Add Andy David and Jesse Schomberg to the list of persons named on this grant.

**Rationale for the Research:**

Minnesota hosts three species of ash, white ash (*Fraxinus americana*), green ash (*Fraxinus pensylvanica*) and black ash (*Fraxinus nigra*). White ash is an upland species and is at the edge of its range in extreme southeast Minnesota. However both black and green ash are common lowland hardwoods that are found throughout the majority of the state. Ecologically, black and green ash are the most important hardwoods in the lowland forest community representing 51% of the lowland hardwood cover type in Minnesota. As an example of their importance the next closest species is silver maple, which represents 11% of this cover type. Black ash is very important in native cultures as a source of wood for ash baskets and both black and green ash provide a source of pallet, saw and veneer logs to hardwood sawmills located in rural portions of the state. Ash harvest levels for 2007 are estimated to increase by 55% over 2003 levels due to increasing acceptance of ash in oriented stand board and pulp and paper.

EAB was introduced from Asia in 2002 to the Detroit, Michigan, Windsor, Ontario area most likely on dunnage associated with an overseas shipment. Although adults feed on ash leaves the larval stage does the most damage by feeding exclusively on the cambial layer which girdles the tree. Unlike most borers that target larger trees EAB is capable of utilizing seedlings down to as small as one-half inch in diameter. EAB also has the potential to attack all species of ash and in feeding studies survives equally well on black ash and green ash. As of June 2008 EAB has been found in Illinois, Indiana, Kentucky, Maryland,Michigan, Minnesota, Missouri, Ohio, Pennsylvania and Wisconsin.

Efforts to control EAB and its spread have been largely unsuccessful because EAB does not appear to use long-range pheromones that would be useful in trapping the insect and there are no known biological control agents. Monitoring for new outbreaks, quarantine areas, firewood use restrictions on state lands and Slow Ash Mortality (SLAM) are a strategies that are currently being employed to contain the spread of this insect.

**Project Goals and Objectives:**

*Objective 1: Conserve the genetic diversity of ash through seed collection.*

Increase efforts currently underway to collect seed to capture the genetic variation of ash in Minnesota. This gene conservation effort would preserve the genetic variation for a future point in time when EAB can be controlled and the species can be reintroduced to Minnesota using locally adapted seed sources. In addition, the seed would be made available for research purposes. DNR Forestry will be used to identify stands with seed trees in the grid areas. UMN personnel will collect seed statewide using standard seed collection techniques. and Seed collected by volunteers will also be used. Volunteer collection will be coordinated by Mike Reichenbach, U of MN Extension. Seed properly dried and frozen can be preserved for 10-20 years. Seed will be stored at a USDA seed storage facility. Both black and green ash are important ecological, economic and cultural tree species in Minnesota. The threat that EAB posses to these species is real and if appropriate actions are not taken to preserve the genetic variation of these species before EAB arrives it is likely that these ash species will cease to exist in Minnesota. In the short term the gene conservation effort proposed here will provide an *ex situ* haven for the genetic variation inherent to the species. This period of roughly one to two decades can be used to identify a control method for EAB. The long term benefit this program provides is the opportunity to reestablish two important forest species in Minnesota with seed that is known to be adapted to local growing conditions.

Objective Two:

Develop prescriptions for rural landowners to take in face of the potential elimination of ash from the landscape. The process would allow researchers and landowners to interact with the goal of co-creating prescriptions. This process recognizes gaps in knowledge and science, allows input from different perspectives and results in solutions that are likely to be adopted.

2 day meeting: Conference/scenario learning process-round tables workshops and presentations

12 Invited speakers and participants: travel, lodging and meals $600 each on average

Conference facilities: ???

Printing, marketing?

Conference Fees???

Facilitator for the working sessions: $6000

Some conferences held on topics of interest were free and lunch was provided. This will be working conference and very similar to conferences offered. However, fees would help offset costs. Fees might be used to cover lunch and the cost of the meeting facility. Funds through the grant would be directed at getting the invited speakers and participants to the meeting.

In preparation for the conference. Three persons from the core team would travel to Michigan, and Wisconsin to meet with persons in those states to review on-site infestations and the result.

$1400 each person

Objective Three

Jesse Schomberg MNSG  
George Host NRRI  
Gerry Sjerven NRRI  
Pete Wolter ?NRRI?  
Cindy Hagley MNSG  
Mike Reichenbach UMExt  
  
Subject:  
Effects of ash loss on hydrology of forested streams  
  
Needs:  
  
Data on ash forest cover, canopy coverage of ash trees  
  
Research questions to address:  
What are the hydrological implications of ash tree death, and can we predict watersheds with greatest impact?  
  
Actions:  
evaluate ash canopy cover by watershed; hydrologic model used to evaluate effects on canopy interception, evapotranspiration, and runoff peak flows and base flows. Could also look at regeneration rates of other spp to calculate duration of altered hydrology  
  
Evaluation:  
Success will be

* Determination of effects of EAB on stream hydrology
* identified priority watersheds where greatest impact expected

Budget:  
NRRI GIS: data collection, analysis ($15k?)  
NRRI: Hydrologic modeling ($15k?)

Also in preparation for the conference a literature review would be conducted regarding ash ecology, and management. An additional focus would be on the potential impact that the loss of ash would have on the forest ecosystem. Examples to draw from include American chestnut and elm. For example the loss of elm may have contributed to acidification of streams and lakes due to the loss of the buffering capacity of elms in forested landscapes.