SER News

Volume 35 Issue 4

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Meaningful Engagement

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Nature at the Doorstep

Wildflowers offer a bridge to what is possible

A LETTER FROM THE EXECUTIVE DIRECTOR

Bethanie Walder
Executive Director
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Dear SER Members,

As part of the SER2021 9th World Conference on Ecological Restoration, we hosted a series of virtual field trips every Friday for six weeks before the conference. I was particularly intrigued by a field trip to Beirut, Lebanon. What type of restoration would they be featuring in the middle of a city of 2.5 million people? The field trip was excellent—it focused on restoring an "unloved area" on the banks of the Beirut River using the Miyawaki method. While that method can be controversial, especially when used in more natural settings, the team that implemented this project used local reference areas to determine what species to plant and as of the time that the field trip was recorded, they had seen some important successes with revegetation in this small, restored patch within the city. Restoring diverse and native plants to an empty lot in the middle of an urban area brings so many things to so many people. It creates a green space that people can access—which can reduce stress, improve health and wellbeing, connect people to unseen nature, offer a community hub, and much more. It provides a refuge for small mammal and birds. It gives us hope to see a thriving patch of "nature," inside the city. (You can read an interview with the project lead here.)

Ecological restoration in urban settings is possible, but projects in these areas come with their own unique challenges and balance of benefits. We're pleased to share four articles about urban ecological restoration in this issue of *SERNews* that explore some of the facets of this work. The first article, from Rhode Island, looks at the challenges and opportunities of urban ecological restoration, specifically from the perspective of the land managers implementing the projects and with an eye towards community engagement. The second looks at three case studies from Florida, moving in scale from more traditional restoration in habitat patches to a new tool to facilitate better small-scale individual choices people make in their yards. The third example, from Argentina, builds on key lessons from the first article and shows what deep and purposeful community involvement in urban restoration can look like. The final article takes a different approach from our standard contributed articles—through more of a personal essay format, the author shares his experiences in wildflower meadow creation in the UK, reminding us of the emotional and spiritual gains that come with ecological restoration in urban settings. We recognize these articles are just the tip of the iceberg on this topic, and we look forward to continuing and broadening this discussion within the SER membership and beyond. If you are curious to learn more, we've shared additional resources from the Restoration Resource Center and Webinar Library in this issue as well.

As we close out 2021, a full pandemic year, I am so thankful for the passion and commitment of the SER membership and all of your creativity and perseverance to continue the incredible work of restoration despite the obstacles. Creating protocols to keep field crews safe, leading and participating in webinars to share knowledge,

enthusiastically embracing a 100% virtual SER World Conference, applying to become certified ecological restoration practitioners, publishing articles about your field work and research, and reaching out to your fellow SER members to network and share ideas, even when you weren't able to meet in person.

This growing enthusiasm and support for restoration fueled an exciting growth in SER's activities over the last year. We're pleased to share just a few quick highlights of our accomplishments in 2021:

- We experienced double digit membership growth, pushing our membership up above 4,000 members from more than 100 countries! Our Membership for All initiative continued to increase the accessibility of membership welcoming hundreds of new Equity and Open Doors members.
- More than 1,400 people from more than 70 countries registered for SER2021. The breadth and depth of content was incredible and continues to be available for members via the Restoration Resource Center Conference Library.
- SER held our third biennial Global Forum on Ecological Restoration with the International Union for the Conservation of Nature (IUCN) Commission on Ecosystem Management's Ecosystem Restoration Thematic Group (CEM-ERTG). Together we also partnered with the UN Decade on Ecosystem Restoration's Best Practice Task Force through the Forum to develop, consult, and deliver a set of 10 Principles to guide the UN Decade through 2030.
- We released three new translations of the SER International Principles and Standards for the Practice of Ecological Restoration, and overall the Principles have now been downloaded more than 40,000 times and cited more than 245 times!
- SER's first Make a Difference Week surpassed even our most ambitious hopes—individuals and organizations hosted more than 140 restorative projects in 34 countries around the world. Together, 3,000+ volunteers contributed more than 20,000 hours to these restoration projects, planting seeds and seedlings, pulling weeds, cleaning garbage, improving wildlife habitat, and much more—showing the incredible collective global impact of local restorative activities.
- Restoration Ecology and the British Ecological Society's journals hosted a joint call for articles about the UN Decade on Ecosystem Restoration, representing one of the first such joint calls efforts across a coordinated suite of journals in the ecology space.

That's just a sampling of our successes in 2021—stay tuned for a full year in review shortly after the new year! These successes depended on the dedication, commitment, and volunteerism of so many SER members—THANK YOU for all you do to make SER so successful!

We hope you enjoy this issue of *SERNews*, and that you have a relaxing and restorative holiday and new year.

URBAN RESTORATION

FEATURED ARTICLES ON ECOLOGICAL RESTORATION IN URBAN ENVIRONMENTS

SERNews is sent out four times a year to SER members – February, May, August, and November. To become a member or update your contact information, email membership@ser.org.

Editor: Alexis Gibson

COVER
A group of community members paints a joyful mural focused on restoring a stream in their neighborhood in Buenos Aires, Argentina. Photo credit: Proyecto Hábitat Claypole

MEMBERS in ACTION
Been up to anything interesting lately? If you'd like to be highlighted as a Member in Action, email membership@ser.org and we'll keep your fellow members in the loop!

HOW URBAN ECOLOGICAL RESTORATION GETS DONE: A SYNTHESIS OF MANAGER PERSPECTIVES

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Urban ecological restoration can be both particularly challenging, due to the suite of issues that must be navigated for them to succeed—including complications of industrial pollutants, population density, infrastructure, and expense (Nassauer 2004, Connolly et al. 2013)—and deeply rewarding, by improving ecological conditions while addressing environmental justice issues and delivering wide-reaching benefits to an increasingly urban populace (Bolund and Hunhammar 1999, Lundy and Wade 2011).

In this article, we present insights and guidance gathered from research interviews with practitioners of urban restoration in Rhode Island, the second most densely populated state in the United States. We identify barriers and opportunities encountered by practitioners, and highlight their creative strategies for overcoming challenging barriers and taking advantage of surprising opportunities.

During this project, we were specifically interested in focusing on community involvement in restoration. We took as a launching point the findings of the National River Restoration Science Synthesis Project: the most ecologically successful river projects they evaluated were unique from less successful projects only in their employment of community involvement (Palmer et al. 2005), but that research did not allow them to understand why this was the case (Bernhardt et al. 2007). We also wanted to take an adaptive management approach: learning from managers on the front lines of restoration efforts—like much of the membership of SER—who have a deep well of experience and knowledge, but generally don't have the time or aren't incentivized to do synthetic, post-hoc analysis.

Community engagement can take many forms. All photos in this article credited to the authors.

Community engagement is critical in all restoration projects, but has heightened importance in urban ecological restoration projects because of the number of stakeholders, competing interests, and potential beneficiaries of restoration in urban settings, along with the heightened risks. One such case—which demonstrated the challenges of urban ecological restoration when the community is not fully involved—motivated our research. In an urban parkway in Providence, Rhode Island, the city parks department wanted to restore a mowed riparian area of a small stream. They struggled to get funding, so simply stopped mowing a buffer strip next to the stream as a first effort. They talked with neighbors and left doorknob flyers to explain the benefits of the change in management; however, there was significant push back from neighbors, with some yelling at staff working in the park and eventually mowing down the buffer strips themselves.

Frustrated managers, used to working from a deficit model of science communication that assumes stakeholders simply lack the right information, thought residents didn't fully understand the benefits of buffers. But residents were responding to concerns that tall grass would harbor rats and collect trash, concerns that ultimately played out when fast food cups and rats found homes in the vegetation. In our eyes, this project had it all: communication, engagement, visioning, and funding issues that made it a ripe opportunity for learning about the actual doing of restoration in urban settings.

APPROACH

In 2013, we interviewed a manager involved with the urban parkway project, then 26 others from local, state, and federal government and nonprofits working on urban restoration across Rhode Island. We were looking to hear their reflections on and lessons learned by doing restoration in urban settings. We synthesized the data we collected through qualitative analysis, following content analysis and rhetorical analysis frameworks (Krippendorff 1989, Hsieh and Shannon 2005). More nuanced discussions of this work can be found in several reports (Hychka and Druschke 2016, Mazzotta et al. 2016) and peer-reviewed articles (Druschke and Hychka 2015, Druschke et al. 2016, Druschke et al. 2017, Hychka and Druschke 2017, Mazzotta et al 2018, and Mazzotta et al. 2019), but a synthesis of core lessons follows below.

FINDINGS AND GUIDANCE

We present here some of the key findings of this work along and with insights from subsequent projects, collaborations, and scholarship. We synthesized barriers that managers identified, primarily having to do with the public; with opportunities that working in urban settings affords; and with successful strategies these managers employed to overcome the barriers or capitalize on the opportunities. These findings are likely most directly applicable in the urban northeast of the United States, though are likely to be useful in other urban settings. Similar research in additional locations could be clarifying.

Manager Perceived Barriers

Funding Constraints. Managers pointed to a lack of available funding for urban projects, exacerbated by their high per-acre expense because of infrastructure constraints, contamination, and permitting and funding mechanisms that bias funding towards larger, more rural projects. As a further complication, several managers insisted that even when funds were available, communities "don't want our money!" But managers who worked closely with communities expressed that this concern was due to a lack of community capacity for getting or spending funds or complex reporting requirements, funding restrictions, and tight timelines.

Stakeholder Resistance to Change. Some managers expressed frustration that many proposed restoration efforts seemed to be quickly rejected by local residents simply because they were proposing something new. Managers often felt that even with regional support for restoration, there was local resistance. We note, however, like the case of the unmowed parkway buffers, what appears to be resistance to change may be real concerns about the project or lack of trust in project planners.

Unseen or Trashed Ecosystems. Some urban ecosystems couldn't galvanize the necessary will for restoration intervention because they were either

literally unseen—under pavement like Providence's Woonasquatucket River—or perceptually unseen, as we heard again and again the idea that "there is no nature in the city." Others, both managers and members of the public, simply felt many urban systems are too far gone and that extensive contamination makes meaningful restoration seem impossible.

