

TITLE: Locate, Map, and Establish Long-Term Monitoring of Exotic-Invasive Plant Species in the Southern Appalachian Mountains.

APPLICANT: SAMAB Foundation

LOCATION: Appalachian District, Pisgah National Forest in/around Hot Springs, NC; Nolichucky-Unaka District, Cherokee National Forest near Hartford, TN; Mount Rogers National Recreation Area, Jefferson National Forest in/around Konnarock/Whitetop, VA

DURATION: Year 1 of 3-year project **FUNDING SOURCE:** Fire Plan

PROJECT LEADER:

Dr. Jack Ranney, University of Tennessee; lead investigator on SAMAB Volunteer Environmental Monitoring (SAVEM) Program

Dr. Robb Turner, Southern Appalachian Man and the Biosphere Foundation; Executive Director of SAMAB

Andy Brown, Equinox Environmental Consultation and Design, Inc.; coordinator of SAMAB Volunteer Environmental Monitoring Program

COOPERATORS:

Ken Stolte, USDA Forest Service, Southern Research Station RWU-4803

Dr. John Peine, US Geological Survey

PROJECT OBJECTIVES:

In 2002, the Southern Appalachian Man and the Biosphere (SAMAB) Foundation, in cooperation with the USDA Forest Service and with funding from the National Forest Foundation, initiated a simple, presence/absence study based on an invasive-exotic plant survey (Level I Survey), utilizing citizen monitors along trails, roads, and other rights-of-way in National Forests of the southern Appalachians (<http://samab.org/Focus/Monitor/Invasives/invasives.html>). This proposal submitted to the FHM program would extend that collaboration to accomplish the following objectives:

- Year 1: locate and map exotic-invasive plant species intrusions into interior forests, keying on locations where current Level I surveys performed by the SAMAB Southern Appalachian Volunteer Environmental Monitoring (SAVEM) program have found these species.
- Year 2: establish long-term FHM plots (Phase 4 type) in survey areas where exotic-invasive species have been found.
- Year 3: establish a probabilistic-based FHM plot system throughout forests adjacent to areas where exotic-invasive species have been found.

In each year, we will particularly target the 33 plant species identified as Nonnative Invasive Plants of Southern Forests (Miller, FS-SRS General Technical Report SRS-62, 2003), and a few other invasive exotic plant species of note as suggested by US Forest Service botanists and land managers. Our FHM surveys and plots will continue to include coverage of recent wildfire burns and proposed prescribed burn areas.

JUSTIFICATION:

Exotic-invasive plant species have been identified in the National Fire Plan and by the Chief of

the USDA Forest Service as one of the biggest threats to forest health and sustainability. Dr. James Miller (Forest Service) has identified, described, and proposed treatments for 33 exotic-invasive plant species of particular concern to southern forest ecosystems. What is currently not well known is the geographic extent of these exotic-invasive plant species, and the ecological ramifications of the establishment and spread of these species to native plant and animal species in the Southern Appalachian forests. This information is needed to evaluate invasive exotic plant control efforts being scheduled by the NFS Districts in these project areas for the coming years; understand the role of fire and fire management in invasive plant colonization; and the influence of the urban/forest interface in exotic plant distribution.

DESCRIPTION:

a. Background: The SAMAB SAVEM program utilizes volunteer recruits from nearby communities and trains them on a simple Level I Survey protocol involving: a) identification techniques for these species; b) data entry indicating species presence/absence, relative abundance, and size of occurrence; and c) GPS mapping of these plants. As suggested by NFS personnel, many of these surveys were conducted through or adjacent to recent burned areas. SAMAB has been sharing the data from this program with district rangers and their staffs. While these limited “right of way” based data sets are proving useful information for environmental assessments and larger invasive species control plans at the local and district level (personal communications, 2004; L Randolph [Pisgah NF] and C. Thomas [MRNRA]), the national forests still have an important need to learn definitively which plants are encroaching deeper into the forest interior and to measure the impact of these plants on forest health and sustainability.

b. Methods: In Year 1 of this study, Level II surveys will be conducted based on ecological characteristics (shade tolerance, interior-edge preference, disturbance regimes, and other habitat preferences) of the 33 exotic invasive plant species indicated by Dr. Miller (2003) and other sources. Some surveys will include areas recently burned by wildfire and prescribed fire and will evaluate the establishment and spread of exotic-invasive species into burned areas. In Year 2 we will design and begin implementation of long-term monitoring plots (using FHM and FIA technology) in areas where the surveys have indicated the presence of exotic invasive plants. These FHM-EM plots will utilize FHM and FIA indicators that will elucidate the ecological effects of exotic invasive species on forest ecosystems in the Southern Appalachians, providing *in situ* evaluation of changes in forest ecosystems where exotic invasive species are well established. In Year 3 we will establish a probabilistic sampling grid over areas where exotic invasive species are prevalent, and adjacent areas to begin to evaluate the effects of the exotic invasive plants at the population level. These two fixed-area plot systems (Years 2 and 3) will provide a framework for analyzing relationships and impacts of invasive exotic plant species in our native forest communities. Additionally, these plot systems will monitor the effectiveness of herbicide and other invasive plant eradication procedures that will be on-going in some of the areas where FHM Evaluation Monitoring is occurring. Citizen monitors from nearby communities will continue to assist in data collection and their work will be subject to rigorous QA/QC checks. The USGS National Biological Information Infrastructure will be utilized for data storage and output production to assist in analysis. The NBII communication portal will be used to maximize efficiency of communications by the various monitoring teams.

