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## FHP SPECIAL TECHNOLOGY DEVELOPMENT PROJECT PROGRESS REPORT

### PROJECT STATUS:

- Continuing (Funds are being requested for FY 2000 to continue the project)  
 Continuing (work continues but no FHP-STDP funds are requested in FY2000)  
 Completed (ended in FY 1999)

**PROJECT NUMBER:** R39901

**PROJECT TITLE:** Spruce Aphid Impact Assessment and Hazard Rating in the Southwest

**SUBJECT:** Spruce aphid on Engelmann and blue spruce in the Southwest

**PROJECT OBJECTIVE:** Develop a hazard rating system for spruce aphid in the Southwest

### BRIEF DESCRIPTION OF PROJECT:

Existing color-infrared stereo pair photography will be interpreted for defoliation and site and stand factors. The photo-interpretation (PI) data will be verified using ground plots. Data will be analyzed for associations to form the basis of a hazard-rating system.

**FHP PERSON LEADING THE PROJECT:** Jill Wilson, R-3 Arizona Zone Entomology and Pathology

**COOPERATORS:** Dr. Ann M. Lynch, Rocky Mountain Research Station  
Dave Reinhold, Fort Apache Agency, Bureau of Indian Affairs  
Dr. David L. Kulhavy, Stephen F. Austin State University

### BRIEF DESCRIPTION OF ACCOMPLISHMENTS AND RESULTS:

Prior to obtaining STDP funds the Region 3 Arizona Zone Entomology & Pathology and the Rocky Mountain Research Station in 1997 cooperatively obtained color-infrared 1:10,000 stereo photography of approximately 6,400 ac of aphid-affected forest (and inter-mixed non-host forest and other terrain) on the Fort Apache Indian Reservation and the Apache-Sitgreaves N.F. BIA CFI plots located in the host type were assessed for defoliation and dwarf-mistletoe infection in 1997. These plots will provide the ground-truth data for verifying photo-interpretations.

In August 1999, using STDP and Research funds, a Research Joint Venture Agreement was initiated with Dr. David L. Kulhavy, Stephen F. Austin State University, College of Forestry. Ph.D. candidate James F. Ward will use the color-infrared photography and existing spatially-referenced terrain and vegetation data to develop a site hazard-rating system for spruce aphid in the White Mountains as part of his dissertation research. Progress to date includes a review of the photography and a review of forest insect hazard rating methodologies. Work has begun on indexing the photography and preparation for delineating host and defoliated polygons on rectified ortho-quads. Photo-interpretation objectives are to delineate the aphid-affected areas, rate defoliation severity, and provide site and vegetation data necessary for hazard analysis. The Ph.D. candidate is an experienced PI/GIS expert, with considerable contracting history with Region 2 and elsewhere, and with the State of Colorado the BLM. He has been the recipient of

numerous Chief-signed Certificates of Merit and Appreciation for his work with NFAP and the National Forests. We would be hard pressed to find a better qualified individual for this project.

Additionally in 1999 the CFI plots were assessed for tree mortality related to spruce aphid defoliation. Data entry of the CFI plot data is underway, with expected completion in October 1999. The CFI plot data, intended for use in ground-truth assessment of the photography, will also be used to assess individual-tree characteristics associated with aphid-related mortality.

A manuscript titled "Spruce aphid (*Elatobium abietinum* (Walker)) populations reach epidemic levels on *Picea engelmannii* Parry in the interior southwestern United States" by A.M. Lynch, J.L. Wilson, and M.S. Frank has been completed and is in the Rocky Mountain Research Station publication process for submission to the journal *Agricultural and Forest Entomology*. This manuscript describes the first known continental interior outbreak of spruce aphid.

Only one area of difficulty was encountered: logistical funding and timing problems. An official STDP funding award letter was received in late March 1999, just before the field season. Funding needed to be utilized in FY'99, due to uncertainties regarding carryover authority, especially for Inter- and Intra-Agency Agreements. The technical portions of this project, the PI and GIS work, cannot be completed within a few months. Therefore it was not possible to hire Forest Service or BIA employees to complete that portion of the work in the available time. This difficulty was exacerbated by the departure of many Region 3 and 4 and BIA employees to fire duty in California and Nevada. Nor was it realistic to conduct contract bids, primarily because of accelerated deadlines in Contracting due to FFIS. Because many other Forest Service projects encountered similar difficulties, the FHTET in Fort Collins and the Remote Sensing Applications Center (RSAC) in Salt Lake City were overburdened with requests for similar PI and GIS projects, and were unable to accept this project on a contract or contract employee basis. At the end of July we still had no way to complete the PI portion of the project. Essentially we got lucky - in the interim period between 1998 and August 1999, the College of Forestry at Stephen F. Austin State University greatly expanded and upgraded their photogrammetry and GIS center. At the suggestion of RSAC, and using funds from the research portion of STDP and from the Rocky Mountain Research Station, the RJVA described above was initiated. Due in large part to the quality of the Ph.D. student assigned to this project, this approach will provide a more intensive effort and better quality product than the originally-intended approach. This would not have been possible if a large portion of the STDP funds had not been research funding, as S&PF funds cannot be used for RJVA's. However, the project completion date for the RJVA is 31 May 2001.

**DOCUMENTATION:** Accomplishments (no results to date):

Poster presentation: "Spruce aphid - A maritime insect in the Southwestern United States", A.M. Lynch, J.L. Wilson, International Union of Forest Research Organizations, 16-19 August 1999, Victoria B.C.

This poster is now on display at the College of Forestry, Stephen F. Austin State University.

