THE NEXT REGENERATION

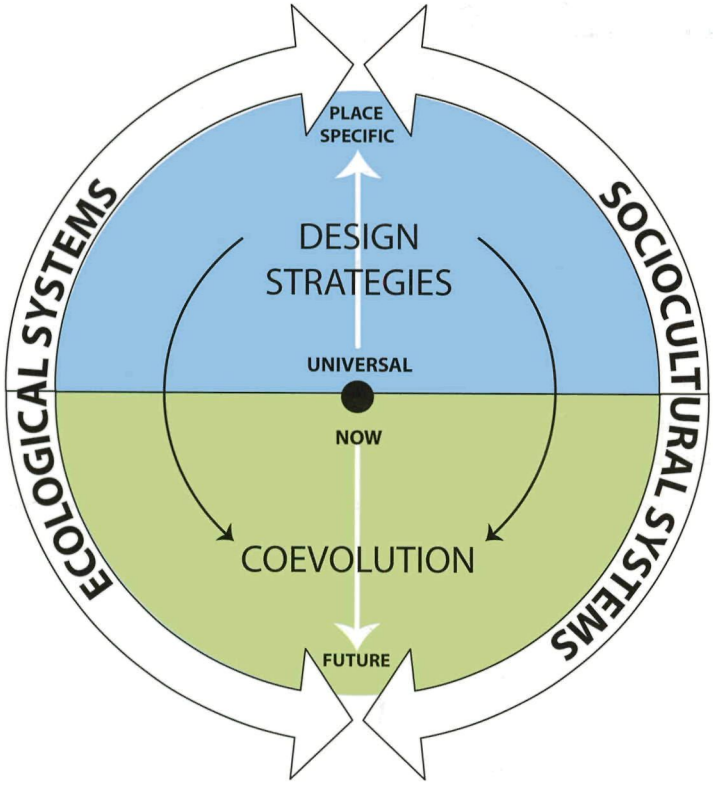

FIGURE 1 GENERIC MODEL DESCRIBING THE RELATIONSHIP BETWEEN DESIGN STRATEGIES AND COEVOLUTION

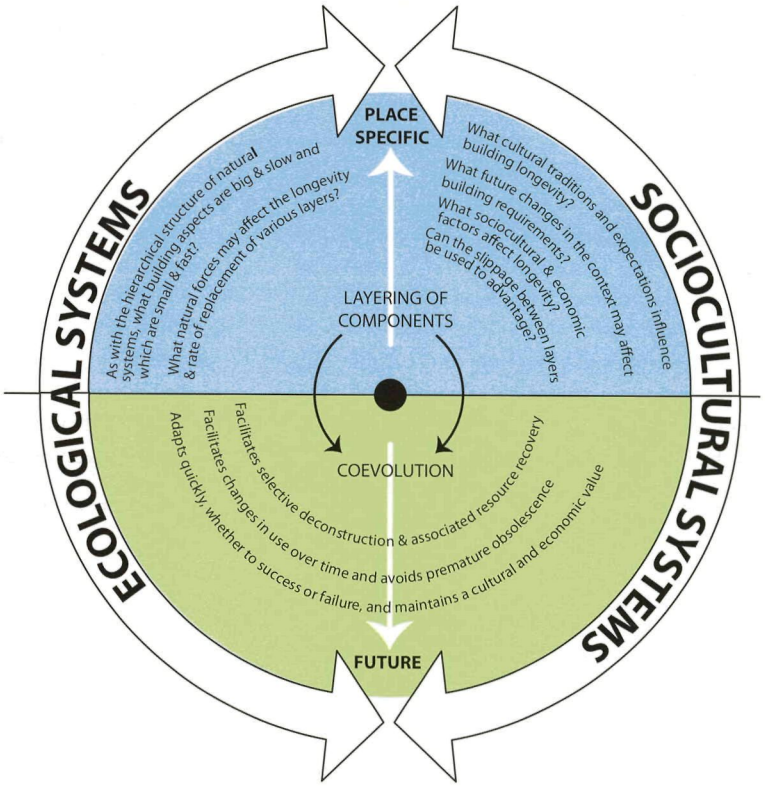

FIGURE 2 LAYERING AND THE RELATIONSHIP BETWEEN DESIGN STRATEGIES AND COEVOLUTION

"REGENERATIVE DESIGN" HAS BEEN GARNERING INCREASING INTEREST AS A MEANS OF REFRAMING GREEN DESIGN. WHAT DOES IT MEAN FOR PRACTICE? CAN BUILDINGS BE REGENERATIVE IN A SIMILAR MANNER AS LIVING SYSTEMS?