c. Products: For all Level II and Level III surveys and plot establishment, our study will generate a report and posters for the FHM program each year, journal articles, and interpretive materials used by National Forest Systems and National Park Service. A framework will be

developed for FS-NFS, NPS, and others to evaluate exotic-invasive treatment methods, prescribed and natural fire effects on establishment and spread of exotic-invasive species, and movement of these species into forest interior areas.

d. Schedule of Activities: Winter 2005. Design surveys based on ecological characteristics of each species, for areas where exotic invasive species were found in Level I survey. Review by Dr. James Miller, Gary Kauffman, and others will be requested. Spring 2005. Train citizen-scientists in exotic species identification and survey methods. Certify qualified persons completing training. Conduct surveys in lowland areas. Summer 2005. Conduct surveys in highland areas. Perform audits of field crews. Fall 2005. Analyze data, write report, and develop posters. Submit portions to journals. Provide relevant data to NFS and NPS for interpretive and education purposes.

e. Progress/Accomplishments: Winter 2004—Fall 2005: Plan, train, and execute Level II surveys. Analyze data and produce information products. Winter 2005—Fall 2006: Use locational information from past SAMAB SAVEM Level I and recently completed FHM Level II surveys to design stratified-random selection of plot locations. Train citizen-scientists in FHM and FIA indicators. Establish Level II plot system in areas with existing exotic invasive plants. Analyze data and produce information products. Winter 2006—Fall 2007: Design probabilistic sample of forest areas where exotic invasive plants are invading. Train citizen-scientists in FHM and FIA methods and indicators. Establish Level III plot system to determine invasion, spread, and ecological effects of exotic-invasive plant species at forest population level (areas with and without exotic invasive species).

COSTS:

	Item	Requested FHM EM Funding	Other- Source Funding	Source
YEAR 1 TOTAL		\$40,800		
Administration	Salary	\$11,000	\$1,500	SAMAB/JIEE
	Overhead	0		
	Travel	\$800		
Procurements	Contracting	\$28,000	\$20,000	USGS-NBII
	Equipment	\$600		
	Supplies	\$400		
YEAR 2 TOTAL		\$36,800		
Administration	Salary	\$11,000	\$1,500	SAMAB/JIEE
	Overhead			
	Travel	\$300		
Procurements	Contracting	\$24,000	\$20,000	USGS-NBII
	Equipment	\$1,200		
	Supplies	\$300		
YEAR 3 TOTAL		\$40,300		
Administration	Salary	\$11,000	\$1,500	SAMAB/JIEE
	Overhead	0		
	Travel	\$300	\$20,000	USGS-NBII
Procurements	Contracting	\$28,000		
	Equipment	\$500		
	Supplies	\$500		

TOTAL 3YR COSTS		\$117,900	\$64,500	
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- FHM Funding for YR1 Administration Salary = \$2,000 to SAMAB project administration; \$5,000 to FS SRS RWU-4803 ; \$4,000 to
Principal Investigator Jack Ranney at UT
- FHM Funding for YR1 Contracting = \$20,000 to Equinox, fieldwork and citizen monitor supervision; \$4,000 to J. Ranney fieldwork
- FHM Funding for YR 2 Administration Salary = \$2,000 to SAMAB project administration; \$5,000 to FS Southern Research Station RWU 4803; \$4,000 to Principal Investigator J Ranney at UT
- FHM Funding for YR 2 Contracting = \$20,000 to Equinox Environmental field work and citizen monitor supervision; \$4,000 to PI J. Ranney
- FHM Funding for YR 3 Administration Salary = \$2,000 to SAMAB project administration; \$5,000 to FS Southern Research Station RWU-4803; \$4,000 to Principal Investigator J. Ranney
- FHM Funding for YR 3 Contracting = \$24,000 to Equinox Environmental fieldwork and citizen monitor supervision; \$4,000 to PI J Ranney
- Other Source Funding for YR 1-3 Administration Salary = \$1,500 from SAMAB/JIEE as in-kind contribution
- Other Source Funding for YR 1-3 Contracting = \$10,000 NBII Data Management Systems; \$10,000 USGS J. Peine, student intern, communication Portal; All other-source funding is contributed in-kind