Lack of Political Will. Managers recognized a general lack of will—both within communities and the political system—to do urban restoration. In Providence, managers pointed to the lack of political power of communities marginalized through immigration status, race, and income. Managers also pointed to a lack of public understanding of the benefits of restoration and, again, a feeling that nature was something only in far-off national parks. There was also a perception among some managers that lower-income residents in cities did not prioritize environmental issues in the face of other, more critical concerns in their lives. As one manager suggested, "the populace does not care about and will not do anything about [restoration] because they have to focus on survival." Within the political system, managers identified a strong anti-urban bias in policy structures and policy makers' outlooks, and noted that gerrymandered districts fragmented marginalized communities, leaving them without strong political advocates.

Manager Identified Opportunities

Benefits. While urban restoration projects may not provide the same big improvements in ecological outcomes as larger projects in less developed and natural areas—with notable exceptions including fish passage and migratory stop over habitat—they can provide a suite of co-benefits to many beneficiaries and impact the daily lives of many more people. Examples of these benefits include flood attenuation within and upstream of an urbanized area, cleaner air in urban cores, and proximate green space that provides transportation access and supports well-being.

Community Development and Environmental Justice. Tackling environmental and socio-economic issues can be daunting, but they are critical issues that provide opportunities to effect real change and can be meaningfully addressed by urban ecological restoration projects. One restoration advocate persuaded policymakers to offer funding by taking them on a bus tour to show them children playing on piles of asbestos instead of in parks. Further, though there may be a lack of political will in some urban areas, often there are local organizations and foundations primed to help.

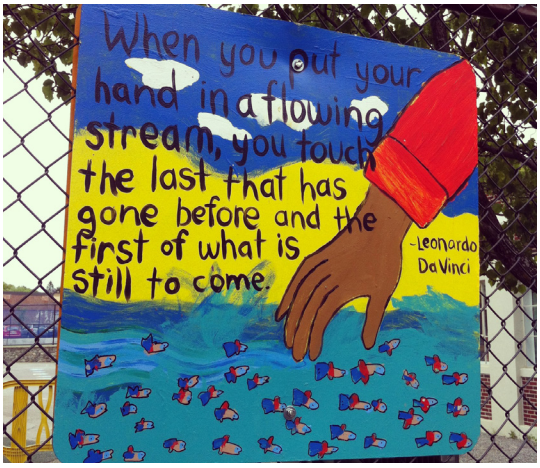
Shifting Perceptions of Urban Ecosystems. Though historically urban ecosystems have been seen as "trashed" or "too far gone" in the eyes of the public and the natural resource community, there is growing understanding that these significantly altered ecosystems can be critical ecological pinch points and can provide co-benefits to many people.

Triggering Events. Many managers argued that a proactive approach to restoration was both cheaper and more strategic than reactive projects, but noted that major events, like flooding, can prime the public and policymakers for discussions about improving conditions in their watershed. These events can be galvanizing to co-develop thoughtful restoration plans or provide resources and energy to execute an existing plan.

STRATEGIES FOR OVERCOMING BARRIERS TO AND SEIZING OPPORTUNITIES FOR URBAN RESTORATION

Making Systems Visible. Getting projects to be "seen"—both literally by removing barriers and figuratively by opening people's eyes to their urban ecosystems—can build both short term support and long-term will for restoration. One manager described a party she held on the river's edge with canoes and music in a park known for drugs and prostitution; a participant asked her earnestly: "Where'd you get that river?" Making systems visible can also take the forms of building public access through canoe launches and bike paths, and by creating "ambassador sites" in high-traffic areas like schools or libraries.

Changing Metrics of Success. Evaluating projects purely on ecological metrics—acres restored or stream miles buffered—does not fully capture



Examples of on-site outreach and art developed by a local school that makes the system visible and is tailored to the local community.

the impacts of ecosystem restoration, particularly in urbanized areas. Consider measures that account for multiple social and ecological benefits and beneficiaries (Mazzotta et al. 2019).

Setting a Different Reference. Similarly, fully restoring a system to an undegraded reference condition often isn't a realistic or suitable goal. For example, the SER International Principles and Standards (Gann et al. 2019) point out that the reference model and the project target do not have to be the same; while the model is important, the target needs to be appropriate for the situation. Further, targets for urban restoration projects should be agreed upon through discursive goal setting (Gobster 2010, Shackelford et al. 2013).

Improving Public Engagement.

Work Collaboratively with the Community: Include community stakeholders in all phases of restoration projects in sustained and consequential ways. Avoid—at all costs—engagement for the sake of checking a box or tokenizing local input. Be prepared to make fundamental shifts in projects based on community input. Include community members as true partners on your projects with funding for their efforts if possible (Arnstein 1969).

Support and Collaborate with Visionary Leaders: Many practitioners said that having a dogged advocate can get a project through the long and often torturous process to completion. Having a trusted local, particularly an elder, advocate for a project has often turned the tide on public acceptance of a project. Engaging local leaders can be facilitated by providing local liaison trainings and financial support. Additionally, these leaders can also help managers by providing opportunities to learn techniques on how to handle tricky situations in their communities.

Build Trust and Listen: It is time-consuming but critical to build trust through ongoing communication with community members. Start by meeting people where they are—examples included going to public housing board meetings or talking for hours with locals who get together for coffee at an autobody shop—and listening to their concerns, both related and seemingly unrelated to the project. Then build towards meaningful, two-way conversations. Remember that trust is earned and not assumed.

Center Community Members as Experts: All collaborators come with their own expertise—managers bring knowledge of hydrology, soils, plants, turtles, government programs, etc.—and community members come with their complementary lived experiences—how to get things done in their community, the specific hydrology of that place, and so on. Be respectful of community knowledge.

Shake Up Outreach and Communication: Outreach and communication strategies need to be tailored to the local community, project goals, funding situation, and political atmosphere. Strategies that have worked well include: employing trusted locals to tell their stories, getting kids to help communicate project goals to the public, using graphics to help visualize possible future conditions, and collaborating with artists to communicate in public spaces. Be incredibly careful not to slip into employing a deficit model by treating the audience as empty vessels waiting to receive technical understanding (Gross 1994); instead, follow a contextual model that recognizes local understanding of ecosystems and builds trust, not assumes it. This model allows you to be a better listener and to recognize that public concerns or resistance do not necessarily equate to ignorance of the benefits of the projects or a simple need for more funding. Resistance can come from insightful, site-specific concerns that can improve or reinvent a project.

Use Best Practices for Diverse Engagement: Follow best practices for diverse engagement, including paying for childcare, holding meetings in accessible locations, providing translations for materials and public meetings, and compensating local community members for their time (Klein et al. 2020). Make sure to account for these costs when budgeting and developing the timeline for your project.

Get Help: Many restoration managers were primarily trained in the physical sciences and may not have the knowledge or the inclination for discursive public engagement. There is no shame in hiring and paying facilitators, local heroes, and community organizations to help develop and execute your engagement strategies.

Confronting Green Gentrification. Restoration efforts can have the unintended (and unfortunately, in some cases intended) consequence of displacing lower income or marginalized communities. Some research points to smaller projects having less of a green gentrification effect (Curran and Hamilton 2017, Curran and Hamilton 2020), but in the face of a changing climate, landscape-level restoration projects are necessary. In these cases, engage practices that deal with the competing need to fund local expenditures with tax revenues and not displace or inequitably impact communities by: working where there is stabilized rent or housing costs; funding restoration efforts through regional collaboration; co-developing projects with and directing opportunities to local communities through construction, maintenance, and monitoring contracts; and developing multi-use spaces that incorporate local opportunities such as urban farming (Shi 2020, Derickson et al. 2021).

CONCLUSIONS

Though the barriers to urban restoration are significant, they are balanced with the opportunities to improve ecological conditions and provide multiple benefits to urban residents. Changing perspectives on the many values of urban ecosystems—including the people they benefit—offer important paths forward for meaningful change.

We urge practitioners to move away from a deficit model of science communication for ecological restoration projects, where there is an assumption that stakeholders are waiting to be filled with knowledge, and move towards sustained, purposeful communication that centers on local expertise. This shift can be difficult, but as many of the managers we spoke with identified, it can also cut down on manager frustrations by fostering reciprocal and necessary dialogue about projects. Further, engaging meaningfully with local partners takes time and resources, but it also builds more sustained projects and sets the stage for receptivity to future efforts. This is true for any restoration effort, but particularly so in urban settings.

Adaptive management is critical in any restoration effort. We hope to see future opportunities for natural resource managers to synthesize their hard-earned experience and expertise—through practitioner groups such as the ASWM Wetland Restoration Workgroup or academic efforts like the National River Restoration Science Synthesis Project—so that we can continue to learn about the practice of urban restoration in ways that provide ecological and environmental justice outcomes.

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We're grateful to SER and, particularly Alexis Gibson, for providing this opportunity to look back on work we did over eight years ago conducting interviews across Rhode Island about urban ecological restoration, each accompanied by our breast-feeding infants who are now third graders.

We are deeply grateful to the practitioners we spoke with. Many of our practitioner interviewees thanked us for giving them the time to share their experiences, but the pleasure was truly all ours.

ECOLOGICAL RESTORATION IN URBAN SOUTHEASTERN FLORIDA, USA

George D. Gann
The Institute for Regional Conservation; International Policy Lead, SER

Southern Florida is famous for the vast Everglades, but many other ecosystems are critical for regional biodiversity. All photos in this article credit of IRC unless otherwise noted.

