

Environmental Science Seminar
School of Public and Environmental Affairs
Thursday, February 9th at 4:00 p.m. in SPEA Rm 278

Presentation by:

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Position in the School of Public and Environmental Affairs

Quantifying Land Use and Reactive Nitrogen Footprints
associated with U.S. Consumption using Input-Output
Life Cycle Assessment Methods

Abstract: Humans require land to meet basic needs (e.g., food, fiber, and shelter) and to create highly complex products (e.g., metals for computers and petrochemicals for plastics). For every product that reaches a consumer, land is modified, exploited, transformed and occupied. These actions result in environmental disturbances that can have far-reaching consequences. To quantify the amount of land occupied to support U.S. domestic consumption, including imports, I created a multi-regional input-output model. The first step in such an analysis is developing an inventory of land occupied by each of the 434 sectors of the U.S. Challenges and limitations of constructing this inventory will be addressed. Results demonstrate the significance of agricultural and forested lands throughout the supply chains of most produced goods and services. Traded goods are significant in the U.S. economy, approximate areas 'virtually imported and exported' are presented. Finally, I will discuss initial results that include reactive nitrogen species in an input-output framework. This work is part of a larger effort to make tools such as Ecological Footprinting more rigorously tied to physical limitations.

Bio: Christine Costello is currently a Post-doctoral Associate at Cornell University in the Department of Ecology and Evolutionary Biology. She earned an M.S. and Ph.D. from the Department of Civil and Environmental Engineering – Green Design Institute at Carnegie Mellon University and a bachelor's degree in Environmental Engineering Technology from Temple University. She has interned with the Environmental Protection Agency in the Region III office and DC Headquarters. Following graduation Chris spent two and a half years at an engineering consulting company working on sediment remediation projects. Her passion for Sustainability research began in undergrad and was strengthened through witnessing the perils of ignoring the environment in engineering design while collecting polychlorinated biphenyls, petroleum by-products and chlorinated solvent samples from the groundwater and sediments of the nation's waterways. Research interests include: incorporating uncertainty and variability in life cycle assessment (LCA) particularly using the examples of land use, reactive nitrogen, food and biofuels; incorporation of spatially-referenced data and environmental models in LCA; nutrient cycling in the environment, particularly with regard to agriculture; and, incorporation of social and cultural considerations into engineering design. Personal interests include screen-printing, philosophy, yoga, kayaking, wine appreciation and cooking.