Natural Resources Modeling

**Level:** N/A  
**Date/Time:** Tue, Aug 5, 8:30AM - 9:45AM  
**Location:** Room 30 B  
**Presenter(s):** Sean Murphy  
**Description:** Find out how GIS professionals are employing ArcGIS and ModelBuilder to assess soil erosion risks on utility towers, identify potential bird habitat, and simulate fire risks based on vegetation classification.

**Papers:**  
**Dynamically Evaluating Fire Risk through Agent-based Models**  
Sean Murphy, University of Redlands  
The natural fire cycle in the Great Basin area of California has shortened from every 50 to 60 years to 3 to 5 years, putting many natural ecosystems and occupied lands in danger. Two phenomena will be investigated to quantify fire risk. The first entity, cheatgrass, is renowned for its invasive nature and the detrimental effects it has on native annual and perennial grasses. The second entity, tree death, results from the bark beetle reproduction cycle, a common threat to the San Bernardino National Forest. Based on fuzzy vegetation classifications and characteristics of both species, the rules for an agent-based model will be used to simulate the future extents of both phenomena. The Agent Analyst extension, in conjunction with ESRI's ArcGIS Desktop and the Recursive Porous Agent Simulation Toolkit (Repast), provides an excellent tool to run simulations.

**Energy tower's risks by soil Erosion Assessment using Arcgis 9.2**  
Antonio Guerra, Federal University of Rio de Janeiro  
Francisco Oliveira, State University of Santa Catarina  
Guilherme Wosny, Federal University of Santa Catarina  
The purpose of the project was to assess soil erosion risks surrounding the Electric transmission towers. This situation is a great problem for Eletrosul Company, which is Brazil one of the most important electric power facilities, responsible for the transmission of energy in south of Brazil. In this matter there are specific laws and restrictions which guide the use and settlement of the corridor area, for residences and for cultivation. In respect, using Quickbird Satellite Images, DTM and ArcGIS softwares it was possible to vectorize erosive features and match them with aspect data, which have been obtained from Triangular Irregular Network. The result of this process allowed to analyze the direction of retreat erosion (headward erosion). Finally, by an automatic process it was possible to have an overview of the critical areas of erosion and to decide which ones should be supervised 'in loco' and confirmed by reambulation.

**ArcObjects-Based Species Risk Assessment Using National Hydrography/Land Cover Datasets**
Definition of the spatial extent of possible exposure is a key requirement in the assessment of potential risk to species due to the use of a pesticide product, necessitating the development of approaches to facilitate analysis at both the local and national level. This need may be served by coupling new and existing modeling techniques with ArcGIS capabilities through the use of ArcObjects-based procedures in a .NET framework. Application of this type of approach to identify and focus on areas of interest may be supported by large datasets such as the U.S. Geological Survey 2001 National Land Cover Dataset and the U.S. Environmental Protection Agency National Hydrography Dataset Plus. Interesting challenges emerge with respect to conceptual options, data management, and the control of computational processes. Responses to these challenges may yield benefits for many other types of environmental modeling work.

**Predicting Future Marbled Murrelet Sites Using Model Builder**

Jeanne Keyes, Northrup Grumman - OR/WA Bureau of Land Management (BLM)

This presentation will discuss how Oregon/Washington Bureau of Management (BLM) used Model Builder and random point generation tools to identify potential habitat and predict future Marbled Murrelet sites on BLM forest lands. A classification system based on forest stand age, survey station distance from the coastline, murrelet detection distance, geographic location, timber management areas, and several other datasets and parameters were used to generate a set of forest stands that will serve as the scenarios for future murrelet sites for analysis in the final document of the Western Oregon Plan Revision (WOPR) project.