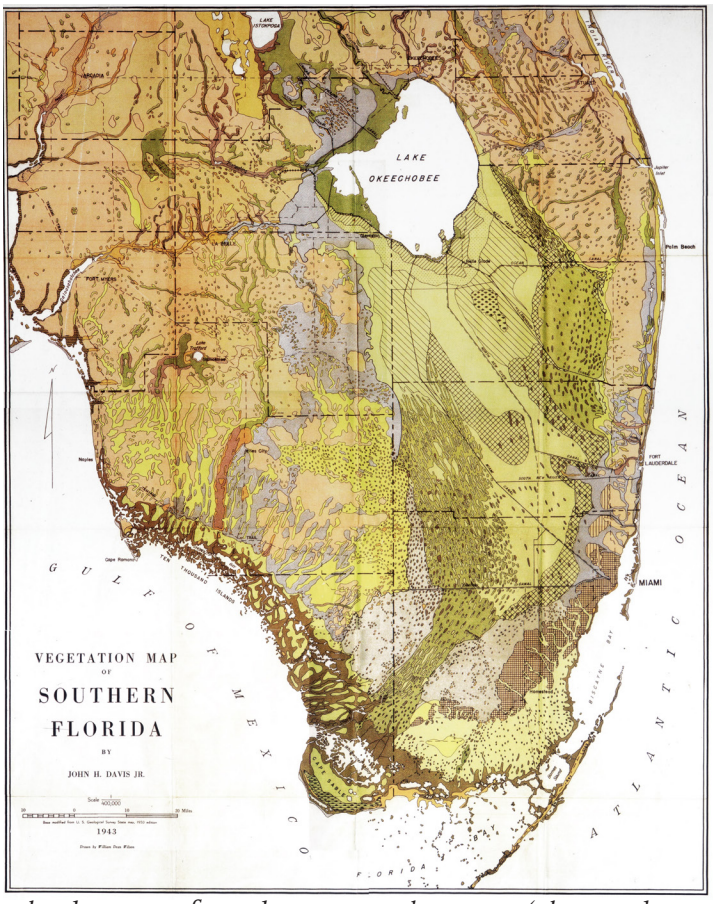
BACKGROUND

Southern Florida is unique in the United States in several respects. Many ecologically based maps, including the first global "Biodiversity Hotspot" map published by Myers et al. (2000) and One Earth's Bioregions 2020 map, include southern Florida in the Caribbean bioregion rather than the southeastern United States, indicating that the region is climatically and ecologically dissimilar from the rest of the continental US. As a result of the combination of this unique environment with physical proximity to the rest of Florida, the area also supports a highly unusual biotic community. Floristically, southern Florida from Lake Okeechobee south has about 1,500 species of native plants (half of the state's total), of which about 3% are endemic, 30% are tropical species at or near the northern limit of their ranges, and about 35% are temperate species at the southeastern limit of their ranges in the region. Like plants, southern Florida's animals comprise a mix of endemic, tropical, and temperate species. Using reptiles as an example, envision the American alligator (temperate), American crocodile (tropical), and Rim rock crowned snake (endemic) all cohabiting the same region.

Ecologically, the region is dominated by the Greater Everglades Ecosystem, a globally important UNESCO World Heritage Site and International Biosphere Reserve, and Ramsar Wetland of International Importance. A 5,247 km^2 core area within Everglades National Park (ENP) is the largest designated Wilderness (roadless) area in the US east of the Rocky Mountains and the third largest outside of Alaska. While the original Indigenous Calusa and Tequesta tribes were functionally extinct by the 1770s (a few individuals may have fled to Cuba), part of the territory they previously occupied is currently recognized as the ancestral homelands of the Miccosukee and Seminole tribes, who permanently settled in southern Florida in the early 1800s.

HISTORY

Beginning in the early 20th century, vast areas of southern Florida were massively developed, from the canalization and compartmentalization of most of the Everglades watershed including the Everglades Agricultural Area in the north, to the densely packed urban corridor from Key West to Stuart on the east coast and Marco Island north to Manasota Key and Charlotte Harbor on the west coast. More than 7.8 million people (36% of the state's population) live in



(Left) An image of the southern Florida peninsula at night showing the clustering of population into urban zones (photo credit: NASA Johnson Space Center; August 14, 2013). (Right) A map of southern Florida's ecosystems illustrating the higher diversity of ecosystems near the coasts and the large everglades ecoystem along the center and southend of the peninsula (image credit: Florida Geological Society, 1943: https://ufdc.ufl.edu/UF00015184/00001/1x).

a 40,000 km^2 area, mostly squeezed along the coasts. Similar to other rapidly growing regions of the world, the population along the Miami-Dade to Palm Beach corridor grew from about 66,500 in 1920 to 6.14 million in 2020. From a conservation perspective, southern Florida is fortunate to have more than 50% of the region protected in ~500 conservation areas, ranging from the very large (ENP and Big Cypress National Preserve) to the very small (<1 h), well above the 2020 UN Convention on Biological Diversity target of 17%. However, ecosystems and biodiversity are not distributed evenly across the landscape and most historically biodiverse upland ecosystems are concentrated along the coasts in what is now the developed urban zone. As an example, in densely populated Broward County, 97% of the native flora has been recorded in the eastern 1/3rd of county where nearly everyone lives, while only 30% of the native flora has been recorded in the much larger remnant Everglades, located in the western 2/3rds of the county. Some ecosystems—like subtropical hardwood forests, pinelands, and coastal uplands—primarily survive only in a highly fragmented and degraded state in the urban zone. Based on seven years of work on the Floristic Inventory of South Florida, in the early 2000s The Institute for Regional Conservation (IRC) published Rare Plants of South Florida: Their History, Conservation and Restoration (RPSF; Gann et al. 2002), which reported high levels of endangerment and extirpations in the south Florida region, primarily from large-scale ecosystem destruction through development. In total, 25% of the historical native flora was reported as possibly extirpated or critically imperiled due to the massive destruction and degradation of native ecosystems. About 80% of the rarest plant species were partly or entirely dependent on small conservation areas and private lands within the urban zone, and 30% of the native flora was historically absent from the three largest

conservation areas totaling >10,000 km^2, making protection and restoration of key ecosystems in the urban zone essential to their survival. RPSF identified many recommended sites for acquisition as well as Key Ecological Restoration Areas where threatened biodiversity was extant or had been recorded. In addition, recommendations for individual species were made, including ecological restoration activities from species augmentations and reintroductions to invasive species control, implementing prescribed burning, and using the reconstruction approach to restore appropriate habitat.

URBAN ECOLOGICAL RESTORATION

Over the past two decades, IRC and collaborators have implemented numerous projects in support of recovering rare species and restoring ecosystems throughout the region. These include a multi-year project in ENP that looked, in part, at how rehydration (part of the Comprehensive Everglades Restoration Plan) might affect rare and depleted species in the biodiverse Long Pine Key region of the park. However, much of our ecological restoration work has been focused on urban areas in southeastern Florida, where most of the native biodiversity and human population resides. This work includes three complementary programs covering very different aspects of ecological restoration: the Pine Rockland Initiative, Restoring the Gold Coast, and Natives For Your Neighborhood. In each case, the challenges of working on highly fragmented ecosystems in densely populated areas must be met with stakeholder engagement and collaboration, as well as creativity and innovation.

Pine Rocklands Initiative (PRI). Pine rocklands comprise a globally imperiled ecosystem that exists only in southern Florida and parts of the Bahamas. In Florida, this ecosystem is home to many rare plant and animal species, including more than two dozen animals and plants listed under the US Endangered Species Act. Dozens of state-listed endangered or threatened and regionally rare plants are also present. Importantly, pine rocklands evolved with periodic fire, which is a key challenge to ecosystem management and restoration in urban areas. Outside of ENP in urbanized Miami-Dade County, small patches representing perhaps 2% of the original extent of pine rocklands are all that remain of the ecosystem. Extant patches are degraded from the direct and indirect effects of fragmentation, hydrological modifications, fire suppression, invasive plants and animals, native hardwood and palm expansion, and dumping (including trash, yard debris, asphalt, and old cars). Important pine rocklands are also found in the National Key Deer Refuge and nearby areas in the lower Florida Keys, where sea level rise also poses an imminent threat.

The Pine Rockland Initiative was founded in 2005 with an emphasis on providing support to private landowners with pine rocklands on their property, especially for invasive plant control, with primary funding from the US Fish and Wildlife Service (FWS). Over the years the initiative has grown and evolved to become a multi-faceted program with many funders and collaborators including the FWS Coastal Program, Miami-Dade County Environmentally Endangered Lands program, Fairchild Tropical Botanic Garden (FTBG), private landowners, private donors, and many more. The goal of the program is to restore and manage pine rockland fragments on public and private lands throughout the range of pine rocklands, including developing innovative approaches to advance the restoration of this unique ecosystem in the context of intense social and ecological barriers. This includes restoring remnant fire-excluded and degraded pine rockland patches, as well as "expanding the footprint" by restoring pine rocklands where they have been completely destroyed. In both cases, restoration is challenged by severe limitations to the use of prescribed fire, together with an extremely high diversity of invasive plants, animals, and an overwhelming weed load in the system.

Over the last five years, IRC has conducted restoration activities on more than 250 acres, including invasive species control, hardwood and palm reduction, ruderal species management, seed collection, direct seeding, outplanting, and pre- and post-fire management. Innovative techniques employed include mechanical hardwood control, large-scape control of palms through bud treatments, groundcover restoration using mowing and rotations of special herbicide formulations, direct seeding into small plots or lines to minimize weed

Long thought to be impossible due to weed competition, direct seeding of native grasses and other pine rockland groundcover species has been shown to be a viable restoration technique using a modified applied nucleation approach, including hand weeding, mowing, and wind and gravity dispersal.

IRC's Ecological Restoration Team Leader and CERPIT Alex Seasholtz at IRC's John Kunkell Small pineland, a <1 h pine rockland patch undergoing ecological restoration treatments. For this ecosystem, every patch matters no matter how small.

competition while seed sources are established, and use of a modified applied nucleation approach for trees and shrubs to maximize areas where mowing can be employed to control weeds. These techniques work both before fire, to prepare sites for prescribed fire and maximize beneficial outcomes, and after fire, to maximize impacts at highly reduced costs. IRC is also a core partner in the Pine Rockland Business Plan being developed by the FWS and collaborators, which is utilizing the Ecological Recovery Wheel and 5-star system from the SER Standards to help develop targets, goals, and objectives for a matrix of >100 pine rockland patches still extant outside of Everglades National Park.

Restoring the Gold Coast.

