Invasive species are a significant problem for terrestrial and aquatic ecosystems in the United States, degrading their biodiversity and the ecosystem services they provide to our society. Despite this, little attention has been directed to this significant problem until the last decade, when federal and state governments and nongovernmental organizations alike have suddenly become painfully aware of this burgeoning problem. While the awareness of the problem has been widespread, the reaction to this threat has not been uniform, and tools to deal with these problems are restricted. In particular, response within the Mid-South states lags behind that of other regions where more resources have been allocated towards dealing with invasive species.

Mississippi State University is developing and implementing a program of planned research, extension, and regional coordination to address these needs. Our approach is multidisciplinary, and involves biologists, ecologists, computer scientists, economists, engineers, and others acting together as a research team.

### Invasive Species Program

**GeoResources Institute, Mississippi State University**

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## General Project Areas

**Aquatic Invasive Plants**

We are pursuing research in four areas of aquatic invasive plant early detection and management: remote sensing, modeling, assessment, and integrated management techniques. The major species of concern include waterhyacinth (*Eichhornia crassipes*), giant salvinia (*Salvinia molesta*), hydrilla (*Hydrilla verticillata*), and water primrose (*Ludwigia hexapetala*).

**Terrestrial Invasive Plants**

We are conducting research in three areas of invasive plant early detection and management: remote sensing, modeling, and assessment. Initial research efforts will be directed towards the highly aggressive coggongrass (*Imperata cylindrica*).

**Invasive Invertebrates**

The cactus moth *Cactoblastis cactorum* has migrated from introduction sites in the Caribbean to the Florida peninsula. If this species were to migrate from Florida to the southwestern United States, which is dominated by Opuntia species, the community effects would be nothing short of catastrophic. We will be developing techniques for early detection of cactus moth and a national network for monitoring native cactus populations.

**Extension and Outreach**

We are developing instructional information, educational materials, outreach media, and advanced short courses and workshops on invasive plant ecology and management is support of efforts to manage invasive species in a coordinated fashion. The distribution and impact of these materials will be maximized by utilizing our connection to the national Extension Service system and system of Land Grant universities.

**Regional Coordination**

We are developing and implementing a task force of federal, state, and local government agencies, nongovernmental organizations, and concerned citizens focused on the early detection and management of invasive noxious species in mid-southern states, which will initially be named the Mid-South Invasive Species Alliance (MISA). The organization will be tiered, with coordination at both the state and regional level. Our target states include Alabama, Arkansas, Louisiana, Mississippi, and Tennessee. The MISA will coordinate the sharing of data, act as a clearing house for locations of invasive species in the region, facilitate information exchange at the appropriate federal level, and act to coordinate funding of regional management efforts.

### Student Participation

Graduate and summer student opportunities are available. Students interested in educational opportunities should either contact the principal investigator listed above by their e-mail address, or send a general inquiry to: Dr. John D. Madsen, GeoResources Institute, Box 9652, Mississippi State, MS 37962-9652, Ph: 662-325-2428, Fax: 662-325-7692, E-mail: jmadsen@gri.msstate.edu

**www.gri.msstate.edu**