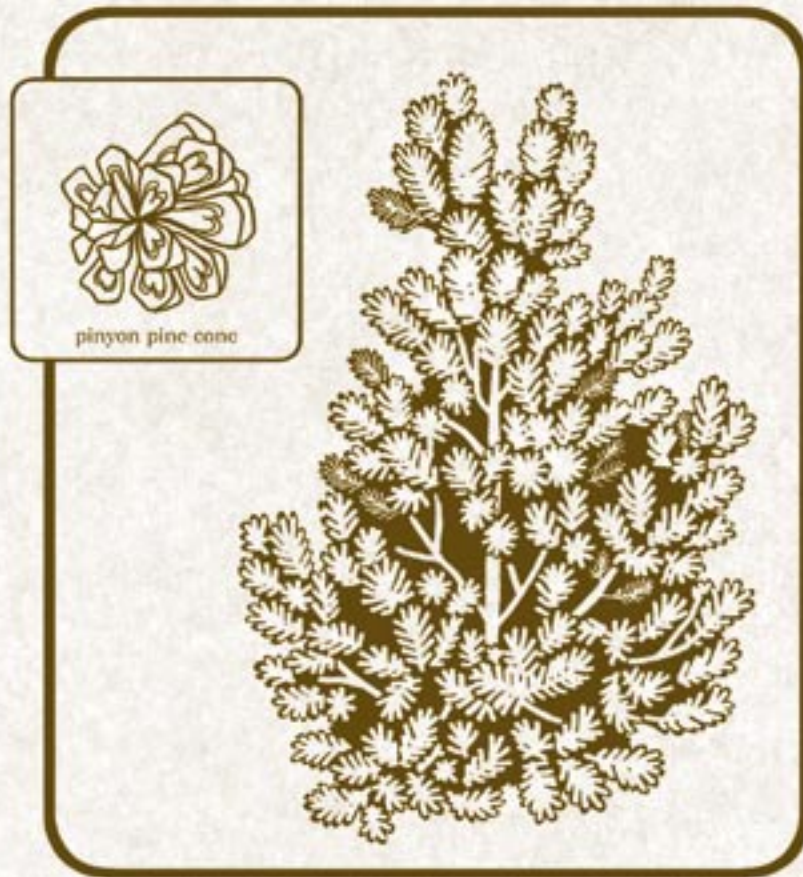


# BEYOND FIREWOOD AND FENCE POSTS:

Exploring and Expanding the Commercial Potential of Colorado's Pinyon-Juniper Woodlands



**PINYON PINE** (*Pinus edulis*)

## Colorado Pinyon to Market *A Case Study*

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## Project Summary

Beyond Firewood and Fence Posts (the Project), initiated in October 2005, is a venture between the Bureau of Land Management Colorado (BLM) and the Colorado Wood Utilization and Marketing Program (COWOOD). Our overarching goal is to encourage commercial opportunities for pinyon and juniper. The Phase I outcomes include the following:

- Documentation of Colorado pinyon (*Pinus edulis*) working properties as well as collection and organization of previous research. Products: *Pinyon Pine Wood Data Sheet* and *Pinyon literature review available on CD*.
- Partnership with a small manufacturer to complete the product and market research and development phases for a line of value-added pinyon products. The process and outcomes are described herein.

Phase II of the project will focus on commercialization options for pinyon and opportunities to utilize pinyon as a biomass energy source.



Historically, the commercial potential for pinyon-juniper woodlands has been limited to firewood, fence posts, small carvings, and novelty gift items. The decline of these woodlands beginning in

the early 2000s triggered by drought and Ips beetle (*Ips confusus*) outbreak forced land managers into these low-lying areas to reduce fire hazards. According to BLM estimates, in southwestern Colorado 25 percent of the pinyon component was lost between 2001 and 2004. In Colorado, BLM has identified 650,000 acres of pinyon-juniper woodlands in need of

restoration. Costs to simply masticate or remove trees without value are often high. A desire to lower management costs and utilize this resource led to the Project and partnership.

Find the products from this project and information about **COWOOD** and other projects at [www.colostate.edu/programs/cowood/](http://www.colostate.edu/programs/cowood/)

## Product Development Overview

In 2002 at the height of the pinyon die-off in southwestern Colorado, John Kennedy, a lifelong wood worker and maker of custom cabinetry and furniture, began experimenting with the cutting and tooling of dead pinyon. His desire to see the resource preserved in products led him on a three-year research mission. A visit to Surfaces, a large Las Vegas flooring show, and exposure to a strip-flooring product made from Australian Cypress (*callitris glauca*) led Kennedy first to experimentation with flooring. Kennedy noticed significant similarities between the characteristics of the cypress and pinyon. Both are very pitchy with similar grain and identical growth rings. The Australian soil conditions give the cypress product a warmer brown coloring than the pinyon.