Diverse, healthy coastal uplands are critical to local communities as the first line of defense against sea level rise and catastrophic storms; as covered earlier in this article, coastal areas in southern Florida have the highest population concentrations in the state. They contain hundreds of species, not just the few dominant plants species and sea turtles that are the traditional focus of restoration and conservation projects. Coastal uplands comprise an economic engine, protecting the beaches essential to tourism and property values as they help capture sand and prevent erosion; where populations of depleted native plants are restored, they in turn provide food and shelter for native butterflies, migrating songbirds, and other wildlife.

Because of intense public interest in coastal beaches and their management, stakeholder engagement and education is of the highest concern.

Restoring the Gold Coast (RGC) aims to restore key ecosystems and biodiversity along barrier islands and other coastal areas in southeastern Florida along the historic Gold Coast from Palm Beach to Miami-Dade County. It is a collaborative initiative that mobilizes partnerships within the community to teach children and adults about the importance of restoring coastal ecosystems while providing hands-on opportunities to restore ecosystems degraded over the last century. This includes restoring populations of more than 100 species of native plants historically documented in the area that have been depleted by development and the degradation of coastal ecosystems, as well as restoring critically rare ecosystems such as coastal shrublands that are vital for biodiversity. RGC is the culmination of years of floristic research and planning, and builds upon small volunteer-driven restoration projects in Delray Beach and Miami Beach. It was seeded with a $100,000 Impact 100 Palm Beach County grant, and later drew support from New York Life, municipalities, local business, community organizations, and schools. The program includes biodiversity assessments, in-field restoration events, in-school events, and in-person and online workshops. It includes collaborations with the City of Boca Raton to restore key coastal uplands, and FTBG to restore and monitor populations of endemic and threatened coastal plants. At the launch of the UN Decade on Ecosystem Restoration, and as part of SER's 2021 Make a Difference Week, IRC began the symbolic reintroduction of the federally endangered Florida prairieclover, an endemic shrub last recorded in Palm Beach County in 1918.

Natives For Your Neighborhood. To reach even a small proportion of the people who live in urban southern Florida, we need tools that are accessible. With this in mind, in 2005 IRC developed Natives for Your Neighborhood (NFYN), a web-based tool underpinned by data from the Floristic Inventory of South Florida. NFYN provides user-friendly information on plants within their native ranges that are appropriate for ecological restoration and naturalistic landscaping especially in the urban zone. Detailed information on more than 600 species of native plants are linked to postal codes, including special recommendations for specific ecosystems that can be restored in the urban context in southern Florida. NFYN also links native plants to native wildlife so that users know what native wildlife may be attracted by which plants. Over the last year, this very popular online tool had >68,000 unique visitors and >660,000 page views. With funding from the Florida Wildflower Foundation, native plants nurseries, Florida Native Plant Society chapters, and others, NFYN is now under expansion statewide. This tool is used by many collaborators, including FTBG's Connect To Protect Network, local garden clubs, and municipalities.

CLOSING

While ecological restoration is often considered inapplicable in urban settings, it is a critical tool for combating the biodiversity crisis in places like southern Florida where threatened, endangered, and rare plant and wildlife species share the same "habitat" as densely populated human communities.

Ecological restoration also provides meaningful engagement for individuals who want to personally contribute to moving the Earth from a trajectory of degradation to one of ecological and societal recovery—key to building support for the UN Decade on Ecosystem Restoration and other restoration initiatives.

IRC's urban ecological restoration programs illustrate that with education, creativity, and innovation urban ecological restoration can be both successful and sustainable. Importantly, they are evidence-based, taking into consideration the most critical restoration outcomes needed, as well as respecting the interests and capacity of collaborators and other stakeholders. From IRC's perspective, these programs collectively represent a wide range of possible restoration scenarios that can be employed in the unique urban settings of southern Florida, aligned with high functioning urban ecological restoration programs in other areas.

Providing stakeholders meaningful opportunities to participate is critical to successful restoration in the urban context. Volunteers install native plants to stabilize the dune; professional practitioners will follow up to remove the invasive Agave in the background.

URBAN STREAM RESTORATION AND THE CO-PRODUCTION OF SOCIALLY ROBUST KNOWLEDGE

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URBAN STREAMS IN LATIN AMERICA AND THE NEED FOR A PARADIGM SHIFT

Latin America is highly urbanized with more than 80% of the population across the continent living in cities of 20,000 or more inhabitants (Walteros & Ramírez 2020). The expansion of metropolitan and urban areas without adequate evaluation of the environmental consequences of their growth often imposes severe negative impacts on associated ecosystems such as streams, rivers, and lakes. Furthermore, the great housing deficit, estimated by the World Bank at 28 million homes, usually forces the most vulnerable members of society to settle in housing in marginal territories near already degraded aquatic environments, which in turn increases the risks to their health (Lora et al. 2010). Deficiencies in sanitary infrastructures and waste management lead to the disposal of high loads of pollutants in streams and exacerbate the negative perception of urban waterbodies, reducing citizen engagement with local ecosystems (Walteros & Ramírez 2020). Recurrent waterbody problems in urban areas, such as flooding or untreated wastewater, are then generally addressed without public participation through grey infrastructure interventions (e.g., dams, walls, drainage pipes) rather than sustainable urban designs that incorporate nature-based solutions to mitigate impacts and deliver additional ecosystem benefits (e.g., wetlands, restructuring floodplains, etc.). Altogether, this regional context puts urban waterbodies into the center of many concerns of urban communities in Latin America.

This article focuses on work happening in the metropolitan area of Buenos Aires, Argentina. Neighborhoods inhabited by working class communities in Buenos Aires are crossed by a large number of degraded streams that can benefit from restorative actions. Although many studies have reiterated that to be successful ecological restoration programs must be approached in a participatory way by engaging the community in the decision-making, execution, and monitoring of the process (Bernhardt et al. 2007; Palmer et al. 2007), to date the local communities in Buenos Aires have not been involved as relevant stakeholders, resulting in a stream management approach characterized by a hierarchical and highly bureaucratized structure (Graziano et al. 2021).

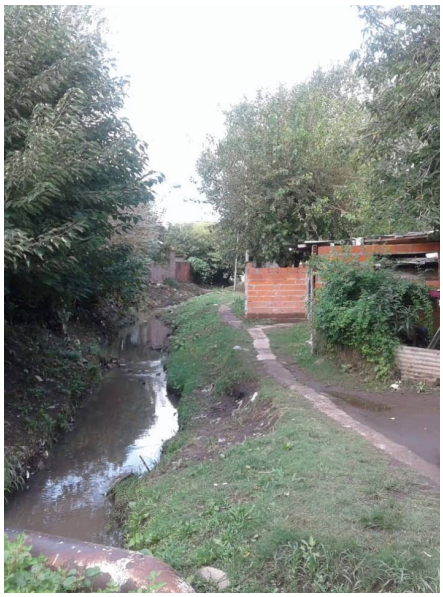
For urban restoration to be successful, a shift is needed from the top-down hydraulic perspective, where streams are mainly considered "pipes" that drain excess water and effluents, to a bottom-up social-ecological management paradigm where streams are considered living systems that support people and nature. This shift, however, requires breaking the influence of the socio-ecological traps driven by trends in urbanization described above, addressing the persistent structural poverty due to economic inequalities and real estate market speculation (Graziano et al. 2021), and radically changing how local communities are engaged in land management decisions.

COMMUNITY ENGAGEMENT AND THE CO-PRODUCTION OF SOCIALLY ROBUST KNOWLEDGE

The historic inability to face these challenges has led to interest in the local community to find new ways of action and production of knowledge for conservation and restoration. The transdisciplinary approach is one of these methods. This approach provides an alternative paradigm of generating

knowledge that involves both the scientific community and other sectors of civil society (governmental and non-governmental organizations, community networks, private sector) and attempts to produce more effective results to address socio-environmental conflicts and promote greater socio-environmental justice through the incorporation of locally relevant questions and the active participation of civil society (Nowotny 2003; Polk 2015).

The transdisciplinary approach can be complemented with the action research paradigm, which seeks a dialectic synthesis between knowledge production and intervention in the territory, with a focus on the diagnosis and resolution of locally relevant problems (Reason & Bradbury 2001). It should be noted that action research in Latin America is particularly fruitful and has made numerous contributions to this paradigm as an approach to social research and popular education (Fals Borda 2013). Alternative scientific research paradigms, such as transdisciplinary research and action research, can play a fundamental role in favoring local experiences where transformative changes become a reality, generating bottom-up pressures that can foster large-scale social-ecological transformations. These approaches have not traditionally been used in restorative projects although they are becoming more common in different areas of sustainability science, having the potential to be highly disruptive by empowering marginalized actors and the



Arroyo San Fransico in Buenos Aires. Photos: Bárbara Gómez & Martín Graziano.

generation of socially robust knowledge, especially in urban contexts where the hydraulic perspective explained above is commonplace.

A CO-PRODUCTION EXPERIENCE OF SOCIAL-ECOLOGICAL STREAM REHABILITATION

Since 2015, we have been using a transdisciplinary approach to develop a co-production experience around the ecological management of Arroyo San Francisco, one of the many degraded urban streams that cross the metropolitan area of Buenos Aires (Saraceno et al. 2021). We call this project "Proyecto Hábitat Claypole" (PHC; Claypole Habitat Project, @proyectohabitatclaypole for more information on Instagram, Facebook or YouTube). PHC provides a space for academic and social articulation focused on promoting socio-ecological transformations that are co-produced, favoring socio-environmental improvements for the local residents.

The formation of PHC has generated a network of social and academic actors that grew over the years and made it possible to carry out different activities focused on the rehabilitation of the San Francisco stream. In the last six years, PHC's co-production work has focused on the implementation and evaluation of participatory ecological management activities for the stream, such as the re-introduction of native aquatic plants (Graziano et al. 2019); the co-production and evaluation of vertical constructed wetlands to mitigate the entry of pollutants from the urban drainage; the protection of local green space through collective actions; and the redesign of the landscape based on the promotion of natural urban wetlands.

Re-introduction and mnitoring of macrophytes in a section of San Francisco stream. Photos: Martín Graziano.

