MANAGEMENT PLAN:

Project management will be coordinated by Dr. Lori Eckhardt and day to day coordination of activities will be managed by the postdoctoral fellow (to be hired). The research components are tightly linked and will require excellent communication and coordination among all participants. Dr. Eckhardt has previously successfully coordinated and worked as part of several multidisciplinary and multistate research projects. The proposed project includes three years of work and is divided into four components culminating in a conference in year four. Each component (and the final conference) will be overseen by Dr. Eckhardt but may be initiated by the other group members with the expertise necessary to accomplish the work. However, all investigators will provide their specific expertise within each component in a cooperative fashion throughout the project.

Research component one will focus on determining and developing an inoculation protocol to screen seedlings and assess strain aggressiveness. This component will be co-directed by Drs. Lori Eckhardt and Annakay Newell. Dr. Eckhardt will be responsible for the coordination of the sampling and fungal identification portion of component one. Drs. Lori Eckhardt and Annakay Abrahams will be responsible for the (1) development of a method of propagation for *Lecanosticta acicola*; (2) developing an inoculation protocol for *Lecanosticta acicola*; and (3) developing a seedling screening protocol. Dr. Annakay Newell will coordinate seedlings for experiments with the Southern Forest Nursery Management Cooperative. Key discoveries from research component one within each year will be quickly summarized and integrated into reports and presentations. This will be accomplished through data sharing among the research team. Dr. Eckhardt will monitor and ensure quality control and release of these findings.

Research component two will focus on the distribution of *Lecanosticta acicola* across Alabama and the environmental factors that drive its emergence and exacerbation. This component will be co-directed by Drs. Lori Eckhardt, Lana Narine, and Joseph Fan. Dr. Eckhardt will be responsible for coordinating the sampling and fungal identification portion of component two. Drs. Fan and Narine will be responsible for environmental factor data collection and analysis as well as distribution mapping. Drs. Brian Via and Iris Erramuspe will train the student in the total phenolic analysis using wet chemistry and NIR (equipment in Dr. Via's lab) as well as the statistical

analysis. One graduate student will be co-advised by Drs. Eckhardt and Narine and the other will be advised by Drs. Eckhardt and Fan. As with component one, key discoveries from research component one within each year will be quickly summarized and integrated into reports and presentations. This will be accomplished through data sharing among the research team. Dr. Eckhardt will monitor and ensure quality control and release of these findings.

Research component three will focus on the detection and movement of *Lecanosticta acicola* with remote sensing. Dr. Lana Narine will lead this component. She will be responsible for the coordination of the remote sensing components of the project, and supervision of one graduate student to conduct field work and geospatial analyses for integrating field with remotely sensed data related to detection, distribution mapping and movement of needle pathogens. As with components one and two, key discoveries from research component one within each year will be quickly summarized and integrated into reports and presentations. This will be accomplished through data sharing among the research team. Dr. Narine will monitor and ensure quality control and release of these findings.

Research component four will focus on the genetic diversity of *Lecanosticta acicola* across the southeast, its origins, and its invasion history. This component will be led by Dr. Willoughby. She will be responsible for the supervision of one graduate student and one short-term postdoc to conduct the lab work and analysis related to the genetic diversity and pathogen origins/history, including whole genome analyses of *L. acicola* and its *Pinus* hosts as well the analyses that incorporate range-wide distribution, genetic diversity, and relatedness of *L. acicola*, identification of functional *L. acicola* variants associated with habitats and species, and analysis of the duration of contact between *L. acicola* and the host *Pinus* species. As with the previous components, key discoveries from research component four within each year will be quickly summarized and integrated into reports and presentations. This will be accomplished through data sharing among the research team. Dr. Willoughby will monitor and ensure quality control and release of these findings.

The Extension and outreach component will be co-directed by Dr. Lori Eckhardt and J. Ryan Mitchell. They will coordinate with ACES and AFC personnel as well as extension specialists in

other southeastern affected States on dates and locations for the train the trainer workshops that will initiate the project. Field days will be coordinated based upon both research components to maximize information to clientele. The Fact sheet and articles will be coordinated for web dissemination by Dr. Eckhardt and the project postdoc.

Additionally, team meetings among the PIs will be flexibly scheduled quarterly to evaluate progress and address any unforeseen issues that may arise within any of the project components.