TEXT RAYMOND J. COLE AND AMY OLIVER

Introduction

Over the past five years or so, the notion of "regeneration" has been garnering increasing interest as a means of reframing green design.[1] Unlike conventional green building practices which are directed at reducing environmental impact, regenerative design promotes a coevolutionary, partnered relationship between sociocultural and ecological systems rather than a managerial one and, in doing so, builds, rather than diminishes, social and natural capitals.

It is not the building that is "regenerated" in the same sense as the self-healing and self-organizing attributes of a living system but, as Pamela Mang and others in the Regenesis Group[2] argue, by the ways that the act of building can be a catalyst for positive change within the unique "place" it is situated. As Peter Clegg[3] of the UK-based Feilden Clegg Bradley Studios further suggests, this produces "built form and infrastructure that begins to 'heal the wounds' that have already occurred." Within regenerative design and development, built projects, stakeholder processes and inhabitation are together focused on enhancing life in all its forms—human, other species, and ecological systems—through an *enduring* responsibility of stewardship. In short, regenerative design aims to rethink how buildings are designed, built and managed.

While having proven to be an enormously valuable vehicle for mainstreaming green building practice, LEED's checklist format that allows users to select what are deemed achievable credits is considered by many as incapable of guiding design in a systems-approach manner and establishing positive links between buildings and their context. Regenerative design uses green building technologies and strategies, but complements these by facilitating positive connections to the social, economic and ecological context. Moreover, whereas green building solely focuses on reducing the environmental impacts of buildings, regenerative design and development is viewed as a process that can accelerate the development of the systems-thinking, shared vision, shared ownership and shared responsibility necessary to transition to a sustainable future. Though many of its core tenets—systems-thinking, community engagement, respect for place—also have long individual histories in architectural discourse and practice, regenerative design begins to tie them together in a cogent manner.

Broadly speaking, regenerative design seeks ways in which sociocultural and ecological systems can mutually benefit each other; in other words, its long-term aim is to support the harmonious *coevolution* of sociocultural and ecological systems. American environmental biologist John Cairns[4] argues that "mutualistic coevolution is the only path to success" and that "a 'partner' unable to coevolve with the other partner is in serious, probably fatal, trouble." Synergies between ecological and sociocultural systems lead to designs that are much more than the sum of their parts and do not simply look after their own needs. To illustrate, regenerative buildings may restore or even create natural habitats, purify water, sequester carbon, produce oxygen, generate energy, and enhance human connections with their environment.

Shifting Scale

While the ambition of regenerative design is both positive and inspiring in comparison to the "doing less harm" emphasis of green design, recent critiques emphasize some practical and operational concerns—challenging its feasibility in the urban context and whether or not its core design tenets are scaleable (building, neighbourhood, community and city). For example, re-

generation operates most effectively at a larger spatial scale than that which most architectural projects are commissioned and so raises questions about the ways and extent that individual buildings can participate in the regenerative design process. American anthropologist and historian Joseph Tainter[5] raises several important concerns about scale. "If it is too small," he suggests, "the system will require constant human intervention" and, "it is prudent to assume that a system that requires endless subsidies is not sustainable." He continues, "[u]nfortunately, this is likely to be the spatial scale (i.e., too small to be self-sustaining) at which many regenerative designs are commissioned. Thus, there may be a scalar contradiction between the aspirations of regenerative designers and the realities of their profession."

Extending Time Frame

Current green design practice and assessment tools concentrate on describing the initial performance of a building prior to occupancy and can, within the limits of simulation, do this with some degree of certainty. However, it rarely explicitly acknowledges that future performance and changes in a building's context are always unknowable. Regenerative design, by contrast, accepts this future uncertainty. The notion that the successful performance of a building can neither be predicted nor guaranteed at the completion of design clearly represents a major challenge for architects and other design consultants, particularly in the way that they convey their proposed strategies to clients. Since regenerative performance cannot be known at the design stage, the measure of success in regenerative design is represented in terms of the capacity invested in a building at the outset and stakeholder input that will encourage the coevolution of sociocultural and ecological systems. However, determining if and to what extent a capability has been invested in a project will be based on the collective experience of the design team, continued stakeholder engagement, feedback, reflection and learning.

Given the concerns raised above, how can individual buildings participate in the positive coevolution of sociocultural and ecological systems? Can regenerative design offer positive direction to the day-to-day practice of designing buildings amidst a host of time, cost and regulatory constraints?