Case Study 1: Reintroducing Native Aquatic Plants. One of PHC's first projects was the re-introduction of native aquatic plants and was carried out together with the workers of Mirabal Cooperative, a local social cooperative (Graziano et al. 2019). Through a set of participatory action-research methods combined with traditional ecological rehabilitation techniques, we evaluated several restorative interventions in a 200 m reach of Arroyo San Francisco during three consecutive years. Interventions were mainly based on the transplanting of native plant species absent in the stream and the analysis of their survival capacity over time. Our results showed a relatively high short-term survival of macrophyte transplants (up to 75% within 2 to 4 months), with an increasing decline in survival (10-30% at 6 to 12 months) after the interventions. However, a convergence of biophysical, social, and institutional factors prevented us from obtaining better results from these interventions. At the same time, this experience showed us the strong motivation of local workers to generate transformative actions to improve their local quality of life, revealing the potential effects of a more participatory approach to watershed governance.

Case Study 2: Participatory Design for Native Wetland Restoration. In 2019, we started a participatory redesign of the landscape based on the restoration of an urban wetland. Urban wetlands fulfill important functions at the local and watershed scales: they are important for flood protection, they increase areas for temporary water storage and create hotspots for biogeochemical processes, they increase the local biodiversity of both the flora and the associated fauna, and they provide spiritual and cultural benefits for the local community among other contributions.

Given their importance, we conducted several participatory workshops with the local community in which we discussed the importance of urban wetlands and selected native vegetation based on aesthetic, floral and ecological attributes. To do this, we compiled a small book containing beautiful images and the main ecological and floral attributes of each plant and hired facilitators to

Community engagement in a participatory design workshop of an urban wetland. Photos: Bárbara Gómez & Martín Graziano.

lead discussions with community members about which plants they would want to incorporate. Over 40 species of native flora were selected, with coral tree (*Erythrina crista-galli*) and passionflower (*Passiflora caeroulea*) as some of the most requested. We are now turning those preferences into a restoration plan, and planning to implement it with the support of the local authorities. We are also working to strengthen local environmental working cooperatives through the greenhouse production of native aquatic and riverine plants for this and future projects.

Overall, these activities have begun a path towards the socio-ecological transformation of the

Local environmental cooperative workers in action. Photos: Proyecto Hábitat Claypole.

management of the Arroyo San Francisco, with PHC (and by extension the diverse participants in PHC) included as a relevant stakeholder in its management. In turn, the active participation in these activities and dissemination of information among residents has generated a change in the perception of the environment and the need to protect the green spaces that remain in the area. Human and ecological well-being in cities depends to a large extent on the success and multiplication of these kinds of activities and more fully engaging local stakeholders in ecological restoration and management.

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ESSAY
NATURE IN THE INTERSTICES AND BEYOND

Richard Scott
National Wildflower Centre; Chair UK Urban Ecology Forum

I have just returned from an incredible gathering of French Parks staff in Paris organized by Hortes de Seines called Nature in the Interstices, focused on updating urban park management. Interstices are small, intervening spaces – nature in the interstices is a lovely way to think about urban nature, be it in parks, greenspaces, yards, or borders. The fact is that right now we are witnessing a major reboot for society that makes clear the importance of parks, the only refuge for many during the COVID pandemic. Ecological restoration can help us re-imagine what urban parks and greenspaces can mean for society in the future.

To make the UN Decade on Ecosystem Restoration work we must act fast. Nearly 70% of the world's populations could be living in cities by 2050, meaning urban green places will quickly be the primary daily connection most people have with the natural world (and for most this is already the case). The well known British naturalist Sir David Attenborough says we must teach people to love the natural world from their doorstep. But Attenborough's point is not new. It was 150 years ago, in 1870, when Scottish planner Patrick Geddes is considered to have originated the adage to "think globally, act locally." In November 2021, the UK Urban Ecology Forum will present six principles on urban nature at COP 26.

These reccomensations are to:

1. Reconnect and restore accessible spaces for nature
2. Plant and sow trees and wildflowers in unexpected places
3. Celebrate and protect healthy air, water, and soil in the urban landscape
4. Share joy and understanding of natural processes on our doorsteps
5. Commit to climate mitigation and resilience
6. Work with diverse communities to bring nature's health and well-being to all

The COVID-19 pandemic has illustrated the importance of urban parks for human wellbeing. Ecological restoration in urban parks, and even more widely throughout urban areas, can help enhance the relationship between people and nature. Urban parks are a critical part of reaching UN Sustainable Development Goal 11 (SDG 11): Sustainable Cities and Communities. As an example, after years of work London became the first National Park City, an effort born out of the recognition of the large number of

A field of wildflowers in Manchester. All photos in this article credited to National Wildflower Center.

greenspaces, outdoor recreational opportunities, and urban biodiversity in the metropolitan area. This designation is the start of an ongoing process to make London "greener, healthier, and wilder" and is a fantastic model for cities everywhere.

NATIONAL WILDFLOWER CENTRE

The National Wildflower Centre has a mission of creative conservation. Founded in 2000, it is now part of the Eden Project and focuses on bringing wildflowers back for people to enjoy and celebrate in urban areas, reversing biodiversity decline with color and style, and employing the very special energy of urban nature conservation to address the climate and biodiversity crises. Nature is a continuum, and our "wildflower interventions" bridge the urban and rural divide, creating a path towards more livable and caring places.

Daisies and poppies growing in Liverpool.

Our work starts with the soils, which are often overlooked in the preparation of meadow creation sites, despite the wider recognition of soil's importance. Soils reflects the ecology and geology of a particular area and, of course, have a major role in what plant and other communities appear on a site. Our wildflower efforts are especially focused on meadow ecosystems, which require nutrient poor soils, as opposed to nutrient rich soils. Urban soils tend to be more nutrient poor unless located in areas downslope from agricultural inputs. These already poor soils create significant opportunities for restoration. Where soils are not poor, but flower-rich communities are desired, reducing the fertility of the soil at the first stage of the project is crucial, especially if the plan is for minimal subsequent management (Ash et al. 1992). Grasses readily grow on fertile soils and will outcompete less vigorous wildflowers – it is no coincidence that 20% of all Sites of Special Scientific Interest (SSSIs) are on the poor soils of former quarries or mines (Sinnett 2018), including the wonderful Canvey Wick SSSI, hailed as a "brownfield rainforest" (Barkham 2017) for its rich assemblage of invertebrates.

Soils hold 80% of the world's terrestrial carbon (Goddard 2016) and over 2 billion tons of carbon is stored in UK grasslands (Ward et al. 2016). Urban soils are important for carbon storage: studies have shown that 1ha of urban soil can sequester up to 85 tonnes of atmospheric carbon per year (Goddard 2016). More significantly, research shows that species-rich grasslands can sequester more carbon than low-diversity pastures (De Deyn et al. 2011) and grasslands store more carbon than shrub communities (Sorensen et al. 2017). Ecological restoration of urban green and open spaces can increase the value of these areas for carbon sequestration.

The National Wildflower Centre focuses on creating successional landscapes. Wildflower habitats start with annual species, with the further addition of biennial and perennials to mimic natural habitat patterns of succession. This work captures public imagination, it links to the new energies of the wilding and rewilding movements, but it is deeply informed by ecological experience and social engagement skills. Wildflower projects transform sites through the clever intersection of feasibility, successional mixtures of native seed for biodiversity, and well-chosen substrates. But wildflower projects aren't only ecological – these projects create

Field of viper's bugloss in Everton (top); wildflower meadow in the city center of Liverpool (center); children from Liverpool and Manchester meeting and exhanging wildflower seeds.

Attenborough's link between doorsteps and wild places.

One favorite NWC project involved re-creating fields of viper's bugloss (*Echium vulgare*) in Everton, just a mile from Liverpool City Centre in England. Everton has experienced two eras of urban decline. This project shows what can be achieved by the simple and iconic act of sowing: beauty sown by hand by hundreds of children and the local community over the past seven years, extended across 15 hectares of the city despite lockdown and uncertainty - these fields are about the joy and hope of native recovery. Carl Linnaeus apparently adored fields of Echium "surpassing in splendour anything that can be imagined." It was a joy for those who witnessed the transformation in Everton, and Linnaeus too, I am sure, would have been whistling if he walked through this land. This project goes beyond the formal ecological science … for me, the fields of viper's bugloss made clear the role of joy in re-awaking a sense of place and community.

In 2014, the National Wildflower Center worked with Liverpool and Manchester (two historically rival cities) to win the Kew Garden's Wildflower Flagship award. The funding gave the communities a chance to connect – both in creating the bid and in planting the wildflowers – and a chance to see and engage with under appreciated parts of the cities. In 2017, the "Northern Flowerhouse" was launched by the two cities with the goal of working with other northern cities to implement wildflower projects. The name was a play on words, linking economic regeneration ideals like the "Northern Powerhouse" —a proposal to boost the economy of Northern England. Adding fun to the process is another important approach of any restoration project! And it wasn't just the "Northern Flowerhouse;" we also created the and the "Scouse Flowerhouse" (Liverpudlians are known as "scousers"). Activities by the Flowerhouses help facilitate and generate a movement for positive environmental change and pride.

FOCUSING ON URBAN AREAS

Why is focusing on urban areas so important? To truly reverse the climate and biodiversity crises, we have to take action where people live and near where people live—seeing is believing. Curiosity,

participation, and transformation are critical, however big or small the project, bearing witness to what is possible even in unexpected spaces. Urban restoration is a demonstration of how we might manage land in response to the circumstances of climate emergency and extinction crisis, involving everyone in a creative restoration journey.

We must be bold in our actions and share the marvelous journey of transformation with people in urban places. The thread of nature is there in the cracks and crevices, the interstices. I look forward to finding more imaginative ways to place nature in the interstices and focal points for people to see, experience, and celebrate, connecting culture and ecology everywhere.

