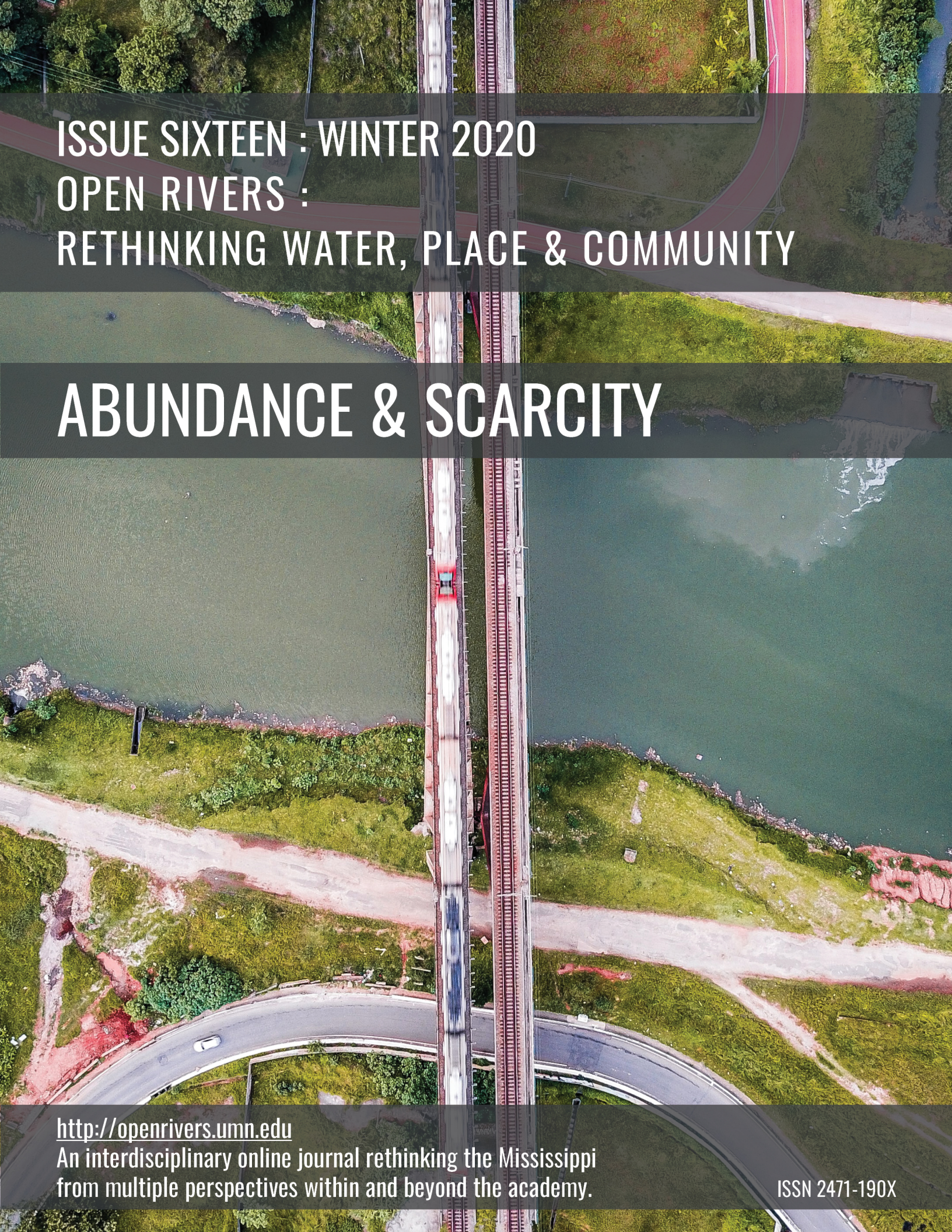

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PERSPECTIVES

THE URBAN MISSISSIPPI: VALUING CONNECTIONS IN A CHANGING CLIMATE

By Emily Green, Bree Duever, and Amit Pradhananga

Social scientists have long noted the value in humans connecting with their communities—through both social bonds and emotional attachment to their local natural surroundings. Whether socially focused or environmentally or both, such connecting benefits people and places. Place attachment has been linked to positive human health impacts (Scannell and Gifford 2017; Stedman 2002). It can lead people to more highly value and more actively take care of their surroundings (Gosling and Williams 2010; Junot, Paquet, and Fenouillet 2017). Scannell and Gifford (2010) have also shown a correlation between place attachment and increased tendency for people to work together on specific pro-environmental projects. Meanwhile,

