vegetation in the surrounding Prescott National Forest and Arizona State Trust lands that provide great recreational areas and hiking trails. While this wildland area can provide an abundant supply of cut logs, small diameter trees and woody biomass, there have been no local markets for these resources. Because of this, all saw logs have had to be transported out of the Basin and most are trucked out of the State. Some US Forest Service timber sales have not been purchased and the Forest Service has had to issue-managed services contracts to accomplish the essential emergency hazard tree removal projects. Woody biomass and chips from thinning and defensible space operations on private property are left in piles or transported to the transfer stations for burning or transporting to the regional landfill. Almost all local lumber and wood products are imported from outside of the Prescott Basin. These conditions result in a negative economic flow from the locally available timber and biomass resources.

Due to the woody overgrowth from lengthy no cutting policies as well as recent drought and beetle kill conditions, the Prescott Basin is at an extreme fire hazard. Prescott is one of the approximately 20,000 US communities considered “at risk” for loss due to catastrophic wildfires. In 2002, the Indian fire burned 1345 acres of forest and destroyed homes on the southern edge of Prescott. The “Rodeo-Chedeski” fire of 2002 that consumed over 400,000 acres about 70 miles east of Prescott and the Aspen fire of 2003 near Tucson are other examples of the hazardous dangers within other wildland/urban interfaces in Arizona.

With the urban populations growing into the wildland areas and the hazardous fire conditions, there is a need in all “at risk” communities for local citizen involvement.

## 2. Prescott Area Wildland/Urban Interface Commission

In 1990, the Mayor and Council of the City of Prescott and the Yavapai County Board of Supervisors [3] formed the Prescott Area Wildland/Urban Interface Commission (PAWUIC). The formation of this Commission was due mainly to the devastation and casualties suffered from the Dude fire near Payson, Arizona. The Commission is a chartered group of citizens and agency representatives (Cooperating Entities) given the expressed mission to advise local government in the identification and prioritization of wildland/urban interface issues in the Prescott area. The Commission’s tasks to accomplish this mission [3] include:

- To advise the Cooperating Entities in matters related to the wildland/urban interface.
- To identify, develop, prioritize, and address wildland/urban interface issues facing the citizens of the Prescott area.

- To develop plans and actions for management of identified issues and make recommendations to appropriate levels of government.
- To promote the development of citizen awareness of wildland/urban interface issues and initiatives.

PAWUIC officers consist of a chairperson, vice chairperson, and treasurer that are nominated and elected by the membership. Private members are selected from interested private citizen volunteers representing a cross-section of local community interests and capabilities, such as foresters, landscape designers, homeowner’s groups, ranchers, private destination camps, environmental groups, education/academia community, business leaders, public service organizations, and retirees. The Cooperating Entities or government representatives are designated from City of Prescott Mayor’s office, Yavapai County Board of Supervisors office, Yavapai-Prescott Tribal Council, Prescott National Forest Supervisor, Arizona State Land Department District Forester, Central Yavapai Fire District, City of Prescott Fire Department, Yavapai County Emergency Management, US Forest Service District Ranger, and Arizona Game & Fish District office.

In accomplishing its tasks, PAWUIC meets monthly to obtain activity updates and has performed the following:

- Conducted an annual town hall meeting, every March/April prior to the fire season, to provide community fire condition awareness, defensible space guidelines, fire safety information, and to respond to citizen questions and concerns.
- Staffed information booths at local events to provide on-going community awareness of wildland/urban interface issues and information.
- Provided chipping equipment and matched staffing from National Fire Plan grants to aid in residential defensible space and fire hazard reduction.
- Coordinated with homeowner groups and US Forest Service regarding interface fire hazard reduction and hazard tree removal projects.
- Researched and developed business plans for establishing bioenergy and wood products businesses to use the excess woody biomass materials.

PAWUIC is actively involved with managing fuel reduction programs, fire safety awareness, and developing local bioenergy and wood products markets to use the biomass removed from the local wildland/urban interface.

