*The BRACE CENTRE FOR WATER RESOURCES MANAGEMENT*

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# ECOSYSTEM SERVICES ACROSS LANDSCAPES: THE MONTREAL REGION

Humanity has expended substantial effort to engineer ecosystems to cheaply and reliably produce desired ecosystem services such as food. However, these efforts have often ignored the fact that landscapes simultaneously produce multiple ecosystem services that interact in complex, dynamic ways. Thus, an unintended consequence of human domestication of ecosystems has been unexpected or undesirable declines in other ecosystem services. Sometimes, an overly-narrow focus on a limited set of ecosystem services has even led to regime shifts with unexpectedly sudden losses of other ecosystem services. These declines and sudden shifts are problematic because demand for reliable provision of almost all ecosystem services is increasing. Consequently, recent studies have called for increased attention to development of a theoretical understanding behind the multiple and non-linear interactions among ecosystem services. Understanding where and how ecosystem services are provided across a landscape and how they interact is a major step forward in our understanding. Here, I show maps of 9 ecosystem services provided across the Montreal region, including carbon storage, recreation opportunities, soil capacity to retain phosphorus (P), high quality water, and food production. Provision of these services appears to be clustered such that different areas of the landscape provide different bundles of interacting services. An in-depth look at the interaction of three services – agricultural production, soil P holding capacity, and water quality – in this region over the past 100 years reveals that historical nutrient budgets are accurate predictors of soil P and holding capacity, indicating that past management may affect provision of ecosystem services for decades to come. Finally, looking globally, I identify and review evidence for hydrological regime shifts related to management designed to increase food production and draw lessons about when and where we might expect other ecosystem service regime shifts and how we might manage to avoid them.

Dr. Elena Bennett earned her Ph.D. at the University of Wisconsin and worked as a postdoctoral fellow for 4 years on the Millennium Ecosystem Assessment before joining the faculty at McGill.

**Thursday, October 9th, 2008**

McGill Macdonald Campus, Macdonald-Stewart Building, Faculty Lounge
3:00 - 4:00 pm

**EVERYONE WELCOME**