PJ Restoration Protocols - NMFWRI

NRCS, April 2019

The leading question is "What do you want?" What do you want the landscape to look like in X years?

One of the big challenges with PJ is the need to define what is meant by PJ. The foundation document, the DRAFT Piñon-Juniper Framework – New Mexico Forest Restoration Principles from 2007, and the Key to 5 PJ Types, are both available at https://nmfwri.org/projects/project-resources-1

The underlying driver of the following restoration recommendations is soil depth, and the related soil fertility, and how they relate to fire. When soils are deep, grass cover should be sufficient to carry a fire that kills most woody regeneration. On rocky soils, grass is not sufficient to carry fire, and PJ can survive and thrive. The following **Key** reflects this:

1a.   Deep soils (>14 inches deep), surface generally free of large rock fragments or large amounts of gravel, and capable of producing continuous fine fuels under normal precipitation -   **2**

1b.   Shallow or transitional soils, surface may be eroded and often is rocky or droughty, and usually not capable of producing continuous fine fuels under normal precipitation –   **3**

2a.   Most precipitation falls during summer. The oldest trees (possibly >150 years) are older and usually taller than those found in Grasslands –   **PJ Savanna or Juniper Savanna**

2b.   Season of greatest precipitation can vary. Old trees are very rare and found on microsites that historically would have allowed escape from fire –   **Grassland**

3a.   Generally on shallow, coarse-textured soils. Most precipitation falls during winter. Piñon and juniper are the dominant species –   **PJ Persistent Woodland**

3b.   Soil transitional between deep Savanna soils and shallow Persistent Woodland soils –   **4**

4a.   Bi-modal precipitation pattern. Uneven-aged stands on rolling uplands with persistent, taller trees. Probably common historically, but rare under current conditions –   **PJ Open Woodland**

4b.   Most precipitation falls during winter. Sagebrush or oak co-dominate with the P-J, but the shrub species may be crowded out under current conditions. This type often found in small patches that can be difficult to map on a statewide scale –   **PJ Shrub Woodland**

From the PJ Framework 2007

Table 1. Restoration Guideline

- Develop site-specific knowledge
- Look for evidence that restoration is necessary
- Don't do restoration just because you need to do something
- If you can't clearly identify a restoration need, but you want to reverse ongoing degradation, use best management practices.
- Don't be too quick to burn the project area
- Only by monitoring are we going to be sure about our treatments

Table 2a. PJ Persistent Woodland (Mesa Verde NP)
Generally, recommendation is that this type be left alone, not touched. It is a low priority for treatment, and money is better spent elsewhere.

Table 2B. PJ Open Woodland (E of Glorieta Pass)
Cut the trees on areas with deeper soils. This means a need for at least a minimal soil survey before treatment. If an herbaceous layer is absent, leave activity fuel. In areas with rocky and/or coarse silts that didn't support continuous grass that could carry fire, thin from below, leaving more trees in rockier soil.

Table 2c. PJ Shrub woodland (sage – S of Tres Piedras; oak – southern slopes of Gila)
Alternative 1: If we think trees grew in rockier soil historically, and sage or oak in deeper soils, then restore by removing PJ where it has encroached onto deeper soil.
Alternative 2: Restore by removing PJ, no matter the age, that is growing in areas of more oak/sage.

Table 2d. PJ savanna or Juniper savanna (N of Sandias; top of Rowe Mesa)
Table 2e. Grasslands (Fort Stanton area)
To restore the grass component, any method of tree removal is acceptable, assuming wildlife, soil, surface water, and other factors are considered. The residual trees or groups will need to be clearly, and probably extravagantly, marked. Residual trees should be based on tree size and presence of rocky outcrops. If selecting for thermal cover, select groups based on size and location most useful for the animals. All PJ would be removed in areas deemed grasslands.

Transition to ponderosa pine (throughout)
Apply a modified ponderosa pine restoration prescription. Take 90% of the trees in the transition area. Leave all the ponderosa pine, especially any advanced regeneration. As much as possible, leave the residual stand with groups and openings. Groups can be a mix of species and sizes, but take care to avoid leaving ladder fuels that may cause loss of larger trees. All the juniper can be removed. Run a prescribed fire through the area as soon as you can. Monitor the area for grass cover, regeneration, and fire effects, and let all of us know how it comes out.

Monitor, especially post-treatment
- Does grass come back? How quickly?
- Do trees come back into the open areas?
- Is enough grass present for fire to carry? How does fire behave?
- How does the oak/sage respond?
- Do invasive species establish?
- Share your monitoring results.

Maintenance
You will need to control PJ regeneration. In a restoration context, where we are interested in restoring full ecological function, fire is the preferred control method, and regular broadcast burning is the preferred way to apply fire. We need a good index of minimum grass cover needed to carry sufficient fire to control PJ regeneration.

Herbicide control is another option. NMSU has done significant work on herbicide control of PJ, including investigating control of larger trees on the Corona experiment station.

Another option is mechanical control, which means cutting or digging out PJ regeneration. This work will be tedious and will carry significant labor costs, but clearing a treated area every five years should be sufficient.