

Ponderosa Pine Restoration: Utility of Terrestrial Ecosystem Survey

US Forest Service - Pacific Southwest Region

Coconino National Forest - Arizona



Partnering with Northern Arizona University, and University of Nevada-Las Vegas



Project Contact: Wayne Robbie

Phone: 505-842-3253

Email: wrobbie@fs.fed.us

Project Cost:

Forest Service Contribution: \$50,000

Partner Contribution: \$85,000

Project Cost: \$135,000

Focus Watersheds:

Walnut Cree-Upper Lake Mary, and Volunteer Wash

Accomplishments:

Development of a new application for the Terrestrial Ecosystem Survey: guiding landscape-scale restoration of ponderosa pine ecosystems in Arizona.

External Partners: Ecological Restoration Institute, Northern Arizona University; and, Department of Environmental and Occupational Health, University of Nevada, Las Vegas

Internal Partners: Soils/TEUI, Vegetation Ecology programs

Project Objectives:

Developing a terrestrial framework for assessing reference conditions, and evaluating ecosystem suitability for ponderosa pine restoration.

This collaborative project used the Southwestern Region's Terrestrial Ecosystem Survey (TES) as the basis for identifying suitable locations for ponderosa pine restoration.

TES subdivides large landscapes based on soils, geomorphology, topography, dominant vegetation type, and microclimate. Map units are associated with information on land capability and expected response to disturbance.

Researchers collected information on historic ponderosa pine forests that existed around the year 1880, before fire exclusion became common.

They sampled field plots to find evidence of dead wood, or old living trees, that dated back to that time period, and found that historic tree density and

vegetation pattern were significantly different among TES ecosystem types. Ponderosa pine forest reference conditions are associated with environmental factors reflected in TES.

This information allows land managers to tailor restoration plans to specific ecosystem types, so tree density and pattern can be matched to appropriate places in the landscape. The study showed that TES can be a useful tool for designing landscape-scale restoration projects.



Caption: Ponderosa pine ecosystems in Arizona; tree density is associated with the geologic materials in which soils formed.



Caption: Close up to Ponderosa pine ecosystems in Arizona

Citation: Abella, S.R., C.W. Denton, D.G. Brewer, W. A. Robbie, R.W. Steinke, and W.W. Covington. 2011. Using a terrestrial ecosystem survey to estimate the historical density of ponderosa pine trees. Res. Note. RMRS-RN-45. Fort Collins, CO: U.S.



Caption: Ponderosa pine ecosystems of varying density and pattern in winter season.



Caption: Ponderosa pine ecosystems of varying density and pattern.



Caption: Two scientists digging a soil sample pit.

Related information:

Abella, S.R., and C.W. Denton. 2009. [Spatial variation in reference conditions: historical tree density and pattern on a *Pinus ponderosa* landscape](#). Canadian Journal of Forest Research 39:2391-2403.

Abella, S.R., J.C. Hurja, D.J. Merkle, C.W. Denton, and D.G. Brewer. 2012. [Overstory-understory relationships along forest type and environmental gradients in the Spring Mountains of southern Nevada, USA](#). Folia Geobotanica (in press).