The urban Mississippi River flowing by downtown Saint Paul. Image courtesy of Nattapol Pornsalnuwat.

our research group, the Center for Changing Landscapes (CCL), and others have found that people who feel greater social attachment to their community are more likely to engage in local water resource protection activities (Brehm 2006; Pradhananga and Davenport 2017).

As social science researchers who explore human values and beliefs related to environmental matters, we in the CCL are intrigued by the phenomenon of community attachment in both its environmental and social dimensions. We are primed to recognize attachment themes when they appear in our survey or interview data. And we continually seek to further our understanding of their importance and role in the face of today's urgent, complex environmental challenges. For example, in 2016 a team of our researchers surveyed residents of Minnesota's North Shore to explore their views on climate change. Among other questions, they sought residents' views on changes and impacts occurring globally relative to those predicted locally—for example, higher average summer temperatures, more intense precipitation events, a decrease in maximum wintertime snow depth, and a later average date when snow levels reach the one-foot depth that is desirable for many winter sports. Not surprisingly, survey respondents were much more concerned about local changes and impacts than global ones. From these and others of our studies, we can stress a recommendation for those working to boost local public engagement or promote behavior changes to mitigate climate change: focus your efforts on the local landscapes with which your target audience connects. A feeling of

Sunset relaxation at Shadow Falls overlook, Saint Paul. Image courtesy of Visit Saint Paul.

connection to a place can be a powerful driver for environmental values and actions.

