

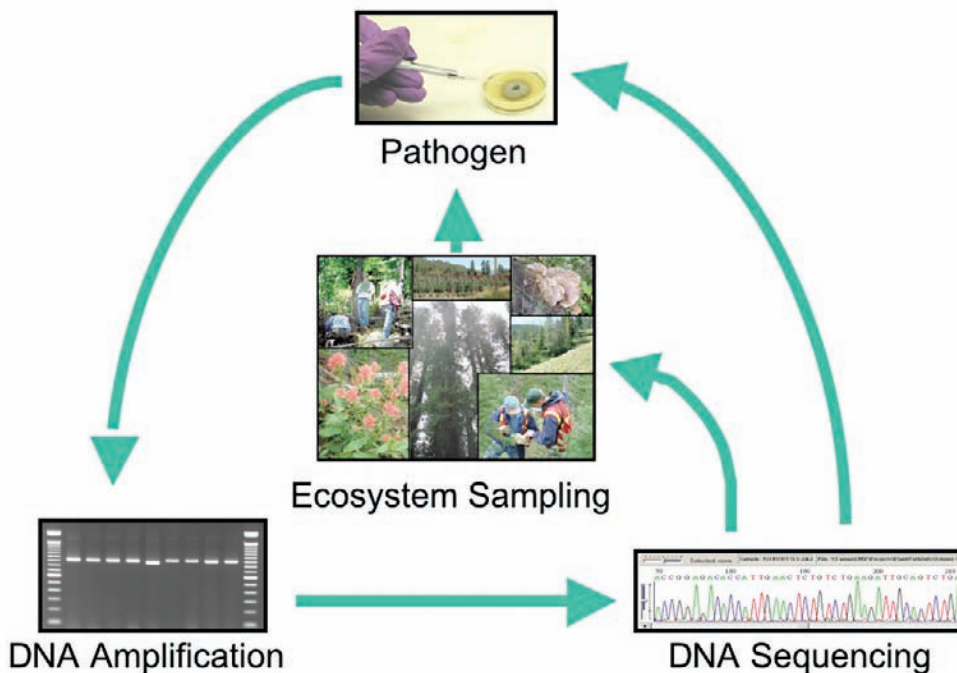
# Summary of Taxa-Specific Research

## 2. Pathogens

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Damage caused by invasive forest pathogens is widely viewed as more severe, long-term, widespread, and difficult to restore than that caused by any other biological disturbance agent. In the last century, pathogens introduced into our native forests have threatened extinction of native tree species and critically degraded many different ecosystems across North America. Not only trees are threatened, but also the dependent forest flora and fauna. Invaders have severely diminished

productivity, sustainability, and ecological functions of many forests. Diseases caused by invasive pathogens may result in altered forest succession and species composition that can dramatically impact the delivery of ecosystem services. RMRS research programs have developed critical information for the following four key research areas related to invasive pathogens like white pine blister rust, ohia rust, Armillaria root disease, and Fusarium root rot.



*Interdisciplinary approaches, including integration of genetics, pathology, ecology and silviculture, are used by RMRS to develop science-based information/tools.*

## **Prediction and Prevention**

- ♦ Integrate genetic analysis and bioclimatic modeling to predict potentially invasive pathogens at the landscape level
- ♦ Develop proactive management strategies to mitigate impact of invasive pathogens
- ♦ Predict potential impact of climate change on invasive pathogens

## **Early Detection and Rapid Response**

- ♦ Develop DNA-based diagnostic tools to identify potentially invasive pathogens
- ♦ Maintain culture collections, fungal herbaria, and DNA-sequence databases to help identify pathogen species and populations

## **Control and Management**

- ♦ Identify geographic distribution of host resistance frequencies and mechanisms
- ♦ Develop systems to better evaluate risks of invasive pathogen spread
- ♦ Synthesize science information and establish Web sites and models with management information
- ♦ Provide management recommendations for impacted and threatened ecosystems

## **Rehabilitation and Restoration**

- ♦ Use genetic analyses to identify ecologically valuable and appropriate host populations for conservation and restoration
- ♦ Maintain long-term research to monitor ecosystem function and restoration
- ♦ Synthesize science-based restoration guidelines for impacted and threatened forest ecosystems