

INT-EM-06-01 The Influence of Wolves on Decline in Aspen Communities in Northeastern Arizona.

LOCATION: Northern Arizona

DURATION: Year 1 of 2-year project **FUNDING SOURCE:** Base

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PROJECT OBJECTIVES:

1. Quantify the extent and severity of decline and mortality of aspen at the stand level through an extensive plot network on a portion of Northern Arizona National Forests not included in the EM project funded in FY 03-04-05 by Fairweather et al.
2. Look for correlations between stand and site conditions and aspen mortality.
3. Specifically survey areas where wolves have been reintroduced and look for correlations between areas with and without wolves and aspen recruitment.

JUSTIFICATION:

Linkage to FHM Detection Monitoring: Aerial and ground detection surveys have determined a decline in aspen clones across northern Arizona over the past few years. Affected areas have a combination of symptoms including reduced canopy, branch dieback and mortality. Fairweather et al. were funded by the USFS Evaluation Monitoring for three years (2003-05) to monitor the severity of the decline. The Fairweather et al. monitoring project helped to quantify aspen decline and mortality levels and describe site-specific stand and site variables that are influencing this event. They found that: “there is little aspen regeneration, especially at lower elevations where most of the overstory is dead. Ungulate browse is heavy at all sites, especially to aspen regeneration. On seven of the nine sites surveyed more than 50 percent of the regeneration was browsed, and two sites had 100 percent browse damage.”

Significance in terms of geographic scale: Although this project is centered on a small region in northeastern Arizona, the results can impact similar regeneration/ungulate issues throughout the west.

Biological and political importance: Recent observations by Forest Health Protection and Rocky Mountain Research Station staff indicate that aspen recruitment appears to be robust in aspen stands in eastern Arizona where the Mexican grey wolf has been reintroduced. Similar patterns of recruitment of willow, cottonwood and aspen suckers have been documented in Yellowstone National Park (Beschta 2005, Ripple and Beschta. 2005, Ripple and Beschta.

2004a, Ripple and Beschta. 2004b). Wolf recovery may represent a management option for helping to restore plant communities and conserve biodiversity.

Feasibility or probability that the project will be successfully completed: The successful Fairweather et al. project in 2003-05 was a model that we will follow in conducting this project. The University of Arizona Forest Health Program has a trained Research Specialist, Chris Hayes, and access to summer employees through the Northern Arizona University School of Forestry.

DESCRIPTION:

a. Background: Region 3 forest managers have discussed a decline in aspen communities for decades, after it was reported that the acreage of aspen dominated forests declined from nearly 500,000 acres to 263,000 acres between 1962 and 1986. Arizona is believed to have just twenty-five percent of those acres. This decline has been associated with two main factors: the absence of fire in southwestern ecosystems since European settlement, and extreme browsing pressure from large ungulates. An even more accelerated rate of decline has been observed across the northern half of Arizona over the past 3 years, following a severe frost event and several years of drought. Mexican grey wolves were reintroduced in 1998 in the Apache-Sitgreaves and Gila National Forests as of May, 2005 21 wolf packs were living in the 2 forest area.

b. Methods: This project represents an intensification of the Forest Health Monitoring program permanent plots by providing finer resolution into specific aspen forest types and how regeneration has been impacted by presence or absence of the Mexican Grey Wolf.

We propose to establish 80 plots within 10 aspen stands on the Apache-Sitgreaves NF, 40 in wolf reintroduction areas and 40 in areas where wolves are not known to be established. We will select areas with input from Fairweather et al. for areas without wolves and John Oakleaf, Albuquerque Office US Fish and Wildlife Service will provide the areas where wolves are known to range. We will utilize aerial detection survey data to help determine areas to survey. Individual plots will be randomly selected. A grid of permanent plots will be established across an affected area.

1. Stands will be dominated by aspen.
2. Stands will be paired (non-wolf area vs. wolf reintroduction area) by site characteristics. Once the five non-wolf stands are determined we will use their individual site characteristics to pair them with the five wolf stands. Site characteristics include: aspect, slope, and elevation.
3. The species, number, stage of regeneration, height, and evidence of browsing is collected on a sub-plot of 1/100th of an acre for saplings under 5" dbh. Larger regeneration (>0.5" dbh) will have the dbh recorded.

c. Products: Evaluation monitoring and technical reports will be sent to Northern Arizona forest managers and planners on the extent and severity of aspen decline, mortality, and regeneration success. This information will also be useful for agencies outside the Forest Service, i.e. State Lands Department, AZ Fish and Game, Bureau of Indian Affairs, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service as well as the numerous mountain communities that are concerned with aspen forests and wolf reintroductions.

d. Schedule of Activities:

Year 1. Establish 40 permanent plots in the A-S NF within the wolf reintroduction area and 40 permanent plots in the A-S NF outside the wolf reintroduction area but within areas of decline as indicated by aerial detection survey and previous EM study. Analyze findings and prepare progress report with initial findings and any trend information. Prepare and present poster at the annual FHM conference.

Year 2. Revisit all plots and to collect subsequent impact data. Complete final analysis and report. Prepare and present poster at the annual FHM conference.

COSTS:

	Item	Requested FHM EM Funding	Other-Source Funding	Source
YEAR 1				
Administration	Salary	15,000	5,000	Univ. of Arizona FHP Base
	Overhead			
	Travel	7,000	1,000	Univ. of Arizona FHP Base
Procurements	Contracting			
	Equipment			
	Supplies	1,000		
Total, Year 1		23,000	6,000	

Year 2 budget should be within 10% of the year 1 budget.

REFERENCES:

- Beschta, RL. 2005. Reduced cottonwood recruitment following extirpation of wolves in Yellowstone's northern range. *Ecology* 86:391-403.
- Fairweather, M., B. Giels, and J. Rolf. 2005 Evaluation Monitoring Annual Report. USFS, Southwest Region.
- Ripple, WJ and RL Beschta. 2005. Willow thickets protect young aspen from elk browsing after wolf reintroduction. *Western North American Naturalist*. 65:118-122.
- Ripple, WJ and RL Beschta. 2004a. Wolves, elk, willows, and trophic cascades in the upper Gallatin Range of Southwestern Montana, USA. *Forest Ecology and Management* 200:161-181.
- Ripple, WJ and RL Beschta. 2004b. Wolves and the Ecology of Fear: Can Predation Risk Structure Ecosystems? *Bioscience* 54:755-766.