## 3. Managing fuel reduction

In the western United States, a majority of lands are in federal and state ownership. Many of the approximately 20,000 “at risk” communities have as much as a third in private ownership within the surrounding wildland urban interface.

The Prescott area includes ponderosa pine, juniper, and chaparral vegetation types. All of these have been fire dominated and maintained with natural fire regimes of every few years in the ponderosa pine-type to approximately 40-year return intervals in the chaparral-type. Fire has essentially been excluded from this landscape over the past 100 years with the result being an accumulation of forest fuels made up of live and dead woody vegetation. Also, natural grass understories or ground fuels have been replaced by excessive accumulations of woody surface fuels. The amount and character of increased woody vegetation has typically established a ladder fuel component as well as increased the horizontal continuity in the predominant fuel layer. These physical factors and ecological changes have produced fire-dominated landscapes with excessive and continuous forest fuels.

The infrastructure and social context of these landscapes is in large part a result of many years of activities by preservationist groups and individuals throughout the United States. In part, the “green giant” has reduced the local and regional wood products industry to a level of sparse in-woods production capability and minimal converting capacity. In general, forest stewardship activities planned by the United States Forest Service have been litigated, stalled, or otherwise delayed to the extent that very little is accomplished on the ground. Until very recently, much of the public has remained nonsupportive or simply apathetic about planned Forest Service management within and around their communities.

In the past year or two bark beetle epidemics and wildfire have resulted in the destructive loss of communities and forest lands. These events are triggering increased levels of fuel reduction, hazard tree removal, and thinning activities. These activities are not industry driven within the greater Prescott area. The landowner typically pays to have the work done (negative stumpage valuation) with biomass disposal being factored as an additional cost. The expected benefits of accomplishing these forest stewardship activities include: (1) an improvement in public safety, (2) a reduction in wildfire hazard, and (3) the promotion of forest health.

The ongoing fuels reduction/defensible space program carried out by the Central Yavapai Fire District and the Prescott Fire Department focuses on private homeowners with over 2000 homes accomplished to-date. Arizona Public Service is removing hazard trees along overhead transmission lines, and the Arizona Department of Transportation and Yavapai County are removing hazard trees from along specific road right-of-ways. The Arizona State Land Department and the United States Forest Service have projects underway within the Prescott basin with particular emphasis on agency land adjacent to private property as well as that with high public use such as recreation sites and trails. Both of these land management agencies are being assisted with funding from the National Fire Plan. Local public support for these projects is increasing with an obvious shift towards advocacy and,

in some situations, a request for work to be accomplished “across the fence”. This is a significant shift from the mentality of “not in my backyard.”

Forest stewardship activities are also being accomplished on private working cattle ranches and private destination camps. Opportunities currently exist within these private sectors to integrate student experiential learning activities with forest stewardship. Current informal programs include high school level agriculture classes and Future Farmers of America clubs from the greater Prescott area.

The Prescott Basin is one example where components of conventional forestry can be found in a contemporary setting. A key challenge is to integrate and strategically manage these components. As a concept, if one considers the neighborhood as the forest stand, then Codes, Covenants, and Restrictions may provide stand management direction. The homeowner’s association implements stand management typically at the sub-stand or individual lot level, and requires the use of forestry Best Management Practices. The insurer of the stand requires certain conditions be established such as zoned defensible space and home ignition zones with acceptable levels of combustibility. The Central Yavapai Fire District and the Prescott Fire Department collaborate in the functional areas of assessment, implementation, and monitoring. The silvicultural objectives of their program emphasize forest fuels reduction and modification. The continued development and use of geographic information systems support the analytical and monitoring needs of the “at risk” community from the landscape to the sub-stand level.

The first benefit produced as a result of implementing forest stewardship fuel reduction activities is the improved acre or forest stand condition. The by-product of biomass generated from these activities is the potential raw material supply for branded “value-added” wood products and potential bioenergy facilities. Organizations like the PA-WUIC will continue to serve as a catalyst by providing continuity and expertise in integrating parties needed to accomplish these actions.

