

**Project Number:** INT-EM-05-01

**TITLE:** Piñon and juniper mortality – extent, severity, and causal agents.

**LOCATION:** Utah and Nevada

**DURATION:** Year 1 of 1-year project    **FUNDING SOURCE:** Base

**PROJECT LEADER:** Brytten Steed, Entomologist, Forest Health Protection, R-4 Ogden Field Office, (801-476-9732), bsteed@fs.fed.us

**COOPERATORS:** John Shaw, Ecologist, Forest Inventory and Analysis (Rocky Mountain Research Station), Gail Durham, Forest Health Specialist (Nevada Division of Forestry), Joel McMillin, Entomologist (R-3), Tom Eager Entomologist (R-2), Sheri Smith Entomologist (R-5),

**PROJECT OBJECTIVES:**

Monitor ecosystem changes in the piñon-juniper forest type:

- monitor changes in mortality over time (e.g. FIA panel)
- evaluate relative importance of stand and site characteristics to mortality levels
- monitor activity of insect and disease agents, especially those causing mortality
- monitor the fate of mortality trees (e.g. snag or woody debris status)
- monitor regeneration of the stand after the mortality event
- describe pre- and post- mortality stand conditions

**DESCRIPTION:**

**a. Background and justification:**

Data from Forest Health Monitoring (FHM) plots, Forest Inventory and Analysis (FIA) plots, and from special FHM-funded surveys (westwide piñon-juniper survey) in 2003 and 2004 show significant mortality events in the piñon-juniper forest type (PJ) throughout the West. For states like Utah, Nevada, Arizona, and New Mexico where PJ is the principal forest type (see FIA summaries) this mortality is of particular concern. Federal (FS, BLM, BIA, NPS), State, and private land owners, as well as the media, have expressed great concern over tree loss and are requesting additional information from FHP on the extent, severity, and causes of the mortality.

Tree loss has occurred relatively quickly in some areas, and appears to be increasing in some locations while subsiding in others. However, it is difficult to get an understanding of the extent and severity of this mortality event over such large areas if evaluations are concentrated in areas of high mortality and high human interest (e.g. wildland-urban interfaces) over a short one year period. A broader survey over the entire PJ type is needed.

Causes of this mortality include drought, bark beetles, root disease, dwarf mistletoe, and a variety of other insect and disease agents. However, the roles of these insects and diseases as well as the importance of stand conditions and site characteristics in this mortality event have not yet been well monitored or evaluated, especially in Utah and Nevada. (Note: Joel McMillin and others have an EM project in Arizona, R-3 FHP).

In 2004 FHP-Ogden Field Office and FIA-Ogden signed a memorandum of understanding (MOU) allowing FHP personnel to revisit a subset of FIA plots to obtain data on piñon-juniper that is valuable to both the FHP and FIA programs. FHP goals for this adjunct inventory are to monitor ecosystem changes represented by mortality of piñon and juniper species over time, relative importance of insect and disease agents in causing mortality, fate of mortality trees (e.g. woody debris) over time and by agent, and regeneration after the mortality event. These changes will be related to site conditions, providing important information to FHP on the health of this forest type and potential hazard rating information. This data should also allow FIA to produce a more accurate assessment of mortality trends than is possible under the annual plot system by providing a statistically sound basis for projecting forward plots that were visited by FIA under the annual inventory system and before the onset of the piñon mortality event. Damage and damaging agents will be documented by FHP insect and disease specialists in greater detail than currently done during FIA annual inventory. This will provide an independent assessment of causal factors that can be compared with assessments made by FIA field crews.

Re-visitation of FIA plots has the advantage of providing statistically valid data about mortality (extent and severity) over a several year period (e.g. 2000-2004 for Utah) for a wide range of conditions in the PJ forest type. Re-visitation by FHP personnel also provides specific information concerning insect and disease (causal) agents that were not identified during the FIA inventory.

**b. Methods:**

Plots surveyed by FHP are a subset of FIA plots described as Piñon-Juniper Woodland, with one condition class, and Forest Service or Bureau of Land Management ownership. In order to cover a wide range of PJ forest types, 10 plots in each of the eight ecoregion have been selected. Only ecoregions that contain a sufficient level of PJ type are included (n=8). These plots must also meet the minimum criteria of 35 sq. ft per acre total basal area, 35 percent of which is piñon species. In addition, FIA has stratified these plots so as to provide a representative sample of plots from each year the annual panel has been conducted in UT/NV (2000, 2001, 2002, 2003, and 2004).

At each plot FHP will obtain additional information on tree status (live or dead), presence and impact of various insect and disease agents, and understory / regeneration vegetation components. For trees that have died within the past 5 years the suspected mortality agent as well as the snag/coarse woody debris condition is recorded.

Analyses of data will be done with FIA personnel with the objectives of describing the mortality event, the stand and site conditions that most closely relate to the mortality levels, the relative impacts of various insect and disease agents, and the condition of stands after mortality has occurred. The cooperators on this project have additional data and experience in the PJ type that will be useful in interpretation of results from this project.

**c. Products:**

Data from this adjunct inventory will become part of the FIA (and PTIPS) databases and will be used by FIA as part of their analyses of the condition of PJ in Utah and Nevada. FHP and FIA will work together on a report describing the condition of PJ in Utah, including an evaluation of the stand and site characteristics related to PJ mortality, the progression of mortality over time and space, and the role of various insects and

diseases. A poster summarizing this information will be presented during the annual FHM Working Group meeting. These results also have relevance to our current Risk Mapping effort in this forest type.

**d. Schedule of Activities:**

- evaluation of 2004 adjunct plot data and fine-tuning of data forms, insect and disease identification materials, and initial collaboration with FIA on summary about PJ mortality event (October 04 -March 05)
- 2005 plot survey in UT and NV (June-August 2005 principally)
- progress report and initial summary for FHM Working Group meeting (date?)
- complete analyses of FHP adjunct and related FIA plot data (Oct-Dec 2005)

**e. Progress/Accomplishments:** n/a (However, we did begin this project in 2004 [-16 plots revisited in Utah] with modest funding from PTIPS. The MOU is signed and valid for 5+ years.)

**COSTS:**

	Item	Requested FHM EM Funding	Other-Source Funding	Source
<b>YEAR</b>				
<b>Administration</b>	Salary	17,000		
	Overhead			
	Travel	11,500		
<b>Procurements</b>	Contracting			
	Equipment	4,000		
	Supplies	500		

**Details:**

- a. 2 GS-5 Technicians for 7 pay periods (\$15/hr\*560\*2)  
\$17,000
- b. Travel (\$90/day\*63days\*2)  
11,500
- c. Vehicle for 4 months (4WD @ \$650/mo plus gas)  
4,000
- d. Supplies  
500

Total Cost:  
**\$33,000**

*\* R-4 Forest Health Protection personnel time and travel will be contributed to accomplish this project.*