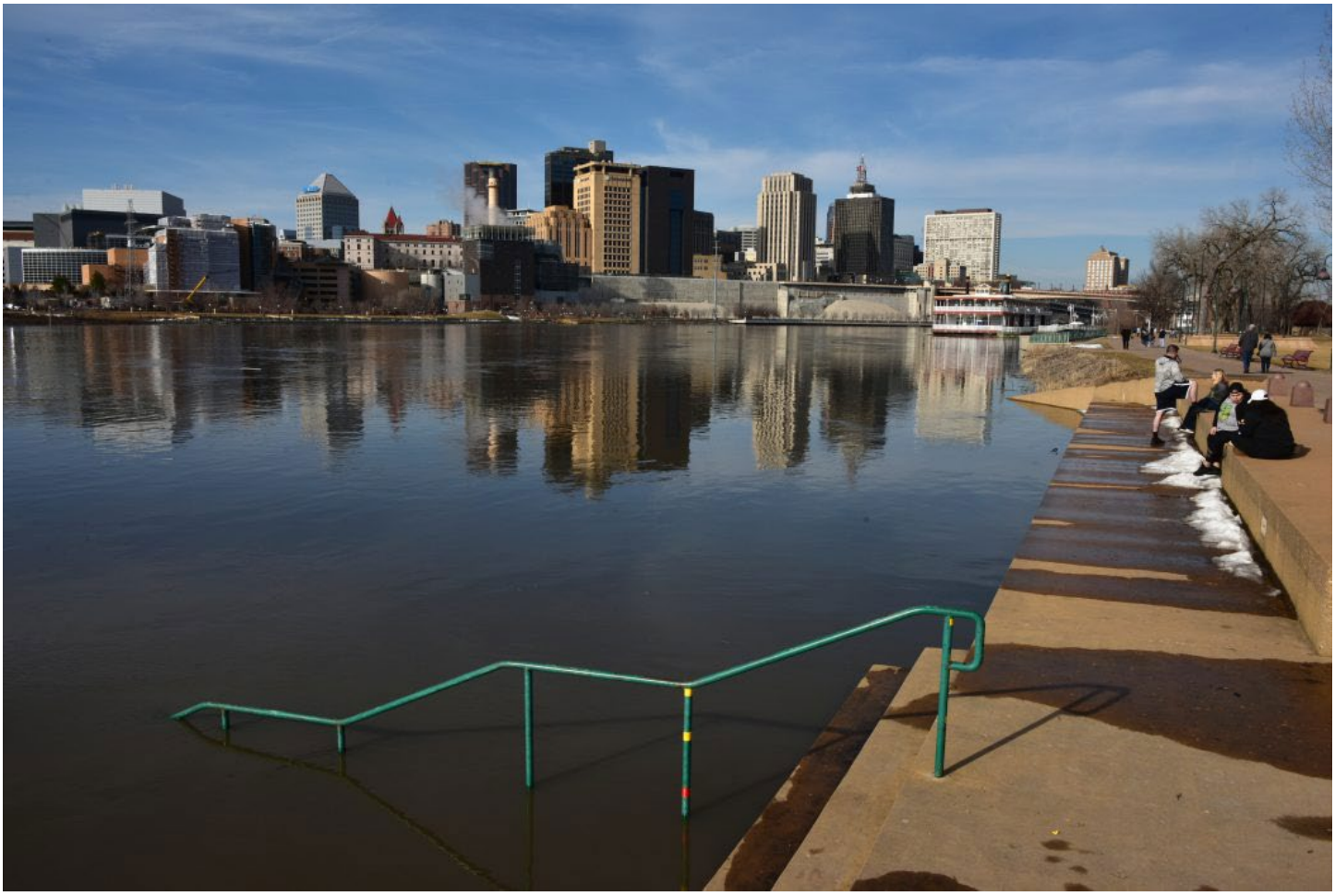
The connection between people and their community is not the only kind of connection that we think about at CCL. Indeed, the connection concept has multiple applications to our work in the context of current environmental challenges. There is the interconnectedness of landscapes—especially via water bodies—and how (or whether) people understand the potential impact of upstream actions on downstream water bodies. There is also the importance of connections in the form of collaboration. The increasingly apparent effects of climate change point out the need to replace "silo thinking" with collaboration across sectors, levels, and locations, to cope with and limit its impacts. Recognizing the pressing need for collaborative connections, the Center for Changing Landscapes created the seminar series "Climate Connections" to support existing connections and forge new ones among Twin Cities' environmental professionals and those whose work is impacted by climate change. The seminars are designed to create space for networking and conversing across sectors, and to facilitate knowledge sharing related to problems or solutions.

Saint Paul's riverfront historically has lacked opportunities for human connection and access to the river. Image courtesy of Visit Saint Paul.

Climate Connections Seminar—Exploring Connections

A fall 2018 Climate Connections seminar explored all these forms of connections in relation to the future of the urban Mississippi River in St. Paul. Our starting point was the pathbreaking work of the Great River Passage Initiative (GRP) to both increase the physical connections between downtown St. Paul and the river, and to facilitate the sense of connection that the city's residents and visitors feel to the urban Mississippi. In alignment with CCL's North Shore study findings, the GRP builds on the idea that helping people feel more connected to their local stretch of river will boost the public's value of and willingness to invest in protecting river health and quality; it will also bolster the river's value to the city. The scenic and cultural value of the river was long neglected by nineteenth- and twentieth-century city planners and developers, who viewed the river largely for its utility. In contrast, the GRP Master Plan, adopted in 2013 by the St. Paul City Council, presumes that improving human access to and connections with the river will fuel St. Paul's vitality and enhance its identity as a nationally esteemed river city.

At the seminar, Mary deLaittre (then GRP initiative manager; now executive director of the GRP Conservancy) spoke about the GRP's



Mississippi River flooding in 2019, near downtown Saint Paul. Image courtesy of August Schwedfeger (http://schwerdfeger.name).

visionary, connection-building projects and goals for St. Paul's 25 urban riverfront miles, detailing three efforts currently being launched. The first is a "River Balcony," which is conceived as a "publicly accessible bluff-edge experience" running through downtown, facilitating greater connectivity between people and the riverfront. The second is a River Learning Center to house river-oriented educational programming and potentially the local National Park Service headquarters. The third is the East Side River Initiative aimed at rejuvenating a 2,000-acre largely industrial area below St. Paul's East Side bluffs. Yet even as she spoke enthusiastically about these projects and the overarching vision of a solidly river-identified city, deLaittre acknowledged the complications posed by climate change to the GRP's planning and implementation work.