John Kennedy Plans for Marketing his **High Desert Pinyon** product line.

Kennedy's goal was to identify products that could be made with short pieces, less raw material, and low cost. Part of his research involved exploring past uses of pinyon by local mill owners.

He found that during the 1970s mill owners supplemented ponderosa pine with pinyon pine for the booming mine-props market. They found that the mine operators loved the strength of the wood but found it nearly impossible to demolish when closing out mines. Despite finding little published information on the properties and handling elements of pinyon, he endeavored to

learn for himself what capabilities the pinyon wood surrounding his home possessed.

Through the joint BLM and COWOOD Project aimed at marketing pinyon and juniper, Kennedy has developed a line of products and will soon embark on a marketing campaign. The *High Desert Pinyon* line includes strip and parquet flooring, wainscotings, molding products, and novelty items. Through the Project, he has received technical and financial assistance with setting up the milling components, procurement relationships, and initial marketing strategy.

### Milling Set-Up

Kennedy already possessed a full complement of wood-working equipment including commercial-grade table saw, four-sided molder, shaper and sander as well as a dehydration kiln to service his custom cabinetry business. In order to prepare for commercial manufacture of the pinyon products he needed to add several key components.

1. Kennedy built a circle sawmill powered by a gas engine. Despite the fact that circle saw manufacturers have been replaced by band saw makers, he wanted the speed and longevity offered by a circle saw. He plans to replace the sawmill's gas engine with an electrical one in the future.



2. An additional molder set-up and tooling was added to accommodate the products.
3. A dust collection system was installed to control shavings. Clean shavings will be sold into other markets once production is underway.



4. An electrical phase converter was added to handle the additional electrical load presented by the dust collection system.

The estimated set-up costs for this type of operation range from \$30,000 to \$50,000 including all needed equipment and labor.

### Working with Pinyon: Cutting, Machinability, Drying, Adhesion, Finishing

A thorough description of pinyon and characteristics is available in the Pinyon Pine Wood Data Sheet. In general, the wood is moderately heavy, slow-growing and often knotty, pitchy and blue-stained but strong and hard. The heartwood is yellow.

#### Cutting

Woodsmen have historically not considered pinyon a desirable commercial species. It is relatively short, produces many limbs, contains a great deal of pitch, and possesses a thin but multi-layered bark. The initial focus for product development is with dead standing pinyon. Next steps will involve selecting live pinyon. The dead presents an additional barrier because as the pitch sets within the tree it becomes extremely hard. The contractor found that most trees become too "pulpy" after two years. Rot and fungus prevail under the bark of dead trees when moisture collects over time and temperatures get to 95 degrees and above.

In the experimental trials for this project, Kennedy cut five board feet at a time. Four cuts from a 6- to 8-inch diameter log yields a 4-inch by 4-inch blank. He generated 60 board feet an hour in the blanks.

#### Machinability

Kennedy found pinyon performs well on a table saw at moisture contents ranging from 14 to 6 percent and reported "zero tear-out" with speeds of 20-plus feed per minute. No splintering or inability to tool was experienced using his high-speed steel blades or carbide saws.

## Drying

Assessments of drying characteristics, e.g., warping and cupping of strip flooring, will not be complete until larger quantities of pinyon can be loaded into the kiln. Up to this point, drying has been conducted in small quantities both by air and in kiln for the production of product samples and experimentation.

Kiln experiments reveal more warpage than twist, which is characteristic of most small-diameter trees, e.g., small-diameter ponderosa pine presents a great deal of twist, cup and warpage. Kennedy utilized a dehydration process as opposed to high heat. Dehydration enables a more controlled removal of moisture content.

The moisture content of dead pinyon is an average 22 percent while the live is 80 to 85 percent. Obviously, live pinyon will extend drying times and therefore costs.

## Adhesion and Finishing

Kennedy found no problems with the pinyon accepting stain and did not box prior to treatment (sanding and sealing to get color uniform). Finishes held without surface checking, peeling, or crazing. The wood glues “great” as well. He found that dead pinyon acts much like a deciduous species and exhibits characteristics of ponderosa pine.

For producing samples, Kennedy utilized Sherwin-Williams’s water-borne lacquer – Sher-Wood® Kem Aqua® Lacquer. The wood was sanded, vacuumed, and sealed with spray sealer or flood-stained, then touch-sanded and finished with two quick coats of the lacquer.

