



Piñon-Juniper Restoration Protocols

Presentation to WHO CG42

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DRAFT Piñon-Juniper Framework - New Mexico Forest Restoration Principles

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This draft document, a four-part framework prepared by the New Mexico Forest Restoration Principles Working Group in 2006-2007, summarizes the current state of our knowledge of the piñon-juniper savannas, shrublands, and woodlands of New Mexico: their ecological context, management needs, and considerations for restoration. This working document is intended for use as preliminary guidance for piñon-juniper management projects, including those whose goal is to produce fuel for electricity generation or home heating. A secondary purpose is to document the extent of our knowledge about the distribution and dynamics of these piñon-juniper types, and to provide a list of ecology and management references (Table 4).

Key to 5 P-J Types



- 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**



What do you want?

Table 1 from the 2007 draft PJ Framework



- Develop site-specific knowledge
 - Develop a comprehensive understanding of historical and current conditions.
- Look for evidence that restoration is necessary
 - Areas can seldom be readily identified
- Don't do restoration just because you need to do something
 - Use resources on areas that are truly degraded and in need
- If you can't clearly identify a restoration need, but you want to reverse ongoing degradation, use best management practices
 - The best possible land management is restoration, but good land management does not necessarily include restoration.
- Don't be too quick to burn the project area
 - You may need to leave-and-scatter a substantial portion of the woody biomass to help site recovery, especially if the site can't be rested from grazing

Summary of Possibilities:



- For the time being, skip Persistent Woodland
- Treat Shrubland and Open Woodland with caution, with the understanding that we don't know enough about their reaction to restoration
- Go ahead and restore Grassland or Savanna.
- For all types, re-introduce fire, or rather, manage so that fire can be re-introduced
 - and continue to monitor
- Only by getting a lot of data points are we going to be sure about our treatments

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.
- What do you want?
- If fire is a worry, in this order:
 - Cut some openings in it, locating the openings on deeper soils within the stand.
 - Thin from below in the rest of the stand.
- Beyond and possibly including these two steps, any work would be considered something other than restoration.

PJ Open Woodland (E of Glorieta Pass)



- Restoration means reducing density back to what might have been historically present.
- Assume deeper soil grew better grass and thus carried fire, so those areas would have been relatively free of woody plants.
 - Thus, cut the trees on areas with deeper soils. This means a need for at least a minimal soil survey pre-treatment.
 - If 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 on rockier soil.

PJ Shrub woodland (sage – S of Tres Piedras; oak – southern slopes of Gila)



Considered to be restored when the system is stable, when a fire can burn and the plant community not be changed significantly.

- The stands will burn in a mosaic, and some areas will be high severity.
- And, some areas need to burn at low intensity, and this possibility is what we are creating with our mechanical treatments.

What do you want?

PJ Shrub woodland, cont.



Alternative 1: based on soils

- 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.
 - This alternative might remove younger PJ:
 - With insects or just aging, older trees might completely disappear.
- Assumes the oak/sage will occupy the deeper soils

PJ Shrub woodland, cont.



Alternative 2: based on oak/sage

- Restore by removing PJ, no matter the age, that is growing in areas of more oak/sage,
 - Would leave all ages of PJ on the site
 - Oak/sage would be released, because only selecting where oak/sage is already present
 - Doesn't rely on a soil survey

PJ savanna or Juniper savanna

(N of Sandias; top of Rowe Mesa)



- It can be very easy to remove all the PJ in a project area and call the result a Grassland, when historically the site was a Savanna.
 - The difference between Savanna and Grassland can be subtle, since the main historic difference was a very few trees vs even fewer trees.
- Leave the trees on areas of rocky soils, or leave trees that stand out as being older.
- At the other end of the spectrum, groups of PJ could be left as thermal cover, creating a Savanna in areas that historically were Grassland.
- What do you want?

PJ savanna or Juniper savanna



- 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.
- The regeneration will need to be managed.
 - We need a good index of minimum grass cover needed to carry sufficient fire to control PJ regeneration.
- Understand the snow will melt faster on treated areas, and wind may take snow off of treated areas.

Grasslands (Fort Stanton area)



Same as Savanna, but remove all the trees.

What do you want?

PJ-ponderosa pine transition



- A historic restoration would remove the PJ in the transition zone.
- However, assuming plant communities will move up the mountain as the climate warms, the current ponderosas will die off, and removing this PJ band today may result in a tree-free zone in 50 years.
- On the other hand, removing the existing ponderosa means that we are removing individuals that are best placed to have the genetics to reproduce in a warmer climate.
- So, what do you want?

PJ-ponderosa pine transition



- Apply a modified ponderosa pine restoration prescription.
- Take 90% of the trees in the transition area.
 - All the juniper can be removed.
- 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 avoid leaving ladder fuels that may cause loss of larger trees.
- Run a prescribed fire through the area as soon as you can.

Maintenance



If a seed source is nearby, a treated area will begin to regenerate with PJ.

Fire:

In a restoration context, fire is the preferred control method, and regular broadcast burning is the preferred way to apply fire.

In areas managed for cattle, fire can be applied directly to individual seedlings with a drip torch or fusee.

Maintenance, cont.



- Herbicide control is another option. NMSU has done significant work on herbicide control of PJ.
- 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.

Maintenance, cont.



The use of intense domestic cattle grazing is not recommended.

Bison promoters say that bison will horn-up seedlings growing in grassland and serve as an effective control on PJ regeneration.

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?
- How do other woody species respond?
- Do invasive species establish?
- Share your monitoring results. Please.

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