**FIRST YEAR FUNDED:** FY\_99\_\_ .

**YEAR SCHEDULED TO END:** From original proposal, FY\_00\_\_ .

**ACTUAL YEAR TO END:** Year products will be delivered, FY\_01\_\_ .

See last paragraph of "Brief Description of Results..." for explanation.

**PRODUCTS AND DUE DATES IDENTIFIED IN THE ORIGINAL PROPOSAL:**

A delineation of defoliated and non-defoliated host areas will be completed in FY99. Photointerpretation of a systematic sample of the photographed area should be completed in FY99 as well, but may require work in FY2000. Analysis and development of a risk-rating system will be completed in FY2000.

**STATUS OF PRODUCTS:**

If not completed by due date, explain why and indicate when they will be complete. Due to logistical difficulties described above, PI will require work in FY'00. Polygon delineation may be completed in FY'99, but preliminary work indicates that it might be better to proceed with PI and polygon delineation together, covering watersheds or natural landform boundaries.

Does the Region/Area consider progress on this project to be acceptable, and if not, what corrective measures are planned? **Yes, /s/ Jill Wilson.**

**FUNDS OBLIGATED FROM BEGINNING OF PROJECT THROUGH END OF FY 1999:**

Please make a reasonable effort to provide information about funds and contributions from other sources by indicating the source(s) and amount or value of contributions. This information is helpful in order to communicate the effectiveness of this program in leveraging opportunities and fostering collaboration and ultimately to encourage continued availability of future funding for the program.

<b>Fiscal Year</b>	<b>STDP Funding</b>	<b>Contributions</b>	<b>Source organization</b>
1997		\$12,0000 \$ 6,000	R3 Arizona Zone Entomology & Pathology Rocky Mountain Research Station. (RMRS)
1999	\$34,445	\$2,297 \$2,431	R3 Arizona Zone Entomology & Pathology RMRS
		.....	
2000	\$16,188	\$2,273	RMRS

**FUNDS CARRIED OVER FROM FY 1999 to FY 2000:**

Carryover is \$9.66. Due to the excessive amount of paperwork required to re-authorize this small amount of funding, it will be abandoned.

**POST-PROJECT TECHNOLOGY SUPPORT:**

Some projects result in products or information and that doesn't inherently require sustained investments for continued support after the conclusion of a project. However, other projects may result in products that are not usable without a continuing commitment to sustained investments for support (sustained access, user support, training, or through continued funding from a source

committed to the use of the product(s) ). Frequently project leaders develop a deeper understanding and appreciation for this type of sustained support as the project progresses, therefore please provide your best estimates based on current understanding of the products that are being developed. If either item 1 or 2 are irrelevant to this project, explain why.

1. Show estimated annual funding needed to support the product(s) or continued use of technology after the completion of the project when FHP STDP funding is no longer available. \$\_\_\_\_\_
2. Indicate what sponsor/ decision-maker (by name and/or title) or what organization has committed to being responsible for future support and/or to provide this funding for continued support. If no commitment has been made, describe what steps are being taken to secure this commitment.

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It is too early to anticipate future needs. Generally, depending on sophistication, the hazard-rating system will be very low maintenance, requiring only the most basic of site and vegetation information (aspect, slope, elevation, percent host). At the highest level of sophistication, the application will be based on Forest Service Arc Info and FSveg platforms.

**LOOK to the FUTURE:**

Hazard-rating systems developed from PI data usually lack detail and precision. Future recommended work will likely include ground-based validation and calibration during the next spruce aphid outbreak.

Also during the next outbreak it will be paramount that dna material be collected to compare with aphid population dna in Alaska, British Columbia and Europe in order to determine if population dynamics in the Southwest, which exceed known limits of aphid biology, are due to genetic change in the aphid population or to weather or host physiology differences. Based on dna analysis, different research and management strategies would be recommended.

**REQUEST FOR CONTINUED FHP-STDP FUNDING FOR PROJECT**

**PROJECT STATUS:** Funds are being requested for FY 2000 to continue the project.

**ESTIMATED COMPLETION DATE:** FY2001

**PROJECT NUMBER:** R3-99-01

**PROJECT TITLE:** Spruce Aphid Impact Assessment and Hazard Rating in the Southwest

**ADDITIONS:**

This project was originally planned for two-year funding; the second-year funds will be needed (no change).

**CHANGES:**

As described above, the PI and GIS portion of this project will be completed with a RJVA with Stephen F. Austin State University rather than with Forest Service or Bureau of Indian Affairs employees. This change is expected to produce a superior product, but take longer.

**FY 2000 BUDGET:** Do not include costs covered by other FHP funding which will occur regardless of this project. Show estimated FHP STDP funding need for FY 2000. Show separately the funding to be requested/provided from other sources in FY 2000.

ITEMIZE as follows:

Item	Requested FHP STDP Funding	Other Sources amount	Organization Name
Administrative:			
Salary	\$7,139	\$750	Rocky Mt. Res. Stn. (RMRS)
Overhead (RMRS)	\$1,619		
Travel		\$1,525	RMRS
Procurements:			
Contracting			
Equipment			
Supplies			
Other (RJVA)	\$7,430	\$7,139	RMRS
TOTAL FY 2000 Budget	\$16,188	\$9,414	RMRS

**New FHP STDP funding needed in FY 2000 after any FY 1999 carryover is applied:**  
\$ 16,188\_\_\_\_\_ .

Estimated additional future funding needed beyond FY 2000, by fiscal year:  
Show estimated FHP STDP funding needed by fiscal year. Show separately the funding to be requested/provided from other sources.

None anticipated at this time.

