

## **Project Summary**

### **Rocky Mountains Cooperative Ecosystem Studies Unit**

Project Title: Investigating Graphical Models for Predicting Wetland  
Vegetation: Bayesian Belief Networks and Bayesian Graphical Models

**Type of Project: Technical Assistance**

**Project Discipline: Natural**

**Funding Agency: USGS**

**Other Partners/Cooperators: Montana State University**

**Effective Dates: 8/12/2009 - 7/31/2011**

**Funding Amount: \$68,910 [FY10: 32,493; FY09: \$36,417]**

#### **Investigators and Agency Representative:**

**Investigator:** Kathryn M. Irvine, Department of Mathematical Sciences, Wilson  
2/227, Montana State University, Bozeman, MT 59717; Telephone: 406-994-5357  
Fax: 406-994-1789; Irvine@math.montana.edu

**Agency:** Richard S. Sojda, US Geological Survey N. Rocky Mountain Science Ctr.,  
226 AJM Johnson Hall, Bozeman, MT 59717-3492; Phone: 406-994-1820 Fax:  
406-994-6556 ; sojda@usgs.gov

#### **Project Abstract:**

The primary purpose of this project is to model the Red Rock Lakes NWR wetland databy using Bayesian Belief Networks and Bayesian graphical models. This project has 3 main research objectives include:

1. Build a predictive model of wetland vegetation species abundance as a function of abiotic factors within the Red Rock Lakes NWR using BBN and/or BGM that incorporates time lags at different temporal scales.
2. Investigate tools for BBN and BGM model selection. Are the typical information theoretic criteria appropriate to use to select among different hypothetical causal structures? Are the criteria appropriate in a system with spatial and/or temporal correlation?
3. Determine if a BBN or BGM could be a useful tool for practitioners to address the effects of climate change on natural systems.

**Outcomes with completion dates:** July 31, 2011

**Keywords:** graphical models, wetland vegetation, USGS, Montana State University