SCHOOL of SUSTAINABILITY

ARIZONA STATE UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

Sainan Zhang

Will defend her Dissertation Prospectus

Socio-Ecological Drivers and Consequences of Land Fragmentation under Conditions of Rapid Urbanization

Abstract

Land transformation under conditions of rapid urbanization has significantly altered the structure and functioning of Earth's systems. Land fragmentation, a characteristic of land transformation, is recognized as a primary driving force in the loss of biological diversity worldwide. However, little is known about its implications in complex urban settings where interaction with social dynamics is intense. The proposed research asks: How do patterns of land fragmentation vary over time and space, and what are the socio-ecological drivers and consequences of land fragmentation in a rapidly growing city? Using Metropolitan Phoenix as a case study, the research will link pattern and process relationships between land fragmentation and socio-ecological systems in the region. It will examine population growth and coupled land-water institutions as major drivers of land fragmentation, and the changes in biodiversity and surface temperature that result from fragmentation. Data sources for the analysis will be derived from remote-sensing imagery, ecological surveys collected by the Central Arizona Phoenix Long Term Ecological Research (CAP LTER) project, the US Census Bureau, and local and state agencies. Data on water supply and delivery and on land management practices will be provided by the Decision Center for a Desert City (DCDC).

How to manage socio-ecological systems is one of the biggest challenges of moving towards sustainability. This research project will provide a deeper understanding of how land fragmentation affects socio-ecological dynamics in an urban setting. It will use a series of indices to evaluate fragmentation over the past twenty years, including land patch numbers, contagion, shapes, and diversities. It will then generate empirical evidence on the linkages between land fragmentation and ecosystem properties by exploring the drives and impacts of fragmentation. An interdisciplinary approach that integrates social, ecological, and spatial analysis will be applied in this research. The results will provide a documented dataset that can

help researchers to study the relationship between human activities and biotic processes in an urban setting, and that will contribute to sustainable urban development.

Thursday, February 17, 2011
1:00 PM
GIOS 401
800 S Cady Mall, Tempe, AZ 85281

Faculty, students, and the general public are invited.

Supervisory Committee:
Dr. Christopher G. Boone (Chair)
Dr. Abigail M. York (Member)
Dr. Soe Myint (Member)