It's been a thrilling journey, working with the environmental charity Landlife, building the National Wildflower Centre, and making wildflowers personal to people's lives. The Centre is now homed with the energy of the Eden Project which spotlights the power of transformation and community change – from urban to rural to wild places. The painter Vincent Van Gogh once said, "that which is done with love is done well." Perhaps love is the most critical ingredient of all in urban ecological restoration: love of biodiversity, love of flowers, love of color, love of all forms of life. And perhaps restoration is one of the most tangible ways we can show that love. I am proud to own the shovel of the late Tony Bradshaw, a restoration hero and SER founder, who believed in restoration action! And I am proud to use that shovel to restore not just the place where I live, but the to restore hope to the world when it needs it most.

FEATURED RESOURCES

UPDATES FROM THE RESTORATION RESOURCE CENTER, *RESTORATION ECOLOGY*, AND THE WEBINAR LIBRARY

RESTORATION RESOURCE CENTER
FEATURED RESOURCES

INTERACTIVE WETLAND EXPERIENCE CENTER – DIALOGUE OF MAN-NATURE RELATIONSHIP IN 21ST CENTURY, A CASE OF NAJAFGARH WETLAND, DELHI, INDIA

Anupama Khatavkar and Shree Naik

Wetlands are one of the most important and at the same time most threatened resources in India. With rapid urbanization and development initiatives in the country, remaining wetlands are further threatened by urban encroachment. In this SER2021 presentation, Anupama Khatavkar and Shree Naik discuss a new concept of interactive ecology in Indian scenarios where wetlands are becoming part of the urban landscape. Through this approach, where man and nature interact to support each other, maintain, enhance, restore, and revive the natural system, inform the general public about natural ecosystems and their values, and at the same time learn how to sensitively interact with those systems.

Photo: Sunil Sharma / Getty Images

Photo: Peter Patavina / Getty Images

UNDERSTANDING LOCAL STAKEHOLDER PERCEPTIONS AND ATTITUDE OF PRESCRIBED BURNING FOR IMPROVED SUPPORT OF URBAN PINE ROCKLAND RESTORATION IN MIAMI DADE COUNTY (MDC)

Brenna R. Kays and Elizabeth P. Anderson

Prescribed burning is a crucial component of Pine Rockland (PR) habitat maintenance and restoration in South Florida. With less than 2% of original PR land cover remaining and a significant portion of PR stands within the urban matrix of Miami Dade county, understanding public perceptions of prescribed burning in urban areas is critical to ensure local stakeholder support for such practices. This SER2021 presentation focuses on research into perceptions that urban residents have about prescribed fire in South Florida. With MDC being a multicultural, majority-minority county, this presents a unique opportunity to understand resident perceptions in order to carry out culturally informed restoration efforts. Insights obtained through the collection of this data can be used to inform education and outreach campaigns that can be conducted prior to prescribed burns to garner public support.

RESTORATION ECOLOGY EDITOR-IN-CHIEF PICKS

REFLECTING ON TWENTY YEARS OF FOREST LANDSCAPE RESTORATION

Stephanie Mansourian, Nora Berrahmouni, Jürgen Blaser, Nigel Dudley, Stewart Maginnis, Musonda Mumba, Daniel Vallauri

The concept of Forest Landscape Restoration (FLR) was formulated over 20 years ago in response to demand for a cohesive understanding of landscape-scale forest restoration between NGOs, ecologists, private companies, and other entities engaged in restoration. The principles of FLR have since been incorporated into many of the world's largest forest restoration initiatives. In this paper, the authors closely reflect on the 20 years since the initial conception of FLR. First, they examine the context under which FLR was formulated and discuss its development in subsequent decades, providing readers with a comprehensive list of major FLR projects that have appeared in the twenty-first century. The authors then engage in a detailed discussion of obstacles facing current FLR projects, including challenges associated with project governance, spatial scale, and supply of native seeds. They end the paper by exploring how FLR might develop in future years, particularly in conjunction with the UN Decade on Ecosystem Restoration, and propose that FLR projects will continue to play an important role in global forest restoration going forward.

COMMUNITY-LEVEL ASSISTED MIGRATION FOR CLIMATE-APPROPRIATE PRAIRIE RESTORATION

Mark J. McKone and Daniel L. Hernández

Existing guidelines for restoration of North American prairie ecosystems encourage the use of local plant species that are well adapted to current climate conditions. However, future climate change will likely drive a rapid shift in the habitable range of these species and make their use in restoration projects infeasible. The authors of this paper suggest that future prairie restoration projects should attempt to counter such climate-driven range shifts and maximize restoration success by using non-local prairie species that are expected to thrive under future climate conditions. By incorporating seed from both local and non-local sources, the authors argue, practitioners can improve genetic diversity within restored prairie ecosystems and ensure that these ecosystems will continue to function effectively as climate changes. The authors include a discussion of both the potential risks and ethics of such an approach, ultimately arguing that the use of non-local species in prairie restoration is necessary to preserve the integrity of restored ecosystems in the face of future climate change.

GENDER INCLUSION IN ECOLOGICAL RESTORATION

Ludmila P. de Siqueira, Anazelia M. Tedesco, Paula Meli, Anita Diederichsen, Pedro H. S. Brancalion

Gender equality is explicitly promoted by United Nations Sustainable Development Goals and is critical to both equitable and just environmental management. However, many ecological restoration projects fail to fully consider or integrate gender issues. Through a detailed discussion, the authors of this paper make a clear case for the incorporation of gender equality into the planning and implementation of restoration initiatives. They provide practical suggestions on how this can be accomplished, specifically by advocating for the use of gender analysis models throughout the restoration process and proposing that women be more fully integrated into restoration planning, management, and decision-making roles. The authors conclude by proposing that the SER International Principles and Standards for the Practice of Ecological Restoration be amended to more strongly facilitate gender equality in future restoration initiatives.

PRECISION RESTORATION: A NECESSARY APPROACH TO FOSTER FOREST RECOVERY IN THE 21ST CENTURY

Jorge Castro, Fernando Morales-Rueda, Francisco B. Navarro, Magnus Löf, Giorgio Vacchiano, Domingo Alcaraz-Segura

The importance of landscape-scale forest restoration has grown tremendously in recent decades, yet many forest restoration initiatives are primarily focused on planting a certain number of seedlings and do little to ensure that these seedlings survive into adulthood. The authors of this paper propose an alternative approach to forest restoration called Precision Forest Restoration (PFR) that aims to restore self-regulating forest ecosystems while minimizing disturbance to existing plant communities and maximizing the number of individual tree plantings that reach maturity, thereby increasing the efficiency of restoration efforts. They provide a detailed five-step framework of PFR with practical suggestions on how restoration practitioners can implement it at the landscape scale. The authors ultimately propose that a precision framework similar to PFR could be applied to restoration projects in a variety of other ecosystems.

WEBINAR LIBRARY
IN CASE YOU MISSED IT...

SER hosts a webinar series to engage with restoration experts from across academia and the applied field; we also partner with our chapters to bring additional regional webinar perspectives. We are continuously adding new recordings to our Webinar Library and access to recordings is a member benefit. This month we are featuring presentations related to restoration in urban environments.

Creating High-Function, Low-Maintenance Ecosystems in Urban Environments
Joshua Eldridge

The Future of Urban Natural Area Land Management
Toby Query

Urban Ecological Restoration in Aotearoa, New Zealand
Bruce Clarkson

Restoration Strategies for Pollinator Habitats in Urban Landscapes
Rory Denovan

Urban Ecological Restoration: Unique Challenges and Benefits
Derek Schafer

Photo left to right: espiegle/Getty Images, pat138241/Getty Images, Bruce Clarkson, bookguy/Getty Images, and CelilKirnapci/Getty Images

SOCIETY NEWS

UPDATES ON MEMBERSHIP, POLICY & PRACTICE, THEMATIC SECTIONS, AND MORE

MEMBERSHIP NEWS

Laura Capponi and Megan Taylor
SER

MEMBERSHIP FOR ALL UPDATE

What happened in the US after the murder of George Floyd triggered a global response across all sectors of society. SER issued statements standing in solidarity with those demonstrating for justice, but also responded to calls from our members to walk the talk towards building a more just society. The organization took immediate action by implementing the Membership for All Initiative and it has made a huge impact in just over a year. Membership for All expanded eligibility of our income-qualified "equity membership" pricing to any individual or institution, anywhere in the world; it had previously only been available to individuals or entities in select countries. We also created a no-fee Open Doors Membership for those unable to pay a membership fee of any sort.

Membership for All is a strategy SER adapted from similar models in the social service and community-based sector. While we haven't done a comprehensive survey, we are either the only, or one of very few, organizations in the scientific/professional society realm to take this approach. The Membership for All program positions SER as a professional and scientific society for the future.

We're serious about diversifying our network, perspectives, and approaches to solving problems, particularly as the UN Decade on Ecosystem Restoration gains momentum.

Since Membership for All was implemented in July 2020, SER has welcomed 15 new "equity" organizations; more than 250 Individual Equity members from 42 countries; and more than 300 Open Doors Members from 60 countries.

Our flagship programs are also adopting this model:

- The Certified Ecological Restoration Practitioner program has institutionalized. equity rates and is exploring an "open door" fee option.
- SER's 9th World Conference adopted Membership for All pricing for registration. More than 1,400 people from 71 countries participated in SER2021 (a 70% increase from SER2019). Eight percent of those registrants used Open Doors rates and 20% used Equity rates, illustrating how important these tools are for increasing access to information and resources.

WELCOME NEW BUSINESS MEMBERS

All Business Members are listed in the Restoration Directory on SER's Restoration Resource Center. The directory provides a resource to identify and locate environmental restoration leaders in private and public industries.

EcoFutures is focused on resolving landscape scale ecology issues driven by climate change or other long-term impacts. EcoFutures works to advance and apply concepts of ecological resilience, system understanding, and the ecological relationships associated with climate change. This work encompasses ecological modelling, biodiversity planning, conservation and prioritization, natural resource management, and ecological monitoring program design and implementation.

SER'S STUDENT ASSOCIATION PROGRAM EXPANDS INTO AFRICA, CARIBBEAN, CALIFORNIA

Photo: Excellence Akeredolu

We are thrilled to welcome SER's newest Student Associations: University of California-Riverside (USA), University of Lagos (Nigeria), and University of Puerto Rico at Aguadilla (Puerto Rico).

