USGS
science for a changing world

Geography - Geographic Analysis and Monitoring Program

Understanding Amphibian Declines Through Geographic Approaches

Growing concern over worldwide amphibian declines warrants serious examination. Amphibians are important to the proper functioning of ecosystems and provide many direct benefits to humans in the form of pest and disease control, pharmaceutical compounds, and even food. Amphibians have permeable skin and rely on both aquatic and terrestrial ecosystems during different seasons and stages of their lives. Their association with these ecosystems renders them likely to serve as sensitive indicators of environmental change. While much research on amphibian declines has centered on mysterious causes, or on causes that directly affect humans (global warming, chemical pollution, ultraviolet-B radiation), most declines are the result of habitat loss and habitat alteration. Improving our ability to characterize, model, and monitor the interactions between environmental variables and amphibian habitats is key to addressing amphibian conservation. In 2000, the U.S. Geological Survey (USGS) initiated the Amphibian Research and Monitoring Initiative (ARMI) to address issues surrounding amphibian declines.

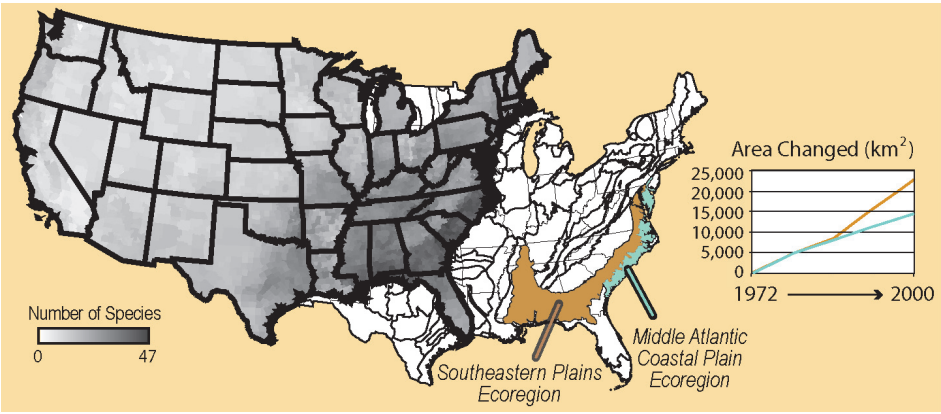
What are ARMI's goals?

- To determine the status of amphibians in the United States
- To research the causes for amphibian declines
- To provide scientific information to researchers, land managers, and policymakers to halt or reverse amphibian declines

What is the Geography Discipline's role?

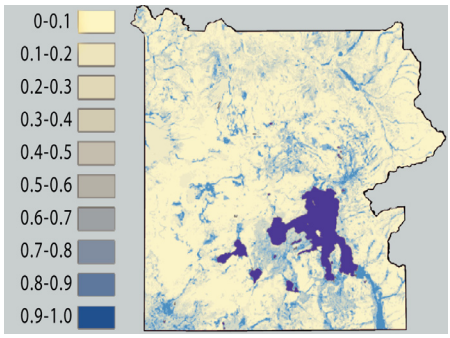
As the geographic research arm of the USGS, the Geography Discipline contributes expertise in remote sensing, geographic information systems, and environmental modeling. Its primary role in ARMI is to provide geographic integration across spatial scales, information sources, and disciplines. Web site: http://edc2.usgs.gov/armi/nmd/

Information Integration



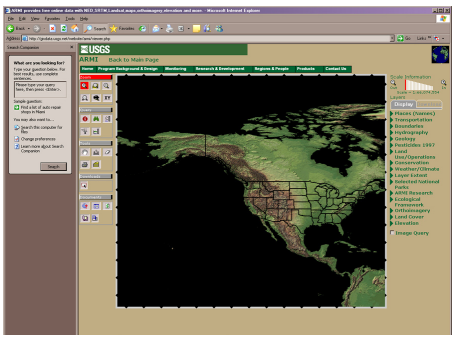
Integrating information across research projects can provide insight. The example above shows that ecoregions with the greatest richness in amphibian species also have been subject to high rates of land cover change. More than 20 percent of their land surface area has been altered since 1973.

Landscape Modeling



This map shows the probability of wetland occurrence in Yellowstone National Park. Predictive maps can be developed using satellite and other environmental data. The maps help field biologists locate potential amphibian habitats and assist land managers with making decisions about habitat conservation.

Data Visualization



Web-enabled tools help integrate information from a variety of data sources and communicate research results through a common graphical interface. Visit the ARMI web tool site: http://gisdata.usgs.net/website/armi/

For More Information

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