

TITLE: Recent, Rapid, Severe Aspen Mortality in the Rocky Mountain Region
INT-EM-07-01

LOCATION: Southern Colorado

DATE: Original proposal: Oct. 31, 2006. This progress report: Sept. 30, 2008

DURATION: Year 3 of 3-year project **FUNDING SOURCE:** Base

PROJECT LEADER: Jim Worrall, R2 Forest Health Management (970-642-1166, jworrall@fs.fed.us)

COOPERATORS: Roy Mask, Tom Eager and Leanne Egeland, R2 Forest Health Management; Wayne Shepperd, Rocky Mountain Research Station; John Guyon, R4 FHP; Phil Kemp, San Juan National Forest; Tim Garvey, Carol McKenzie and Matt Etzenhouser, Grand Mesa, Uncompahgre and Gunnison National Forests

FHP SPONSOR/CONTACT: see Project Leader

PROJECT OBJECTIVES: Determine the severity, site factors and causal complex associated with recent, rapid mortality of aspen in Colorado, now generally referred to as sudden aspen decline (SAD).

JUSTIFICATION: This project addresses evaluation criteria as follows:

1. **Linkage** to FHM Detection Monitoring: Data from FHM/FIA plots on long-term loss of aspen acreage was analyzed recently (Rogers 2002).
2. **Significance** in terms of the geographic scale: A similar phenomenon is occurring in northern Arizona and New Mexico, southern Utah, southern Wyoming, and perhaps in Montana.
3. **Biological impact** and/or political importance of the issue: Rapid deterioration of aspen stands has attracted intense media attention, legislative tours, and has raised concern in areas that are economically dependent on aspen for fiber, wildlife habitat and tourism.
4. **Scientific Basis/Feasibility:** We demonstrated our ability to manage and produce products from similar projects in the past and have a good record of reporting/publication. We already published a report from the first year of this project (see Progress).
5. **Priority Issues** addressed from Request for Proposals:
 - a. **Drought:** Our evidence suggests that SAD was incited by the warm drought from about 2000-2005. We measured site factors that are associated with drought stress, including soil texture, soil type, elevation, aspect, etc.
 - b. **Tree mortality:** SAD is a new syndrome of aspen mortality, much different from the west-wide, long-term "decline" due to succession and lack of disturbance. Mortality is very recent, rapid, and is generally clumped.
 - c. **Poor crown condition:** Mortality is often preceded by several years of branch dieback and crown deterioration.
 - d. **Climate change:** Aspen changes due to SAD are consistent with those predicted based on climate and vegetation models.
 - e. **Soil conditions:** We will determine whether mortality is associated in part with well-drained, coarse-textured (i.e., droughty) soils and soil types that are generally less favorable for aspen.

DESCRIPTION:

a. Background: From 2004 to at least 2007, aspen mortality increased sharply in Colorado and has become a focus for managers on some forests. Based on the 2007 aerial survey, we estimate that approximately 13% of the aspen cover type in

Colorado is affected. This may be related to the high levels of aspen mortality seen earlier in southern Utah, northern Arizona and northern New Mexico. We continue to receive numerous requests from the media and forest managers for assessments of the situation. This project provides for detailed field surveys and analysis of aerial survey and ground data to quantify the severity of the problem, assess potential causal factors, and determine the regeneration potential of affected stands.

b. Methods: Methods for our preliminary assessment are described in our first report (see reference under Progress below). Then, using aerial survey and vegetation cover data, we selected potential plots in aspen damage polygons and nearby plots in healthy aspen cover type. In each plot we assessed stand conditions (including typical stand exam data; crown loss estimates of aspen; diseases, insects and other damages on aspen; and collection of increment cores), tree regeneration, soils, aspen root condition, and herb and shrub vegetation.

c. Products: Early results are already published in *Forest Ecology and Management*. Preliminary results are incorporated in a Frequently Asked Questions document used in response to media and other inquiries, and in a powerpoint used in presentations requested by forest managers, environmental groups, community workshops, and scientific groups. One or more additional reports will be prepared for publication by the end of this final year.

d. Schedule of Activities (FY09):

Oct.-Dec.: assemble dendrochronology equipment, measure cores.

Nov.-Jan.: classify soil types (soil taxonomy) and vegetation types.

Dec.-July: conduct extensive statistical analyses to look for associations and trends among soils, root condition, site factors, stand factors, vegetation, age, growth patterns, crown loss, mortality, regeneration, insects, pathogens, etc. These analyses will help with assessments of severity and causal factors of SAD.

July-Sept.: prepare reports.

e. Progress/Accomplishments: In the first year we completed a comprehensive analysis of GIS data and stand exams from the San Juan National Forest, resulting in the following report:

Worrall JJ, Egeland L, Eager T, Mask RA, Johnson EW, Kemp PA, Shepperd WD. 2008.

Rapid mortality of *Populus tremuloides* in southwestern Colorado, USA. *FOREST ECOLOGY AND MANAGEMENT* 255(3-4): 686-696. <http://www.fs.fed.us/r2/fhm/reports/sad_2008.pdf>

In addition, we completed work in 76 field plots in 2007 and 86 in 2008. All raw data (except increment core measurements) have been entered. We completed preliminary analyses of the 2007 data that we have been using extensively in communicating with managers, the media, and scientists.

COSTS: The primary funding needed this year is for a full-time technician/analyst (GS-7) to perform dendrochronology measurements with 650 increment cores, classify vegetation and soil types of the plots, summarize and analyze the data, and conduct supplemental field work. Permanent FHP staff also work on the project; their contribution is represented under Other Source Funding.

	Item	Requested FHM EM Funding	Other- Source Funding	Source
YEAR				
Administration	Salary	38,000	28,000	SPFH/SPS4
	Overhead	3,200		
	Travel	1,500		
Procurements	Contracting			
	Equipment		500	SPFH
	Supplies		500	SPFH
Total		42,700	29,000	SPFH/SPS4