For example, the potential for more extreme water-level fluctuations limits which investments and developments are feasible near the river's edge, and how riverside programming and businesses are run. Planners, policymakers, and citizens must face the increased probability of extreme weather-related complications such as floods, landslides, blowdowns, and droughts. According to deLaittre, "The reality of climate change must be factored into everything we do." It necessitates the prioritization of flexibility in all project concepts and implementation.

Indeed, climate change throws an unprecedented monkey wrench in our societal drive to plan and design landscapes and assume stability of infrastructures into the future. Planning related to rivers may be especially challenged;

Mississippi River flooding in 2011 at Harriet Island Regional Park, Saint Paul. Image courtesy of August Schwedfeger (http://schwerdfeger.name).

as meteorologist Paul Huttner said in a Spring 2016 *Open Rivers* interview, rivers are "a barometer of climate change," highly vulnerable to the extreme weather volatility that is one of its hallmark features. The Mississippi basin offers strong evidence to support that assertion, including severe rain-induced flooding that caused massive, costly damage and loss of life in St. Louis and Cape Girardeau, Missouri in 2016. Our Minnesota section of the Mississippi has not escaped the increased volatility. In just over two months of 2013, the water level at St. Cloud went from the seventh-highest to the third-lowest reading ever. Downtown St. Paul has experienced flooding multiple times in the past decade, including in 2010, 2011, 2014, and 2019. The 2014 flood saw the Mississippi river cresting at over 20 feet near downtown, making it the sixth-highest crest on record. While flooding isn't new, climate change has likely fueled the frequency and intensity of extreme rain events in many areas, which can magnify the difficulties of protecting downtown infrastructure and residents, and necessitate greater coordination to do so (Mallakpour and Villarini 2015; Maurer et al. 2017).

Landscape Connections

The increased weather volatility associated with climate change spotlights the river's function as a landscape connector. Extreme rain events can cause sharp spikes in the amount of trash, soil, nutrients, and other pollutants washed into waters and carried from upstream landscapes to downstream. During the Climate Connections seminar, Patrick Hamilton, director of Global Change Initiatives at the Science Museum of Minnesota, stressed that "the future of our urban river will be determined by the decisions we make upstream." He stated that one of the Mississippi's most valuable functions is supplying drinking water to 1.1 million Twin Cities residents. Currently, the quality of this river-sourced drinking water is good. He gave substantial credit to the Twin Cities' excellent water management investments, especially our well-designed urban stormwater system. But he alluded to the connection theme in noting the critical water-protective function of the forested headwaters landscape. Intact, forested riparian areas and watersheds are known to perform important water quality functions, including stabilizing and filtering nutrients and sediments, moderating water temperatures, and regulating downstream flow (Haigha, Jansky, and Hellinc 2004). Upstream land use changes—namely the rapid conversion of forested lands to agricultural production—have been linked to increased downstream sediment and nitrate levels. Climate change substantially complicates that picture. Increased precipitation and shifts in seasonality of precipitation are further driving increases in soil runoff. In a future that likely holds more frequent and extreme rain events, and thus more runoff, it is reasonable to expect increased water quality challenges in the urban stretch of the Mississippi.

While water quality degradation clearly relates to the connection theme, so does protection. As Hamilton asserted, the long-term protection of our urban river will depend upon the implementation of upstream land-use practices and management. He named several land management strategies he considers critical for long-term protection of the urban river: reducing loss of forest lands in the headwaters region, promoting and expanding the use of perennial and cover crops on upstream agricultural lands to reduce soil runoff, and supporting the use of converted agricultural lands for solar energy production, noting the corollary benefit of facilitating the necessary energy infrastructure transition.

He added that farmland with solar panels can simultaneously benefit farmers economically by supporting cattle grazing or the production of certain crops.