There are currently very few recent examples of building projects that exemplify regenerative design and, given the absence of evidence that demonstrates that claimed benefits and outcomes can and have been delivered, it remains largely an aspiration. The University of British Columbia's Centre for Interactive Research on Sustainability (see *CA*, March 2012) is important in this regard in that its unfolding performance and consequences will be fully monitored and documented. CIRS is a clear manifestation of core regenerative strategies. It will provide "net-positive" benefits to the environment—creating drinking water from fallen rain collected on site, treating more than its own wastewater on site, and powering itself and a neighbouring building with renewable and waste energy. The combination of an on-site photovoltaic system and creative energy exchange with the neighbouring Earth and Ocean Sciences Building greatly reduces the university's overall carbon emissions. By being constructed primarily of certified wood and pine beetle-killed wood (that would otherwise lead to carbon emissions as it decays), its wood structure locks in more than 500 tonnes of carbon. This offsets the GHG emissions that resulted from the other non-renewable construction materials—cement, steel and aluminum—used in the building. CIRS can thus claim carbon-negative performance (both embodied and operational). While a university campus permits opportunities not often permissible in most contexts in which architects operate, CIRS nonetheless is illustrative of the potential implications associated with the coevolution of sociocultural and ecological systems—that is, how design strategies offer multiple benefits beyond the boundaries of an individual building.

The use of on-site renewable energy and other fortuitous energy supply options, such as those used in CIRS, become an important strategic choice after all possible energy-efficiency and passive strategies have been pursued. Onsite renewable energy options are place-specific—dictated by the seasonal climatic variations and any modifying effects resulting from the surrounding physical context. Fortuitous energy sources and exchange opportunities are also place-specific and dependent on the ways and extent that the energy profiles of adjacent or nearby buildings and systems match that of one being designed. CIRS does exactly this—capturing waste heat exhausted from the Oceans and Sciences (EOS) Building, satisfying its thermal needs and then returning excess back to EOS. Set against the technical potential offered by such synergistic links are a host of sociocultural factors such as a willingness to accommodate renewable energy, matching of energy quality to operation use, enabling inhabitants to understand energy processes and to adjust the systems to meet their changing needs, etc. More broadly, social or industrial metabolism—the socially organized exchange of materials and energy between societies and their environments—represents a critical link between the built environment and the coevolution of ecological and sociocultural systems. While nuclear energy is gaining increasing support as a necessary and seemingly attainable and expedient response to climate change, clean, renewable energy sources are recognized as key to a sustainable future. Renewable energy options have the potential to contribute to long-term energy security and the withstanding of short-term disruptions, and enable building inhabitants to understand energy processes and adjust systems to meet changing needs.

Figure 1 illustrates the expanded questioning of the role and responsibility of design strategies similar to that embedded in CIRS. It highlights the potential link between building design and the coevolution of sociocultural and ecological systems resulting from the use of renewable energy. Building design (situated in the upper half) can be both informed by ecological systems and/or sociocultural systems that may be place-specific or more universal. Resulting strategies can lead to a building offering positive sociocultural and ecological benefits for its local site context. This place-specific approach to design—drawing on and relating to context—invests a building with the potential for improved performance and contributes to its wider social, cultural, ecological and economic context as shown in the lower half, in the end having benefits that extend beyond its property lines.

In summary, green design is directed at reducing environmental impacts—doing less harm, and regenerative design aspires to restore lost capacities—ecological, social and economic—when they are missing or disrupted and establishing new ones. Both are necessary and complementary in transitioning to a sustainable future. While the performance of individual buildings remains of central importance—depending on the process of engaging all relevant stakeholders, understanding and engaging the opportunities afforded by context, and creatively forging synergistic links between these same strategies—these buildings can offer a great deal more. **CA**

Dr. Ray Cole is Professor at and past Director of the University of British Columbia's School of Architecture and Landscape Architecture. He holds the designation of Distinguished University Scholar. Amy Oliver holds a Master of Architecture degree from the University of British Columbia and works at an architectural firm in Vancouver.

[1]Cole, R.J. Regenerative Design and Development: Current Theory and Practice. Building Research & Information 40.1 (2012): 1-6.

[2]*www.regenesisgroup.com*

[3]Clegg, P. Commentary: A Practitioner's View of the "Regenerative Paradigm." *Building Research & Information* 40.3 (2012): 365-368.

[4]Cairns, J. Sustainable Co-evolution. *International Journal of Sustainable Development and World Ecology* 14 (2007): 103-108.

[5]Tainter, J.A. Regenerative Design in Science and Society. *Building Research & Information* 40.3 (2012): 369-372.

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