#### **4. Building local bioenergy and wood products businesses**

There are a recent number of indicators and activities that can positively affect the development of local Prescott Basin bioenergy and wood products businesses. The Forest Health Restoration Act of 2003 has been passed by Congress. Arizona Governor Napolitano has taken a leadership role in dealing with forest health and community protection at the regional level through the Western Governor’s Association and at the state level by declaring a state of emergency in Arizona. Numerous counties within Arizona and other Western States have declared emergencies as well. These Federal and State actions can provide some of the needed funding for sustainable thinning and fuel reduction projects.

Within Arizona, and specifically around Prescott, the United States Forest Service and the Arizona State Land

Department are implementing thinning/fuel reduction projects specifically designed to improve public safety, reduce wildfire hazard, and promote forest health. Private property owners are becoming increasingly aware of the need to remove dead trees and excess forest fuel from their property and many have benefited from the work accomplished under a National Fire Plan grant by the Central Yavapai Fire District and the Prescott Fire Department.

The recent devastating wildfires have increased the general level of awareness about wildfire hazards even though it is seasonal and reactionary. Home insurability issues requiring establishment and maintenance of zoned defensible space in the wildland/urban interface communities, also raises citizen awareness. Current scientific research has shown it is the homeowner's responsibility for the "home ignition zone". This area should be maintained so that the risk of combustibility is relatively low within approximately one hundred feet from the home.

PAWUIC and other local groups are becoming more pro-active in creating local Prescott Basin market opportunities for bioenergy and wood products businesses. A sawmill, partially funded by a US Forest Service grant, is now operating in the Basin. US Forest Service and Arizona State Land Department contracts and city/county defensible space chipping operations are creating the availability of woody biomass materials for bioenergy cogenerators, pellet plants, and mulching/bedding products. The Greenfield Industrial Park has been opened and is being developed for bioenergy and wood products businesses. The sawmill is set up at this location.

Several private groups have expressed interest in locating a bioenergy plant in the Prescott Basin:

- BPG, a privately funded group, is finalizing site location and plans for a 5–10 MW cogeneration plant using woody biomass materials from the local wildlands.
- Arizona Public Service has presented a statewide plan for building up to ten 3 MW plants with one of the plants located in the Prescott area.
- A local business group has submitted a proposal to implement a biogenerated liquid fuel processing plant.

Business plans are in progress for developing and implementing the infrastructures to transport the materials from source locations to local sorting yards and fuel storage sites. A marketing program is being developed for promoting wood products businesses to bring their operations into the Prescott Basin. Some of these business sectors include—pellet fuel mills, animal bedding products, soil amendment and erosion control, packaged firewood,

log home manufacturers, laminated wood products, specialty wood products, and manufactured ties.

## 5. Conclusions

The past decades of little on-the-ground forest management has created overgrowth and extreme fire hazard conditions in the forest and wildland/urban interface areas. Without the availability of or the need to remove materials, local logging and wood processing businesses have long since closed. These conditions have been recently compounded by drought and severe beetle kill, which has created many "at risk" communities like Prescott. The results are that public and private lands in the Prescott Basin have an excess of trees and woody biomass that need to be thinned and removed to create a more healthy forest and lower fire hazard environment. These harvested materials can and should support the growth of local bioenergy and wood products economies.

Government policies and attitudes are changing, as is community awareness. There needs to be a sustained community "buy in" to: (1) support planned forest stewardship activities on Federal and State Trust lands, (2) encourage use of locally produced products, and (3) promote the installation and benefits of bioenergy facilities.

"At risk" communities need private citizen organizations like PAWUIC. A pro-active advocate is needed to focus on marketing and developing local bioenergy and wood products businesses. Government agencies will support these programs.

Citizens must accept their responsibilities for managing their "home ignition zones" and supporting safer, healthier wildland/urban interface areas. By promoting the linkage between local raw material sources and value-added product differentiation, public awareness will be maintained and action taken at the "at risk" community level. This could be in the form of a product-branding program, such as:

Maintaining Healthy Forests  
Will Sustain  
Safer Communities and Local Economies

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