Connection as Collaboration

The climate change context accentuates the importance of connections in the form of collaboration in landscape planning initiatives such as the Great River Passage. During the fall 2018 Climate Connections seminar, Dr. Kate Brauman, lead scientist for the Global Water Initiative at the University of Minnesota Institute on the Environment, spoke about the pressing need for collaboration among scientists and city planners and leaders given the difficulty of predicting specific climate change impacts in a given area or for a given body of water. As the GRP planning and implementation processes illuminate, planners need good data to inform their long-term visioning and planning around the urban river. Brauman explained that good computer models, built from an accumulation of solid data, can lead to stronger and more meaningful predictions that can effectively guide planning in the face of uncertainties. However, scientists must seek and receive input from city planners and leaders to understand what kinds of data are most needed and useful, and they should undertake targeted research explicitly to help leaders plan for and respond to real-world challenges. Collecting and sharing meaningful data is crucial for informing the visioning and planning of our future landscapes. Good data can also help

Researchers with UMN Center for Changing Landscapes have found that for natural resource professionals, building strong relationships and working in genuine partnership with landowners can substantially improve the outcome of water quality protection efforts. Image courtesy of the Center for Changing Landscapes.

focus conversations on necessary technical and policy solutions. For example, data indicates that increasing water storage capacity in upstream agricultural lands can help protect urban water quality by reducing runoff (Johnston, Braden, and Price 2006). Brauman stressed that "building resilient landscapes will require leaders who can absorb scientific data and translate findings into policy."

Clearly, accomplishing the essential upstream landscape protection and runoff reductions to protect the urban stretch of the Mississippi will require more than data. It will require engaging upstream landowners to embrace and implement key land-use practices. Our CCL research has shown that for natural resource professionals, building strong relationships and working in genuine partnership with landowners can substantially improve the outcome of water quality protection efforts (Nelson, Davenport, and Kuphal 2017). Meaningful water quality protection will also likely require state and federal funding to support shifting upstream agricultural practices and potentially to compensate farmers for implementation of key practices. That, in turn, may require a concerted effort to cultivate a more nuanced public understanding of the upstream-downstream connections, not to mention the value of upstream investments and support for leadership dedicated to taking the necessary steps forward. As Brauman stressed, ensuring that our upstream Mississippi landscape is resilient and our downstream water quality remains good in a climate-altered future will require "systematic approaches, not piecemeal ones."

Overall, the Climate Connections seminar highlighted the multiple forms of connection—to place, within landscapes, and among sectors—in relation to long-term visioning, planning, and

Kayakers enjoying the urban Mississippi River. Image courtesy of Visit Saint Paul.

protection of the urban Mississippi. By improving connections between people and the river, the GRP promises to elevate the river's civic and cultural value. However, in the face of climate change, we must invest in building, demonstrating, and understanding connections across sectors, across the landscape, and between humans and their environment, if we are to fundamentally preserve the river's health and value for the long term.

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About the Authors

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Bree Duever is a researcher at the Center for Changing Landscapes where she is involved with research projects focused on community-centered decision making with our water resources. Bree is also the logistics coordinator for the Kawe Gidda-naanaagadawendaamin Manoomin project, a collaboration between University researchers and tribal partners to better understand and protect wild rice. Her research interests include exploring what creates meaningful natural resource consultation between state agencies and tribal nations and how to support inclusive decision making in natural resource management. She obtained her B.A. in English at the University of Wisconsin Stevens Point and her B.S. in environmental sciences, policy, and management from the University of Minnesota Twin Cities. Bree lives in south Minneapolis and enjoys exploring the many state parks throughout Minnesota with her family.

Amit Pradhananga has worked as a senior researcher with the Center for Changing Landscapes since 2006. In that role he designs and leads research projects focused on exploring the human and policy dimensions of natural resources especially related to water resources, invasive species, parks and trails management, and climate change adaptation; and investigating the drivers and constraints of conservation behavior and community engagement in natural resource management. He is especially interested in understanding constraints and strategies to engage racially and ethnically diverse community members in natural resource issues and water resource protection. Amit has a Ph.D. from the University of Minnesota. He is from Nepal and has lived in Minnesota for 15 years.