



Positive dependency and virtuous cycles: From resource dependence to resilience in urban social-ecological systems

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ABSTRACT

We argue that purely deficit-based perspectives regarding urban social-ecological systems (SES) and the human populations within them represent barriers to these systems' ability to move from undesirable system states into more desirable, sustainable ones. We characterize issues such as individual ecological identity, human exemptionalism, anthropocentrism, and resource dependence. We examine notions found in the resource dependency literature, where we trace the roots of ideas about dependency. We use this literature as a spring board into the possibilities of an antipodal notion of resource dependency potentially applicable in urban contexts, what we call positive dependency. Next we describe two possible sources of positive dependency in urban SES, urgent biophilia and restorative topophilia, followed by a brief discussion applying positive dependency to urban systems challenges and management. We conclude with the importance of recognition of positive dependency as a precursor to the development of a heightened sense of ecological self and sense of ecological place in urban SES, and provide insights and suggestions for further research into civic ecology practices that may enhance positive dependency on and investment in ecological assets that contribute to positive ecological senses of self and place, and the importance of these to achieving sustainable, resilient urban futures.

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1. Introduction

The field of ecological economics endeavors to provide a better understanding of economic relationships between people and their environments, which may lead to ecologically better economic behavior (McMahon, 1997). For this to occur, however, the field of ecological economics must be able to adequately theorize these relationships. As McMahon points out, “economic man has trouble with relationships” (McMahon, 1997, p. 163). In this contribution, we attempt to address a handful of related issues that we have termed, perhaps somewhat tongue-in-cheek, “relationship problems” involving humans and social-ecological system sustainability and resilience in urban contexts, including the linked problems of negative (or non-existent) ecological identity, sometimes referred to as ecological selfhood (Bateson, 1972, 1979; Clayton and Opatow, 2003; Macy, 1991; Naess, 1988) among humans (especially urbanites) and how this sometimes appears in the misapplication of resource dependency theory and attendant problems (Freudenburg and Gramling, 1994; Humphrey et al., 1993). Specifically we explore these so-called relationship problems having to do with our understanding of our relationship of ourselves to our local environments, our individual ecological selves, and our understanding of our relationship as a species to the biosphere via the notion of resource

dependency as applicable in urban contexts. In so doing we hope to address gaps in ecological economic studies that “appear inattentive to the ways in which socially defined resources are components of complex, highly dynamic biophysical systems... [whose] resilience may depend on entities and processes far removed from human economies” (Sneddon, 2000, p. 528).

Discussions of social-ecological system (SES) sustainability and resilience in urban contexts often revolve around attempts to better understand, quantify, and appreciate ecosystem services provided to human communities within urban social-ecological systems. Not inappropriately, in many discussions about urban system sustainability, a great deal of attention is given to the mostly negative effects of anthropogenic change in urban SES. As a case in point, the first sentence of the book *An Introduction to Ecological Economics* (Costanza et al., 1997) states: “...the recognition by humans of their impact upon the earth has consistently lagged behind the magnitude of the damage they have imposed, thus seriously weakening efforts to control this damage” (p.1). Often overshadowed by this problem of assumed negativity regarding humans and nature are the positive actions humans sometimes take in the systems in which they live that contribute to virtuous cycles that produce, or significantly enhance production of ecosystem services and other positive social and ecological outcomes (cf. Barlett, 2005; Krasny et al., 2009; Tidball and Krasny, 2008b). To fully appreciate these human initiated virtuous cycles requires viewing humans as part of ecosystems, and then viewing their activities and social behaviors, much like we are accustomed to doing for other terrestrial life, as

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merely parts of a larger whole, rather than as distinctly separate, and therefore unlinked or de-coupled, systems. This requires description of the relationships between “dynamic human economic systems and larger dynamic, but normally slower-changing ecological systems” (Costanza et al., 1991, pp. 8–9).

In this contribution we speculate that purely deficit-based perspectives regarding urban SES and the human populations within them represent barriers to these systems' ability to move from undesirable system states into more desirable, sustainable ones. In other words, so long as humans view themselves solely as distinct, or worse, distinctly *negative*, within their SES, they are considerably hampered in their ability to visualize and actualize the transformation called for in sustainability and resilience discourses. We feel that an exploration of the positive attributes and characteristics of humans in urban SES, within the contexts of the relationship problems such as are manifested by ideas of dependence as outlined above, is a worthwhile endeavor in efforts to reintegrate humans with the rest of nature (Costanza, 1996) and a unique contribution to this special issue.

Stephen Kellert muses in his book *Building for Life* that “a pervasive loneliness and self-hatred sometimes seem to have afflicted humanity like a virus that imperils our species” (Kellert, 2005, p. 217), leading to a kind of “human–nature apartheid” (Hettinger, 1996; Rees, 2003). We begin our approach to these relationship problems characterized by human self-image issues by elaborating upon them. We briefly characterize issues such as forgotten individual ecological selfhood, human exemptionalism, anthropocentrism, and resource dependence. We then examine notions found in the literature on resource dependency, where we trace the roots of ideas about our dependency. Then, we move to use this literature as a spring board into the possibilities of an antipodal notion of resource dependency that may be highly applicable in urban contexts, what we call positive dependency (Stedman and Tidball, 2008). Next we describe two possible sources of positive dependency in urban social-ecological systems, urgent biophilia (Tidball, 2012a) and restorative topophilia (Stedman and Ingalls, in press), followed by a brief discussion applying positive dependence to urban systems challenges and management. We conclude with the importance of a recognition of positive dependency as a precursor to the development of a heightened sense of ecological self and sense of ecological place in urban SES, and provide suggestions for further research into civic ecology practices that may enhance positive dependency on and investment in ecological assets that contribute to positive ecological senses of self and place, and the importance of these to resilience in urban systems.

