Appalachian Transportation Institute (ATI) Research Project Description

Project Number: ATI TRP 99-10-2
Project Title: Endangered Species Identification Along Corridors in WV Using GIS

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Project Objective: The objective is to aid in the development of an interactive GIS for identifying endangered species along current and proposed transportation corridors in WV, in addition to authenticating the presence of a proposed endangered species along the proposed Corridor H of the Appalachian Highway Development System.

Abstract: Since the late 19th century, the exploitation of oil, gas, timber, and mineral resources in Appalachia has been associated with the production of an extensive transportation system and with a concurrent decline in the environmental quality of aquatic systems. This project will establish the infrastructure for a web delivered, interactive mapping system developed from satellite imagery and integrated with Geographical Information Systems that will locate all endemic, threatened, or endangered species relative to transportation systems in WV. The project will incorporate a detailed case study along the proposed Corridor H of the Appalachian Highway System to establish the interactive mapping system criteria and processes, The case study will also address the authentication of a specific rare Appalachian fish as an endangered species or a rare hybrid developed as a result of previous transportation related environmental disturbances in this area.

The Cheat minnow, Rhinichthys bowersi, is a rare fish that has been reported almost exclusively from streams in the Monongahela River system of West Virginia and Pennsylvania. The status of the Cheat minnow is currently controversial. There have been reports that the Cheat minnow has unique genetic characters, is reproductively isolated from other minnows, has a limited distribution, and should be considered a valid species.

Task Descriptions:

1. To use mitochondria DNA base sequences to determine whether the Cheat Minnow is a valid species or a hybrid.

2. To determine whether the Cheat Minnow is threatened by or created by environmental disturbances.
3. To determine the relationship between anthropogenic stress in the environment of the Cheat Minnow and proximity to transportation systems.
4. To link the distribution of the Cheat Minnow in a GIS database to remote sensing imagery (RS-GIS) and to all known biotic and abiotic indicators of environmental quality.
5. To expand the RS-GIS database developed for the analysis of the Cheat Minnow into an infrastructure to link the distribution of the Cheat Minnow in a GIS database to remote sensing imagery (RS-GIS) and to all known biotic and abiotic indicators of environmental quality. Be capable of providing imagery and environmental data for all West Virginia species of state and federal special status

Milestones, Dates, Schedule: Start Date: July 1 2000 End Date June 30 , 2002

Budget:

Year 1	$184,525
Year 2	$184,525
Total	$369,051

Student Involvement: The project will provide employment support for at least 1 undergraduate and 1 graduate student. The student workers will support the Principal Investigator as project assistants. This project is anticipated to lead to at least one undergraduate student thesis directly.

Relationship to Other Research Projects: ATI project 99-01 also addresses the use of satellite imagery and GIS.

Technology Transfer Activities: Final reports will be available on the ATI website. All, ATI Principal Investigators will present findings through the ATI Transportation Seminar Series to invited guests from WVDOT, USDOT, other ATI Principal Investigators, students and other invited guests. Other opportunities to present the project results will be explored including conferences and peer reviewed journals, etc.

Potential Benefits of this Project: The RS-GIS database developed in this project will enable transportation professionals to use their PCs to access all current information on all federal and state species of special interest in West Virginia. They will be able to query such information as distribution of these species, proximity to highway and rail systems, present state and/or federal status, involvement of stakeholders, environmental quality of habitat of species of concern, and summaries of all relevant research on these species. Work from the Cheat Minnow portion of this project will provide a template that integrates

genetic and environmental quality data into the above described remote sensing, GIS database.

TRB Keywords: Environmental decline, Water ways