"There can be no more exciting news than to announce SER's three new international student chapters that will build the next generation of restoration specialists and practitioners inspired with repairing this world of nature and wonderment." – Kingsley Dixon, SER Global Chair.

SER's Student Association Program provides an opportunity for students interested in ecological restoration and related fields to become involved in SER's global network, participate in SER conferences and events, and take advantage of SER resources. Organized by the students with the support of a sponsoring faculty advisor, student associations can be formed at any accredited academic institution, and provide a means for those students interested in pursuing a career in some facet of ecological restoration to come together in a like-minded group. SER is also working to create opportunities for student associations to develop partnerships for long-term restoration monitoring and research with nearby land and water managers who are implementing restoration projects.

"I am very excited that the University of Puerto Rico at Aguadilla is now part of the SER Student Association Program! This will help the students that work in our dune and mangrove restoration projects come together and connect with other ecological restoration professionals in SER's global community...Training this future generation of researchers and ecological restoration practitioners will greatly contribute to the restoration of ecosystems on the island and in other parts of the Caribbean." - Robert Mayer, CERP and faculty advisor of UPR (photo credit: Robert Mayer)

"SER-UCR aims to help increase student awareness and access to opportunities to practice and work in ecological restoration not only to enhance these efforts, but also to provide students with experiences and opportunities both within and outside of academia. We plan to partner with local organizations to carry out restoration projects, organize professional development workshops, and plant a native garden on campus as an educational tool." - Meg Kargul, Student Founder of the UC-Riverside Student Association (photo credit: SER-UCR)

RESTORATION ROADTRIP

Megan Taylor

This quarter, SER and the United Nations Environment Programme (UNEP) North America Office teamed up on a digital campaign to introduce social media followers to restoration across North America. The goal of this virtual road trip through restored ecosystems in Canada and the United States is to make the practice of restoration ecology more accessible to a broader audience, and showcase how a wide range of restorative activities and practices can support the recovery of degraded ecosystems.

If you have not already joined us, we invite you to follow and share posts from this cross-continental road trip on Facebook and Instagram to uncover amazing stories across diverse landscapes, from wetlands and forests to deserts and seas. New restoration sites will be featured every week through December. By showcasing local restoration initiatives throughout North America, SER and UNEP-North America hope to motivate individuals and organizations to protect and restore ecosystems within their own communities. You can locate and learn more about restoration projects near you via the interactive map.

Many of the restoration projects featured were submitted by SER members through the Restoration Resource Center, and we hope that more regional UNEP offices (and other partners) will be interested in expanding this campaign with us on other continents in 2022.

SCIENCE, POLICY & PRACTICE UPDATE

Bethanie Walder and Alexis Gibson
SER

PRACTICE

Partnership with UEBT. Through a Memorandum of Understanding signed in October, SER is partnering with the Union for Ethical BioTrade (UEBT) to incorporate components of the SER International Principles and Standards into the UEBT Biodiversity Assessment Planning Process. UEBT focuses on sourcing with respect for biodiversity for dozens of companies in the beauty, food, natural pharmaceuticals and other related industries. We will also partner with them to design and test a new training module for Certified Ecological Restoration Practitioners (CERPs) so they can act as auditors for UEBT certification. We look forward to formal testing of this program in 2022

SCIENCE AND PRACTICE

New Publications. In October, Stephanie Mansourian (SER Director-at-Large) co-authored a paper in *Restoration Ecology* proposing ten people-centered rules for socially sustainable ecosystem restoration (see the *Restoration Ecology* section in this issue for a highlight of another recently published paper by Stephanie).

In partnership with an international team through the International Union for the Conservation of Nature (IUCN), Jim Hallet (SER Vice Chair) and Cara Nelson (Science and Policy committee member) published a new guidance document titled "Using ecosystem risk assessment science for ecosystem restoration" exploring how the IUCN Red List of Ecosystems can be applied to ecological restoration. You can learn more about the work here.

POLICY AND PRACTICE

Standards of Practice for the UN Decade on Ecosystem Restoration. SER, the International Union for the Conservation of Nature (IUCN) —specifically the Commission on Ecosystem Management (CEM) and its Ecosystem Restoration Thematic Group (ERTG)—and the UN Decade's Best Practices Task Force entered into a new partnership to develop Standards of Practice (SOPs) tiered to the UN Decade Principles to support the implementation of the UN Decade. SER released an initial questionnaire to our members to share good SOPs with the team as part of the first phase of the project—if you have not yet filled out that survey and want to share your recommendations, please do so by December 22. To further develop the SOPs we will hold a joint global forum with IUCN-CEM and The Best Practices Task Force in early 2022, followed by a global consultation on the recommendations, revision, and then a final product in the 4th quarter of 2022.

SCIENCE, PRACTICE, AND POLICY

International Principles and Standards for Ecological Restoration of Mined Areas. SER continues to partner with Curtin University (Australia) and Southern University for Science and Technology (China) on guidance for ecological restoration of mined areas. The mining standards are built from the SER International Principles and Standards for the Practice of Ecological Restoration, but are specific to the mining sector. We recently completed final reviews, graphics, and updates, and the Mining Standards are being submitted for peer-review in early December.

Mediterranean Forest Restoration Certification Pilot Program. SER continued to partner with SER-Europe and Worldwide Fund for Nature – Spain (WWF-Spain) on a pilot to develop a certification program for Mediterranean forest restoration projects. At the end of December we will complete the first year of the project having identified all three pilots and begun work on the first two. The project team is also engaging with Preferred by Nature, which is piloting a slightly different project certification program, to compare the two approaches side by side at one of the pilots.

SCIENCE AND POLICY

Global Restoration Observatory. With the support of Google, SER and Climate Focus continue work on developing common global indicators for ecosystem restoration through the Global Restoration Observatory (GRO) network. We are completing revisions to the proposed common indicators based on review and synthesis of feedback from knowledge café participants and members of the GRO network. We expect to release the final product in early 2022.

CHAPTER SCIENCE, POLICY, AND PRACTICE UPDATE

SER Chapters also engage directly in science, policy, and practice work that relates to their region.

SER-EUROPE

SER-Europe developed the Declaration: "Scientists in Support of an Ambitious European Union Nature Restoration Law" with 12 recommendations in support of an ambitious EU nature restoration law. The Declaration was approved at the 12th European Conference on Ecological Restoration in September 2021. It calls for the support of European academics and practitioners, individuals, and institutions to enable a restoration law that will protect nature and reverse the degradation of ecosystems, turning an environmental challenge into a unique opportunity. 30 expert networks and organizations from 12 European countries and more than 1,300 European scientists and experts in the field of nature restoration have already expressed their support for the Declaration. Simultaneous with the release of this Declaration, several leaders from within SER-Europe and other chapters published a new article calling for an "Ecological Restoration Principle" similar to the Precautionary Principle or the Polluter Pays Principle to help underpin the UN Decade on Ecosystem Restoration.

SER-AUSTRALASIA

In partnership with 17 non-profit and advising organizations, SER-Australasia released the second edition of their National Standards for the Practice of Ecological Restoration in Australia. Including an introduction from the Minister of the Environment, the SER-A Standards have been designed to encourage all restoration and rehabilitation projects in Australia to reach their highest potential, and are based on the current best knowledge and tools for restoration in Australia. Highlights of the Second Edition include revised indicators table for the Five Star recovery tracking system and refreshed terminology for restoration approaches. You can read more about the second edition and find the document here.

CHAPTER NEWS

SER EASTERN CANADA LAUNCHES

Line Rochefort, Jeremy Lundholm, and Luc Bélanger
SER Eastern Canada

SER is happy to announce its newest regional chapter!

The Society for Ecological Restoration - Eastern Canada (SER-EC) is a new bilingual organization and regional SER chapter covering the Quebec, Maritimes (New Brunswick, Nova Scotia and Prince Edward Island), and Newfoundland & Labrador provinces, each having different official languages (English and/or French). SER-EC will bring together ecological restoration professionals in Eastern Canada from governmental, non-governmental, private, and academic organizations.

SER-EC will be added to the membership application and renewal form beginning in December 2021. We invited SER-EC's three founding members to share with the restoration community their inspiration for forming this new organization, and what members can expect in the coming months.

The idea of the creation of a new Society for Ecological Restoration (SER) chapter in Eastern Canada comes from preliminary discussions among stakeholders initiated in 2017. At the end of 2020, an interim organizing committee of three founding members (Line Rochefort, Jeremy Lundholm, and Luc Bélanger – see below) then decided to send an email requesting support for the creation of a chapter entitled "Society for Ecological Restoration in Eastern Canada / Société pour la restauration écologique – Est du Canada" (SER-EC hereafter), to an exhaustive list of restoration professionals (researchers, practitioners, and decision makers) working in governmental, non-governmental, private, and academic organizations located in each of the five eastern Canadian provinces (the Quebec, the Maritimes [New Brunswick, Nova Scotia and Prince Edward Island], and the Newfoundland & Labrador province).

A majority responded with enthusiasm and support for the formation of SER-EC considering that there are few restoration networking and information sharing opportunities in the specific ecological context of Eastern Canada. Consequently, the chapter will fulfill the need for improving the knowledge base, consultation, collaboration, and methods-sharing in ecological restoration of various unique ecosystem types (small watercourses to major freshwater ecosystems, large tidal brackish and saltwater marshes, peatlands, etc.) and will address several industry-related challenges and restoration opportunities (forestry, mining, agriculture, etc.) in Eastern Canada.

SER-EC's mission will therefore be to advance the science, practice, and policy of ecological restoration to sustain biodiversity, improve resilience in a changing climate, and re-establish an ecologically healthy relationship between nature and culture in Eastern Canada. To do so, SER-EC will promote the practice, principles, and benefits of ecological restoration; represent the views and principles of experts in Eastern Canada related to issues of interest or concern in the ecological restoration of ecosystems; facilitate the collection and exchange of information related to ecological restoration; develop a network in Eastern Canada serving as a forum to promote discussion on the ethics and philosophy of restoration; and share knowledge and guidelines of international efforts to restore various types of aquatic and terrestrial ecosystems.