2. Terms and Assumptions

Consistent with others in this special issue, we view resilience as the ability of a SES to absorb unexpected perturbations and to sustain its fundamental functions, structure, identity, and feedbacks through recovery or reorganization in a changed environment (Holling, 1973; Walker et al., 2004). A form of interaction that implies resilience are *virtuous* cycles or feedback loops, which are argued to be foundational to social-ecological system resilience thinking (Gallopini, 2002; Matthews and Selman, 2006; Powell et al., 2002; Selman, 2006; Selman and Knight, 2006). There are cycles and feedbacks that are termed vicious because they produce fundamental change in the system and transition the system to different states with different properties and characteristics. According to Varis (1999, p. 599), if their direction of influence is negative, they are considered vicious cycles, and if their direction is positive, they are known as virtuous cycles. These virtuous and vicious cycles provide a means to visualize how urban environmental stewardship might interact with other processes to help transform social-ecological systems.

We concur with Warner and Kuzdas' (2010) assessment that a more narrowed definition of resilience specific to urban environments is desirable, and their consequent modified definition of urban resilience

from Ernstson (2008) is useful: “urban resilience is the capacity of a city to sustain a certain set of urban subsystem services, in the face of uncertainty and change, for the inhabitants of the city” (p.1). This definition lends itself to application because of its requirement for assessment efforts to analyze “not only how urban subsystems are managed, but also which urban subsystems are prioritized” (Ernstson, 2008). However, it would be improved by clarifying exactly *which* “inhabitants of the city” are of primary concern. We feel strongly that the exclusive prioritization of human inhabitants actually contributes to erosion of resilience in urban SES, and point to social-ecological feedbacks wherein human and other inhabitants of urban SES may be better and more completely accounted for in efforts to enhance urban social-ecological system resilience, rather than simply the resilience of contemporary human society.

3. Relationship Problems—Forgotten Individual Ecological Identity: Human Exemptionalism, Anthropocentrism, Resource Dependence, and Associated Ills

According to Rees (2003), modern humans are unaccustomed to conceiving of themselves as ecological or biological entities. It is as if we as individuals—and indeed, entire societies—have forgotten our ecological identities, or are suffering a kind of environmental amnesia, enduring a self-imposed humanity–nature apartheid (Hettinger, 1996), a legacy of the enlightenment in western culture's reductionist mindset that sees the human enterprise as somehow separate from and above the natural world (Hayward, 1994). This can seem especially obvious in urban contexts. Here we arrive at the first of our relationship problems alluded to in the opening paragraphs of this contribution. For many humans, there appears to be a problem with our understanding of ourselves as individuals and as a species in relationship to the rest of nature, upon which we ultimately depend.

3.1. Ecological Identity and Human Exemptionalism

In his thorough review of ecological paradigms in anthropology, Hardesty (1980) concludes that there are significant problems of analysis that must be overcome before a satisfactory explanation of the place for the physical environment in theories of human behavior is convincing, problems such as proximate and ultimate causes, time scale, and linkages between individuals and larger units of analysis, among others. He argues that human ecology should not be placed in a subservient role to the ecology of other species, but should strive to become a full partner (Hardesty, 1980). As a sort of clarion call, Costanza proclaims that “...as one of the dominant species of animals on the planet, *Homo sapiens* and its relationship to its environment is obviously well within the scope of ecology by any of its various definitions” (Costanza, 1996, p. 978), inviting multidisciplinary approaches to human and nature relationships and ecological identity.

Researchers from many disciplines are engaged in studies of aspects of ecological identity, such as philosophy (Merchant, 1992), psychology (Axelrod, 1994; Stern and Dietz, 1994), biology (Wilson, 1984, 1993), social ecology (Kellert, 1997a, 1997b; Kellert and Wilson, 1993), deep ecology (Naess, 1988), ecopsychology (Roszak, 1992; Thomashow, 1995, 1998; Winter, 1996), environmental justice (Clayton and Opatow, 2003), and ecological anthropology (Tidball, 2012a). In its most extreme conclusion, this research claims that our loss of an ecological identity, or the “... failure of many humans to locate themselves ecologically has contributed directly to the current ecological crisis” (Kretz, 2009, p. 116). Although a clear and rigorous definition of ecological identity has yet to emerge, Clayton and Opatow bring us close in stating that environmental identity includes “the way in which we define the environment, the degree of similarity we perceive between ourselves and other components of the natural world, and whether we consider nature and nonhuman natural entities to have standing as valued components of our social and moral community (Clayton

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