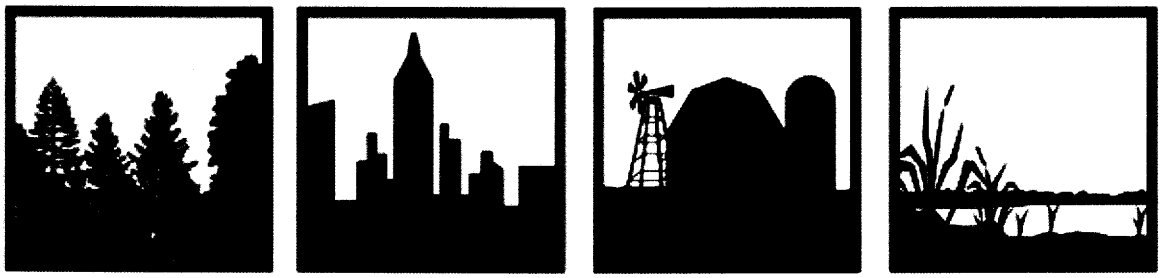

# US - IALE

## 25th Annual Landscape Ecology Symposium
## Is What Humans Do Natural?
## Athens, GA | April 5-9, 2010

# ABSTRACTS

detectability in connectivity via simulations on cactus spatial networks. Our simulations emphasize that landscape connectivity differs markedly with response bias of individuals, independent of signal detectability. Signal detection theory thus provides new insights into perceptual ranges and functional connectivity in heterogeneous landscapes.
Keywords: Behavioral landscape ecology, Functional connectivity, movement, Network theory, perceptual range

69. How to compare graphs
Authors: **FORTIN**, Marie-Josee, Ecology & Evolutionary Biology, University of Toronto; Andrew Fall, Gowlland Technologies Ltd
Invited Symposium: Graph, Network, and Circuit Models of Landscape Connectivity - Thursday, April 8: 10:40-11:00 - Q
Abstract: In conservation and reserve network selection studies, there is a lot of interest in maintaining landscape connectivity such that individuals can move through fragmented landscapes. Over the last decade, different graph-theoretical methods have been proposed to determine potential corridors and reserve networks. The question is however which of these networks is the most appropriate. We need therefore to be having a framework to compare different types of networks based either on the nodes, the links or the network as a whole. First, we present the most common network methods to compare graphs. Then, we propose using spatial graphs and Voronoi polygons to determine the degree of spatial overlap between networks based on different sets of variables. The potential of these new metrics is illustrated using caribou habitat networks. We show that the Voronoi polygon approach offers several advantages when comparing two graphs that do not have the same number of nodes.
Keywords: connectivity, fragmentation, graph theory, network, spatial overlap

70. Forest insect defoliation and carbon dynamics: simulating multiple defoliator outbreaks in mixed deciduous landscapes with Landis-II
Authors: **FOSTER**, Jane, University of Wisconsin - Madison; Robert Scheller, Portland State University; Brian Sturtevant, US Forest Service - Northern Research Station; Philip Townsend, University of Wisconsin - Madison; David Mladenoff, University of Wisconsin - Madison
Offered Presentations: Simulated Environments II - Thursday, April 8: 1:20-1:40 - Y-Z
Abstract: Defoliation outbreaks are dynamic forest disturbances with unique spatial and temporal characteristics that produce distinct changes in forest composition and carbon (C) balance. We simulated defoliation outbreaks using a new module for the forest disturbance and succession model, Landis-II, to better understand the long-term consequences of defoliation on forest C. Our disturbance module recreates defoliation spatial dynamics with parameters derived from Landsat maps and captures species-specific growth and mortality responses to accumulated stress. We demonstrate how simulated defoliation events mimic spatial and temporal patterns of gypsy moth (GM, Lymantria dispar L.) outbreaks and their effects in the central Appalachian mountains of western Maryland, U.S.A. We simulated forest dynamics over 400 years with and without GM defoliation to compare aboveground C dynamics expected in the absence of GM with those following introduction. Simulations were also run with forest tent caterpillar (Malacosoma disstria Hbn.) defoliation, individually and with GM, to examine how multiple defoliators with shared hosts alter disturbance response. Results show that the introduction of GM disturbance changes the trajectory of forest species composition, facilitating increases in non-host species that would not otherwise occur. Forest C is temporarily reduced following individual outbreaks,

as are long-term means, once GM enters the landscape. Changes in forest C storage are even more pronounced when a native defoliator has periodic outbreaks in the same landscape, particularly when outbreaks synchronize. Interacting insect disturbances have significant consequences for forest C storage and should be incorporated into our growing understanding of C dynamics at landscape scales.
Keywords: carbon, defoliation, Disturbance, Forests, gypsy moth

71. Stream Classification for Modeling Ecological Reponses to Hydrologic Alteration
Authors: **FREEMAN**, Mary, U.S. Geological Survey; Robert Jacobson, U.S. Geological Survey; John Jones, U.S. Geological Survey; Colin Shea, University of Georgia; James Peterson, U.S. Geological Survey
Invited Symposium: Linkages Among Landscape, Flow, and Aquatic Habitat: The Upper Flint River Water Availability Study - Tuesday, April 6: 1:20-1:40 - Q
Abstract: Stream classification is commonly used to improve predictive models of physical and biological properties. Classification is often based on general differences in hydrologic patterns, such as degree of flow intermittency or seasonal flow predictability. Geomorphic variation across the landscapes that encompass stream systems is also expected to influence a variety of ecologically-relevant processes, but generalized bases for geomorphic classification have not been widely applied or tested. This is particularly the case for low-relief landscapes such as those that characterize the eastern U.S. Piedmont. We are developing a simple stream classification to support an interdisciplinary effort to model effects of watershed dynamics, water management and climate change on aquatic biodiversity in the upper Flint River system, Georgia. Initially, we have evaluated the usefulness of field, map and airborne LiDAR (Light Detecting And Ranging) data for classifying stream reaches based on variation in channel confinement and bed sediment characteristics. Additional field research will be required to test the hypothesized relevance of geomorphic variation to ecological processes, including the spatial scales at which geomorphic features carry the most useful information for predicting how stream biota respond to hydrologic change.
Keywords: Geomorphology, Hydrologic change, Stream biota

72. Multiscale Analysis of Phenology Data Sets - Implications for Remote Sensing Methods
Authors: **FRIEDL**, Mark, Boston University; Koen Hufkens, Boston University; Andrew Richardson, Harvard University
Invited Symposium: A Land-surface Phenology: A View Through the Lens of Vegetation - Thursday, April 8: 11:00-11:20 - R
Abstract: Satellite-based phenology products are becoming increasingly widespread. Current sensors used to generate these products include the AVHRR, SPOT-Vegetation, MODIS, and MERIS. These instruments provide data that vary in spatial resolution from 300-m to 1 km. Further, each sensor has different radiometric properties and effective temporal resolution. Algorithms used to estimate phenological transitions from these data sources vary widely. As a result, satellite-based measures of phenology show substantial variability across data sets and algorithms. In this paper we provide an overview of ongoing efforts to assess satellite-derived measures of phenology from MODIS based on the MODIS Land Cover Dynamics Product. This product is designed to estimate cardinal dates in the growing season based on time series of vegetation indices. Here we describe results from two assessment activities. First, we compare MODIS-based estimates of phenology against ground-based observations of phenology and light