Building with nature: Ecological design for next-generation cities

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The Ecological Society of America turns 100 this year, with many reflections on the achievements of the discipline and the big questions for ecologists as we embark on a new century marked by great environmental upheaval. ESA's journal *Frontiers in Ecology and the Environment* celebrates the centennial of the society with perspectives on the potential for ecological science to influence the design of the next generation cities and their infrastructure.

The November 2015 Special Issue on Innovations in the face of climate change examines innovations big and small, from massive technological installations like Rotterdam's proposed next generation Dutch Windwheel to municipal planning and the individual construction and land use choices of city residents.

"Cities are emergent systems, with only 5 to 7 thousand years of history, mostly during the relative climatic stability of the Holocene," said guest editor Kristina Hill, an associate professor at UC Berkeley's College of Environmental Design. "We've never tried to operate a city during a rapid climate change, especially not on the scale of population we now have, with our largest cities housing upwards of 20 million people."

New problems require new approaches that strive for harmony rather than control. Hill sees opportunities to solve problems created or accentuated by climate change by hybridizing the concrete-and-steel structures we have been designing for hundreds of years with living systems.

The articles in the November special issue tackle physical, legal, social, and technological interfaces with natural systems.

"It's not about the preciousness of some rare thing that lives far, far away. It's about the water and the wind and the plants in your city," said Hill. "While we've observed that nature can be fragile, we've forgotten that nature is powerful. Our alterations of the planet's climate are going to bite us in the rear end, in the near future it will be up to us to accommodate nature. I find that refreshing."

Hill wants to start a cultural revolution in our relationship with natural systems, working with, rather than against, the force of tides, floods, and storms, and inviting non-human life into our living spaces. Ecosystem services have clear practical benefits. Vegetation brings cleaner air and water as cooler summer temperatures, and as well as beauty, recreational space, and habitat for our non-human neighbors into cities. Making the rhythms of natural systems visible also helps city dwellers connect with the natural world.

"Through ecology, we learn what it is to be human by learning about what is not human. Understanding human experience through other forms of life is so significant and fundamental," said Hill. "Ecology is literally, etymologically, about the house. The problem of climate change is going to bring ecology home. We are talking to people about how they live—their houses. If we all live differently, we can change the world."

More information: Margaret A Palmer et al. Aligning restoration science and the law to sustain ecological infrastructure for the future, *Frontiers in Ecology and the Environment* (2015). DOI: 10.1890/150053

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