

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

Christina P. Wong

Will defend her prospectus

Managing for Urban Ecosystem Services: The Yongding River Green Ecological Corridor

Abstract

For my dissertation, I will explore the capacity of cities to design and manage urban ecosystems for ecosystem services to advance sustainable development. I will examine the Yongding River Green Ecological Corridor (YGEC), a large-scale designed ecosystem, in Beijing, China for multiple ecosystem services. Beijing considers the YGEC important to its sustainability transitions because of its potential to increase resource use efficiency, reduce air and water pollution, provide recreational green space, and spur economic development. I will evaluate the YGEC for five ecosystem services (*social benefit*): (1) local climate regulation (*physical comfort*), (2) nutrient retention (*water quality*), (3) water retention (*groundwater recharge & subsidence prevention*), (4) dust regulation (*air quality*), and (5) recreation. I will estimate the ecosystem functions using three biophysical models, a recreation-observation protocol, and visitor surveys. I will create ecological production functions to link ecosystem functions to social benefits via government regulations to quantify the five ecosystem services. I will determine the marginal change in ecosystem services from the YGEC by determining the difference between *pre-* (June 2009 – June 2010) and *post-* establishment (June 2012 – June 2013). I will create scenarios to explore the feasibility of using alternative management strategies to achieve government-defined social goals. I will evaluate the spatial distribution of YGEC ecosystem services to identify service “hotspots” and local beneficiaries. I will evaluate the synergies and trade-offs between ecosystem services and management strategies to achieve Corridor social targets. Lastly, I will qualitatively assess how the YGEC impacts regional sustainability challenges in the Hai He River Basin. My project will contribute to the science of ecosystem services by advancing the methodology of ecological production functions, and the analysis of synergies and trade-offs between ecosystem services. The YGEC is a unique case study since it will be the largest, most expensive designed ecosystem in

China, and one of the most ambitious uses of aquatic ecosystems in any city. The project will provide an estimate of YGEC ecosystem services for 2012-2013, and will enhance our understanding of how designed ecosystems can contribute to urban sustainability.

Friday, May 11, 2012
4:00-5:00 p.m.
Wrigley Hall, Room 323

Faculty, students, and the general public are invited.

Supervisory Committee:
Ann P. Kinzig (Chair), School of Life Sciences
Kai N. Lee, The David and Lucile Packard Foundation
Rachata Muneeppeerakul, School of Sustainability
Zhiyun Ouyang, Chinese Academy of Sciences
Enrique R. Vivoni, School of Earth and Space Exploration