## **Product Development**

Up to this point, the *High Desert Pinyon* product line has been in a very experimental mode. A number of factors discussed in the next section will determine whether the products move from a specialty niche out of one wood shop to commercialization. Kennedy has conducted his own research and experimentation for determining the handling and tooling properties of pinyon and the development of products.



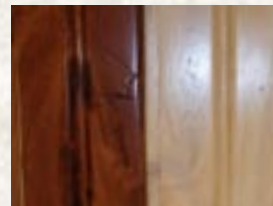
## Strip Flooring

The strip flooring will be sold bulk, unfinished wholesale in 14.6-foot bundles. The

cost is expected to be around \$3.25 per square foot wholesale. The strips will be kiln-dried.

## Parquet Flooring

Parquet is a win/win in that it enables greater net from a log because many small pieces are needed and it can be manufactured without skilled labor. Profit margins for this product are expected to be better than with strip flooring. Commercialization of this product would lead to several part-time, low-intensive jobs. It will be sold via internet in 10-square-foot unfinished kits shipped standard UPS. Each square will be packed with a water release paper alignment sheet. Its 3/8-inch thickness makes the product ideal for hydronic in-floor heating. Two patterns are available: herringbone and circular. Estimated prices are not available at this time.



Wainscoting Samples

## Wainscoting and Molding

These products will be sold finished in complementary kits via internet. The market will be home improvement consumers.

## Novelty Items

Kennedy has researched and experimented with small bats and coat hangers. Wooden coat hangers retail for \$16 to \$20, can be produced for about \$4, and are a high-yield item for a small amount of wood.

Plastic children’s bats retail at Wal-Mart for \$9. Kennedy produced a batch of his own experimental pinyon bats. He took 2-inch by 2-inch blanks, simply turned, and hot-waxed. Kennedy wants to coin the slogan, “I went to bat for pinyon.” He is able to produce six in two hours with existing equipment. The addition of an Autocopy would more than double the production and make for a very low-cost manufactured item.

## Potentials and Pitfalls

As with the development of any new product and market, there are challenges to be overcome. Key issues identified thus far in the *High Desert Pinyon* product line development are discussed below:

### 1) Procurement

The first phase of this project was significantly slowed by a lack of willing contractors to cut and deliver wood to Kennedy. Kennedy cut initial samples. In the winter of 2005, a cord of pinyon firewood averaged \$80. Delivery to Kennedy's specifications is simpler. He requires 4- to 6-foot lengths with a minimum diameter of 6 inches. A partnership relationship has developed between Kennedy and a local contractor. The contractor has been paid \$100 per cord equivalent. All experimental wood has been sourced from private land. The availability and cost of raw material is very unpredictable. This effort has revealed that while most pinyon stands are on private land, owners are hesitant about removal for fear of damage to the land. Many of those that are willing to have the dead pinyon removed want payment or services in excess of break-even points. Yet, a front-page newspaper article in the [Cortez Journal March 28, 2006](#), generated a flurry of calls to Kennedy from private land owners eager to give him access to dead pinyon. Only a small percentage of annual supply in a commercial operation could be reliably procured from private land. The expansion of product lines would depend heavily on the consistency, volume and pricing of federal land sourced pinyon. The availability of green wood will be important. At this point, Kennedy has only worked with dead pinyon. Experimental harvest and handling of green pinyon is scheduled for summer 2006. His projected supply needs will average 2000 to 3000 board feet a month at the scale of business he desires.

### 2) Consumer Attraction

Consumer attraction to the quality of pinyon wood products will be determined by exposure, availability, and price. Anecdotal evidence is good for pinyon flooring in particular. Customers and lumber salesmen in Kennedy's shop have found the products appealing. Small orders have been placed in this setting.

### 3) Marketing

Kennedy has conducted his own research by spending time at trade shows, speaking with similar product representatives and wood brokers, and exposing the sample products to his existing customers. Through this project, a small focus group of wood workers, builders and architects occurred as well as dissemination of product samples via meetings and specialty home stores. Kennedy is convinced that his products would compete best via internet as both finished and unfinished kits. He is in the process of developing a logo and website. His vision involves growing the pinyon product line as a specialty off-shoot of his existing company to a brisk internet market but not to a full-scale commercial operation. He hopes to help another entrepreneur set up a commercial-scale operation if the products take off.

### 4) Workforce

Kennedy has experienced great difficulty in finding trainable employees for his cabinetry business. In addition, it is difficult to pay qualified individuals a wage that is attractive yet leaves profit margin in the product. Employee benefits are offered to those who stay long enough to receive them. Turnover has been extremely high. Light manufacturing companies nationally have difficulty maintaining employees. With current projections, Kennedy expects to create two to three jobs.