This winter, SER-EC will hold a scientific symposium that will

bring together the Peatland Ecology Research Group (PERG) and the new SER-EC Chapter. This event, which will take place in Quebec City (in hybrid mode), will focus on the restoration and management of disturbed peatlands, as well as the restoration and reclamation of other types of environments and ecosystems. More details will be given on PERG's website soon.

LINE ROCHEFORT

Line Rochefort, the Quebec Region Co-chair of SER-EC, is professor in the Department of Plant Sciences at Université Laval (Québec, Canada) and member of the Center for Northern Studies (CEN). She founded the Peatland Ecology Research Group. She is also the initiator of a new field of research in Canada focused on the development of peatland restoration techniques after peat extraction or infrastructure disturbances and of Sphagnum farming projects. Line's other fields of expertise include ecology of Greater Snow Goose nesting habitat in the Arctic; restoration of borrow pits of roads and mining sites in boreal regions using native plants, in particular with bryophytes and lichens (biological crusts). She is also the National Correspondent for Canada for the Scientific and Technical Review Panel (STRP) of the Ramsar Convention.

JEREMY LUNDHOLM

Jeremy Lundholm, the Atlantic Region Co-Chair of SER-EC, is professor in the Biology Department of Saint Mary's University (Nova Scotia, Canada) and associate with CB Wetlands and Environmental Specialists. He founded the first green roof research lab in Atlantic Canada and is globally recognized as a pioneer in the application of community ecology to green roofs. He has over 20 years of experience in coastal wetland restoration and nature-based adaptations. His other fields of expertise include plant ecology, restoration and vegetation classification in barrens and heathlands; urban ecology; and ecosystem services. He is also the co-chair of the Nova Scotia Plant Recovery Team.

LUC BÉLANGER

Luc Bélanger is a retired field biologist and scientific/ conservation program manager, and now an Emeritus Collaborator with the Canadian Wildlife Service. His expertise is related to agroecology, landscape ecology, and conservation biology. He is also a visiting researcher at the Department of Plant Sciences at Université Laval (Québec, Canada) and acts as coordinator for SER-EC.

CHAPTER NEWS

SER AFRICA ELECTS ITS FIRST BOARD

Lynette Munro
SER Africa

The SER-Africa Chapter held its inaugural Board Meeting on 28th September 2021. Zooming in from different parts of Africa, it was a delight to connect, albeit virtually. Discussion revealed that all members are happy to engage using the English language. In addition, everyone is able to access the necessary support in order to connect via the internet, although on occasion, members may drop on and off the call, as was evidenced for one or two of our members during this first meeting.

It was quickly established that there is a significant amount of administration that needs to be dealt with, in order to formalize our structure as the African chapter for the Society for Ecological Restoration, and the team is actively working on finalizing these details.

A brief review of the membership associated with this chapter revealed that the majority of members are "Open Doors", which means income is limited. It also revealed the need to broaden the membership, as it presently reflects the majority of members are from the southern half of the African continent. We agreed on one immediate goal to try to recruit at least one member representing each country in Africa.

We look forward to establishing the SER Africa website, where you will be able to keep a finger on the pulse of developments in this community going forward.

Continued on next page

WELCOME, SER AFRICA BOARD OF DIRECTORS!

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CHAPTER NEWS

PARTNERSHIP FUND AWARDS SECOND ROUND OF GRANTS TO BUILD MEMBERSHIP CAPACITY AND SUPPORT EQUITY AND INCLUSION INITIATIVES

Megan Taylor

SER is excited to announce the recipients of the 2021 Partnership Fund grant awards. Established in 2018, this annual competitive grant program is funded by a portion of membership dues across most membership types and awards grants to chapters and thematic sections for member-driven programs that fulfill SER's mission of advancing the science, practice, and policy of ecological restoration. Past partnership fund grant awards have supported membership recruitment and diversification efforts, scholarship programs, resources, communications, outreach, and advocacy. The 2022 awards vary from $800 to $5,000 USD.

Congratulations to the 2021 Partnership Fund grant recipients!

"I am pleased to congratulate the recipients of the second round of the SER partnership fund. This year's proposals show the same diversity of ideas and commitment to our organization's goals as the previous year. The partnership fund provides support for outreach and leadership development through SER Chapters. SER recognizes the relationship between members and chapters and the importance of the personal interaction to build long-lasting relationships. With this second year of awards, the Partnership Fund has become an important tool to build capacity at the chapter level. I hope that we will assist all chapters with the support they need in the coming years and continue to build our global community of ecological restoration practitioners." – Rolf Gersonde, Chapter Relations Committee Chair

SER EUROPE: CLOSING THE GAP OF SER EUROPE MEMBERSHIP TOWARDS 500 EUROPEAN ECOLOGICAL RESTORERS

SER Europe has set a goal of growing its membership to 500 members by September 2022 through three different campaigns: 1) **Seeding SER-E** will focus on recruiting members in Central and Eastern European and Scandinavian countries; 2) **YOUNG#ER** seeks to motivate students and young professionals to become members by offering mentorship opportunities and rewarding networking activities; and 3) **1+1** harnesses the power of peer-to-peer networking by encouraging current members to invite their colleagues to become members via virtual networking cafes. Partnership grant funds will be used to hire a member recruitment intern, develop promotional videos and membership recruitment social media campaigns, and host a variety of networking events. Towards 500 European Ecological Restorers will not only allow SER-E to gain new members, but will also help to engage and reinvigorate its current membership and elevate SER-E's voice and impact on the European stage.

"Amidst the global moment for ecological restoration, Europe must amplify its contribution and lead by example. The SER Partnership Fund grant is critical to helping SER-E increase its membership base and capacity during this key period." – Jordi Pietx, SER Europe Program Manager

SER NORTHEAST: JUSTICE, EQUITY, AND INCLUSION IN ECOLOGICAL RESTORATION WEBINAR SERIES

SER Northeast is launching a webinar series designed to highlight diverse restoration perspectives from people with different lived experiences and/or from different places. Presentations will focus on the relationship among people, land, and restoration and provide a platform for members to learn from each other. Partnership grant funds will be used to provide invited speakers with honoraria to ensure speakers are compensated for their time and effort. Through its Justice, Equity, and Inclusion in Ecological Restoration Webinar Series, SER Northeast hopes to expand awareness of how acknowledging and valuing diverse perspectives are essential to achieving successful ecological restoration outcomes.

SER NORTHWEST: COMMUNICATIONS INTERN

SER Northwest is hiring a Communications Intern to help improve the quality of the chapter's communications with its membership through information and resource sharing, connecting members to research and volunteer opportunities, and updating the SER Northwest website. Partnership grant funds will be used to help fund the Communications Internship position, which will give SER Northwest the opportunity to engage a student or emerging professional interested in the non-research elements of ecological restoration work. The addition of a Communications Intern to the SER Northwest team will allow the chapter to better support its current membership, increase member engagement, and recruit new members.

"SER-NW is so excited to be able to offer a paid communications-focused internship to a student interested in getting more involved in the northwest restoration community in the coming year! This internship will help our chapter improve communication with members, particularly via our website and email newsletters. We look forward to providing a paid opportunity for an interested student to work with our board to connect with many restoration professionals, learn more about the regional restoration community, and gain skills that can help them succeed in future endeavors." – Regina Wandler, SER Northwest President

SER WESTERN CANADA: SER SCHOLARSHIP FOR AN INDIGENOUS STUDENT STUDYING ECOLOGICAL RESTORATION IN WESTERN CANADA

With the support of the Partnership Fund, SER Western Canada is expanding on its proposal from 2020 to offer a one-year scholarship to an Indigenous student studying restoration, environmental management, and/or ecology in Western Canada for the 2022-2023 academic year. This scholarship is designed to promote and support Indigenous students studying restoration, and to foster collaboration and engagement with local Indigenous communities. The scholarship program also offers mentorship opportunities to student awardees.

The next cycle of Partnership Fund grants will open in July 2022. All active SER Chapters and Sections in good standing are invited to submit a proposal for peer-review to SER's Chapter Relations Committee.

COMINGS AND GOINGS
DAVE POLSTER IS RETIRING

Erin Roberts and Laura Capponi
SER Western Canada and SER

Dave Polster is a plant ecologist with 40+ years' experience in vegetation studies, reclamation, and invasive species management. He became a lifetime member of SER in 2019 and has given years of service on the SER Global and SER Western Canada Boards of Directors and other committees. In a moment of reflection and appreciation, we humbly announce Dave Polster's retirement from the restoration community.

Dave graduated from the University of Victoria with an Honors Bachelor of Science degree in 1975 and a Master of Science degree in 1977. He developed a wide variety of reclamation techniques for mines, industrial developments, and steep/unstable slopes, as well as techniques for the re-establishment of riparian and aquatic habitats. He led his own consulting firm in British Columbia, Canada for many years, effectively applying these techniques to a variety of landscapes in western Canada. Dave has also hosted dozens, if not hundreds, of bioengineering and ecological restoration workshops and courses throughout western Canada (and around the world), helping to educate and pass on valuable skills to the next generation of restoration professionals. He wrote course manuals to support his teaching, authored numerous papers, and taught graduate level courses on these topics. His legacy and teachings will live on through the hearts and minds of restoration professionals for many years to come.

Dave's involvement in the SER organization is extraordinary. He helped found the SER British Columbia Chapter in 2000, oversaw its expansion to the Western Canada Chapter, and served as the Treasurer for SER-WC until his retirement. Dave has been an invaluable member to SER-WC over his decades of service, notably being a key coordinator for the large conferences hosted in our region (Victoria 2014 and in Burnaby in 2018). Dave received the John Rieger Award in 2013 from SER and was profiled as a Members in Action in 2020.

Dave has given an immeasurable amount to our community and his retirement is due to health issues. We are incredibly grateful for all that he has done for SER-WC and SER over the years. He and his family have been generous to those in need but now face unexpected financial difficulties. SER-WC is raising money to honor his gifts to our field and our community, and to support them in their time of need. You may contribute here.

Dave receiving the John Rieger Award from then SER Board Chair Cara Nelson.

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